

**CHAPTER 14**  
**PO 324 – SURVIVE WHEN LOST**





## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 1

#### EO M324.01 – CONSTRUCT AN IMPROVISED SHELTER

Total Time:

90 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Construct an example of each type of shelter. If adequate materials are unavailable, use a picture to illustrate the shelter.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TP 1 to introduce factors to consider when selecting a site for an improvised shelter and present background information.

Demonstration and performance was chosen for TP 2 as it allows the instructor to explain and demonstrate constructing survival shelters while providing an opportunity for the cadets to practice under supervision.

### INTRODUCTION

#### REVIEW

The review for this lesson will be from EO M224.01 (Identify Immediate Actions To Take When Lost, A-CR-CCP-702/PF-001, Chapter 14, Section 1).

#### FIVE ELEMENTS OF SURVIVAL

After successfully completing the S.T.O.P. (Sit, Think, Observe, Plan) action and recognizing a survival situation, the lost individual shall take inventory of all the food and equipment on hand and proceed to procure the five elements of survival. These are listed in order of priority:

1. **Attitude.** Maintaining a positive attitude is essential. One can survive by staying calm, using all available resources, and prioritizing personal needs.
2. **Shelter.** A shelter is designed to provide protection from the weather and, depending on the conditions, protect a person from either hot or cold temperatures. Hypothermia and hyperthermia are two of the greatest dangers in a survival situation. A proper shelter can help prevent these from occurring. In a desert

scenario, for example, the goal is to stay under a shelter, shaded from the effects of the sun. In cold weather situations, the shelter will provide insulation.

3. **Water.** Water is the most essential nutrient for the human body. Even when thirst is not extreme it can dull the mind. Lack of water will slowly degrade the ability to survive. With adequate shelter and water one can survive for weeks.
4. **Fire.** In a survival situation, fire provides heat and light, and signals for rescuers. Cold weather not only lowers the ability to think, but it also lowers one's will to do anything. Even a few degrees drop in body temperature can affect the ability to make reasonable decisions.
5. **Food.** Individuals in good physical condition can go for many days or even weeks without food. The goal in a wilderness survival situation is to be located in the shortest time possible, so in most cases one will be located long before food becomes a survival issue. However, it is always important to prepare for the worst and find ways to supply the body with substance, through berries, fish, animals, birds, etc.

### **QUESTIONS**

- Q1. What are the five elements of survival?
- Q2. What is the one essential nutrient the body requires to function?
- Q3. What does a shelter provide?

### **ANTICIPATED ANSWERS**

- A1. Attitude, shelter, water, fire and food.
- A2. Water.
- A3. Shelter provides protection from the weather and depending on the conditions, protects you from either hot or cold temperatures.

### **OBJECTIVES**

By the end of this lesson the cadet shall be expected to construct an improvised shelter.

### **IMPORTANCE**

It is important for cadets to know how to construct improvised shelters as a method of preventing boredom, as well as helping to combat the seven enemies of survival. Having a shelter that provides protection from the elements and is a source of motivation will increase chances of survival.

**Teaching Point 1****Select a Shelter Site**

Time: 25 min

Method: Interactive Lecture



The instruction area for this lesson should match the factors of site selection as detailed in TP 1 under terrain and location considerations.

By the end of this lesson cadets will be expected to construct an improvised shelter. Introduce this TP by presenting the cadets with a scenario where they have become lost in the field and they have only a few hours of daylight left.

Shelter is the first concern. The location chosen to demonstrate the selection of a site should meet most if not all considerations. Ask the cadets what they think about the location. These questions should get them thinking about considerations when choosing a site.

Continue this lesson by identifying the rest of the factors and considerations described in TP 1.

During the summer months the need for shelter is not thought of as a great concern. It should be, as the weather could change drastically, especially in hilly or mountainous areas. In winter, a survivor may be tempted to set up a fire first rather than tackle the job of building or finding a shelter. When discussing the five elements of survival, shelter is the second survival element. A shelter provides protection from the elements, particularly wind and precipitation. Shelters improve morale by providing comfort, security and a sense of accomplishment.

**TERRAIN CONSIDERATIONS**

There are several factors that must be considered when selecting a site. Locations to construct a shelter should meet certain criteria, to avoid being awoken during the night due to an overlooked problem.

**Select an Area Large Enough for the Shelter.** Possible sites that are perfect in their natural form may be too small to accommodate one person. Ensure that the site can comfortably, considering the situation, fit oneself for the duration of the survival situation.

**Select an Area That is Elevated and Provides Drainage.** A site should provide dry footing and drainage in the case of rain. Keep back from rivers or lakes which may flood after a rain fall.

**Identify Sheltered Areas That Protect From Wind, Rain and Sun.** Shelter from wind, rain and sun can be sought from boulders, hillsides, trees or other available sources. In the summer, a little breeze will reduce the number of insects and can keep one cool during hot summer days. During winter, a shelter will separate the body from wind and snow and provide warmth. If the entrance of the shelter faces leeward (away from the wind), rain or snow will swirl over and drop inside. If the entrance faces windward, smoke and ashes from the fire will blow into the shelter. Place the back of the shelter into the wind.

**LOCATION CONSIDERATIONS**

**Proximity to a Water Source.** The availability of a nearby water source will reduce the amount of energy expended while collecting water. A source of water may also provide fishing grounds that may supply food.

**Proximity to a Fuel Source.** Situating a shelter near a fuel source will reduce the amount of energy required to gather fuel for the fire.

**Proximity to Building Materials.** Although the shelter is an emergency shelter there is always the need to make what is natural more livable. Situating the shelter near building supplies will reduce the amount of energy required to build and secure the shelter.

**Proximity to Animal Trails or Holes.** In the wild, the food chain is active. Beware of locating your shelter near the natural paths animals create. Where there are animals, there may be danger.

**An Area That Can be Seen From the Air.** When lost in a wilderness area it is important to establish contact with or attract the attention of searchers and rescuers. Staying in a site that is easily seen from the air will increase the chance of being rescued.

**An Entrance That is Sheltered From the Wind and Preferably South Facing.** Situating the shelter so the prevailing wind is blowing against the rear will help ensure the occupant will be able to maintain some heat inside. Face the entrance, if possible, into the sun allowing sunshine into the shelter. This provides heat to the occupant.

### TIME REQUIRED TO BUILD THE SHELTER

Depending on the amount of time available, one may choose to construct a simple emergency shelter for the night. Estimate the amount of daylight left when constructing a shelter by looking at the horizon. If the sun is near the horizon, there is not much daylight left. One technique is to measure the number of hand widths between the sun and the horizon. Each hand will represent approximately one hour.

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What are the terrain considerations one should take into account when selecting a shelter site?
- Q2. What are three location considerations that one should take into account?
- Q3. Which way should the entrance of a shelter face?

### ANTICIPATED ANSWERS

- A1. Select an area that is large enough for the shelter, elevated and provides drainage, and helps protect from the wind, rain and sun.
- A2. The location should be in close proximity to a water source, a fuel source, building materials, and in an area that can be seen from the air. It should also be far from animal trails or holes.
- A3. The entrance should face the leeward side (away from the wind).

---

### Teaching Point 2

### Demonstrate and Have the Cadet and a Partner Construct a Two Person Survival Shelter

Time: 60 min

Method: Demonstration and Performance

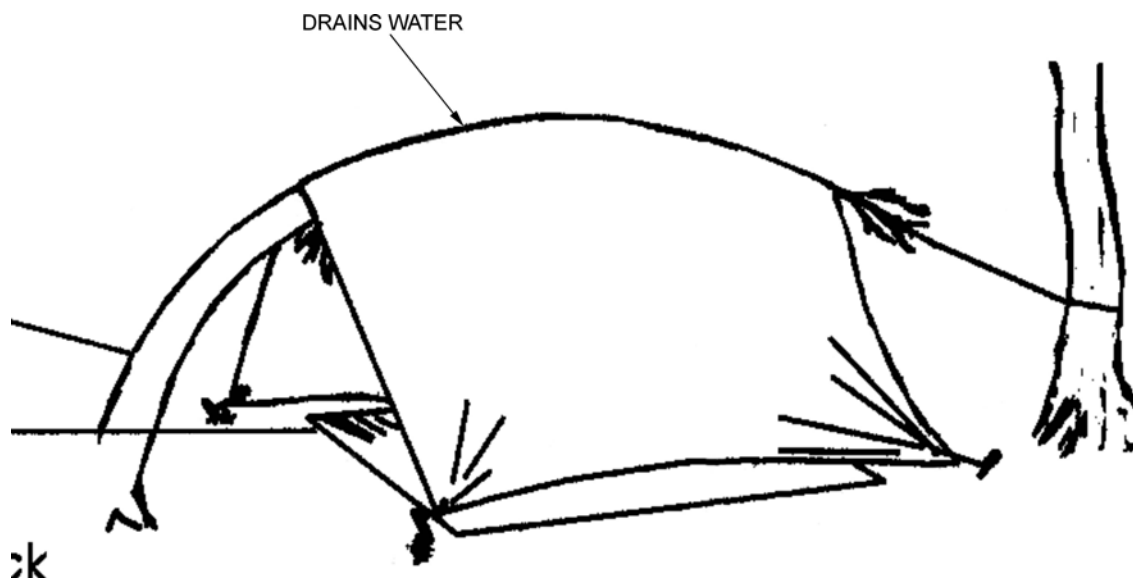
---



Cadets will construct the selected shelter using a groundsheet in place of a bough roof.

## BENT TREE SHELTER

A bent tree shelter is prepared using a young sapling with a natural bend. Bend the tree and attach it to a second tree or secure to the ground with pegs. Place a groundsheet over the tree to protect the area from the weather. The curve of the sapling will drain water away from the shelter.

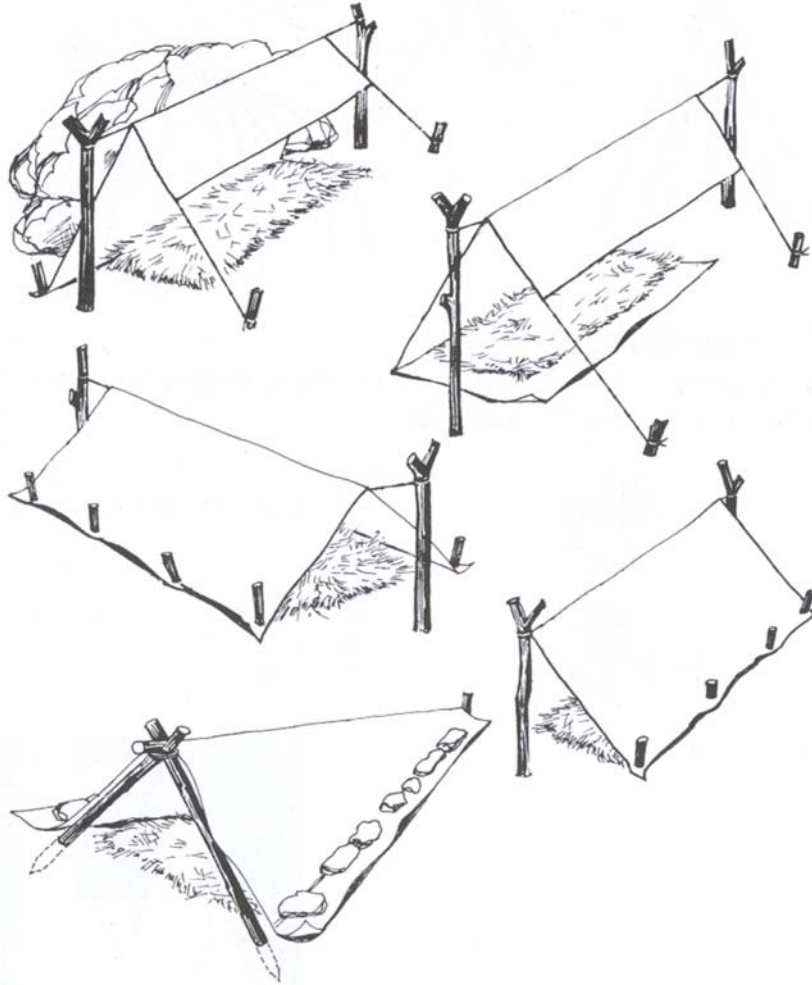


*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 98)*

Figure 14-1-1 Bent Tree Shelter

## LEAN-TO WITH PONCHO

A poncho or groundsheet is perfect for constructing a lean-to. There are different variations on this shelter. The simplest form of a lean-to is secured to the ground and raised to allow enough head room for the tallest occupant to sit up. The groundsheet should be pulled tight between two trees or between two supports.

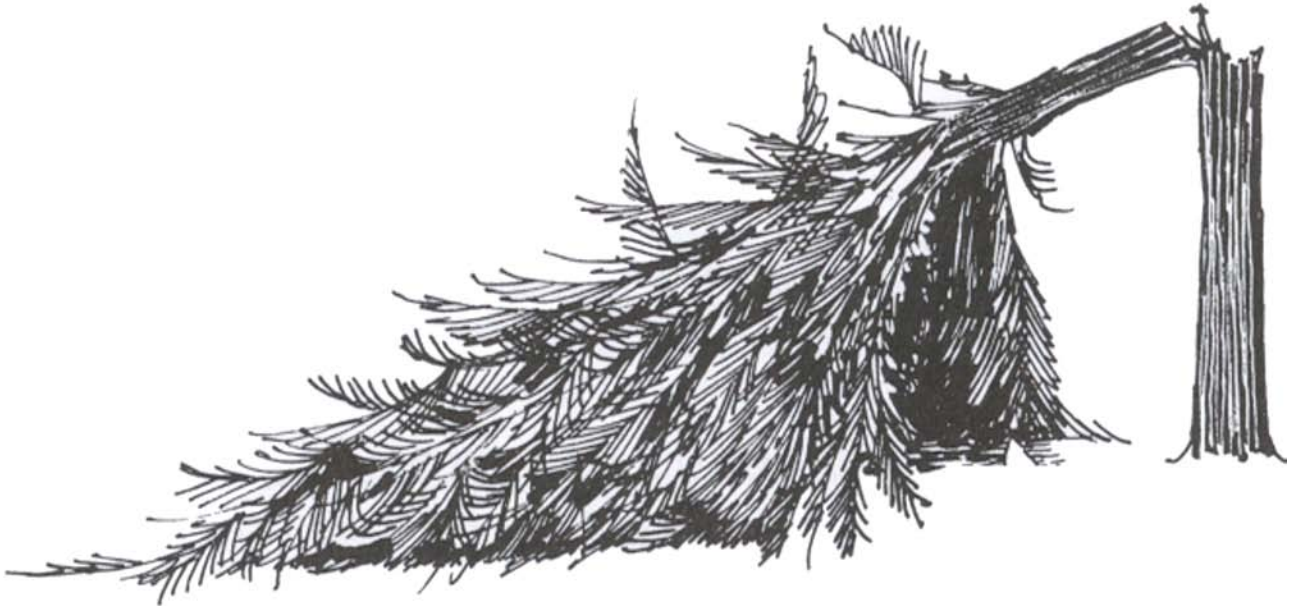


*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 245)*

Figure 14-1-2 Lean-To With Poncho

**BOUGH SHELTER**

A bough shelter, also known as a lopped tree shelter, makes use of a fallen tree. With some preparation this shelter provides good cover from the elements. The fallen tree branches are cut from the centre of the tree, creating a hollow for shelter. The excess branches are woven through the remaining tree branches, making the shelter weatherproof.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 245)*

Figure 14-1-3 Bough Shelter

## ROOT SHELTER

Protruding roots act as the frame for the shelter. Spreading roots and earth act as a wind barrier. Ideally a root shelter should be at a right angle to the wind. Digging into the remaining root system, or filling in the sides between the roots will make the shelter more effective.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 98)*

Figure 14-1-4 Root Shelter

---

## ACTIVITY

Time: 40 min



Take time at the beginning of this activity to show the cadets the pre-constructed improvised shelters.

## OBJECTIVE

The objective of this activity is for the cadets to construct an improvised shelter.

## RESOURCES

- Groundsheet (one per cadet),
- Twine,
- Pocket knife (one per two cadets), and
- Sticks for pegging.

**ACTIVITY LAYOUT**

An area in which each pair of cadets can build an improvised shelter.

**ACTIVITY INSTRUCTIONS**

1. Divide cadets into pairs (same gender).
2. Assign each pair the required resources.
3. Have cadets gather materials for building a shelter.
4. Have cadets construct a shelter. Cadets will check their shelters to ensure:
  - a. there is room for two people to sleep and sit upright;
  - b. the lines are secure; and
  - c. it is waterproof.
5. Inspect the cadets' shelter to ensure it is well constructed and safe to sleep in.
6. Tear down shelters and distribute any materials back into the area.

**SAFETY**

- Cadets will respect boundaries for the activity.
- Cadets will ensure safe tool use at all times.

---

**CONFIRMATION OF TEACHING POINT 2**


---

The cadets' participation in the activity will serve as the confirmation of this TP.

---



---

**END OF LESSON CONFIRMATION**


---

The cadets' construction of an improvised shelter will serve as the confirmation of this lesson.

---



---

**CONCLUSION**


---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 6 (324 EC-01).

**CLOSING STATEMENT**

Knowing how to construct an improvised shelter in a survival situation will assist in maintaining the cadet's self-confidence and help in preventing the seven enemies of survival.

**INSTRUCTOR NOTES/REMARKS**

Prior to conducting this lesson the instructor shall locate an example of each type of shelter.

It is understood that seasonal differences and location may restrict the ability to construct all shelters; however cadets should be provided with as many visual examples as possible.

---

**REFERENCES**

---

- C2-004 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.
- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 2

### EO M324.02 – COLLECT DRINKING WATER

Total Time:

30 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TPs 1 and 3 to give background information and introduce the cadets to methods of collecting water.

Demonstration was chosen for TP 2 as it allows the instructor to explain and demonstrate collecting water while providing an opportunity for the cadets to practice the skill under supervision.

### INTRODUCTION

#### REVIEW

N/A.

#### OBJECTIVES

By the end of this lesson the cadet shall be expected to collect water using precipitation, dew or plant condensation.

#### IMPORTANCE

It is important for the cadets to understand the importance of collecting water in a survival situation, as thirst is one of the seven enemies of survival. As fresh water may not be readily available, cadets will have to use other sources to find water.

**Teaching Point 1****Identify Methods of Finding Water**

Time: 5 min

Method: Interactive Lecture



This TP is designed to give cadets an introduction to different methods of finding water.

Water is the one thing that almost everyone takes for granted. People are used to turning on the tap and having an endless supply of water. Until water shortages or drought occur it is scarcely thought about. Water is universally important and should be respected. It is essential to life and all life contain it.

In survival situations, it is important to conserve potable water and seek a freshwater source.



**Potable Water.** Water of higher quality, suitable for drinking.

**OBSERVING INSECTS, AMPHIBIANS, MAMMALS, AND BIRDS**

When in a survival situation, observing the behavior of mammals is the best indicator of the location of water.

**Insects**

Insects are good indicators of water. If bees are present, water is usually within several kilometres of your location. Bees fly a maximum of 6.5 km (4 miles) from their nests or hives. They do not have regular watering times, but drink when thirsty.

Ants are dependant on water. An ant nest will often be close to a source of water. A column of ants marching up a tree is likely going to a small reservoir of trapped water.

Most flies keep within 90 m (100 yards) of water. If mosquitoes and flies are swarming, there is most likely a good source of water close by.

**Amphibians**

Amphibians are not an indicator of water. They collect dew and draw moisture from prey.

**Mammals**

Most mammals require water regularly. Grazing mammals are usually close to water. Converging game trails often lead to water; follow them downhill.

**Birds**

Grain eaters, such as finches and pigeons are never far from water. They drink at dawn and dusk. When they fly straight and low, they are heading for water. When they return from water they fly from tree to tree, resting frequently. By plotting their direction, water can be found.

Water birds can travel long distances without stopping to feed or drink; they do not necessarily indicate water nearby.

Hawks, eagles and other birds of prey draw water from their victims and cannot be taken as a sign that water is nearby.

## SEARCHING FOR PLANTS

Watch for green leaf plants and trees that require a lot of water. These plants include cattails, bulrush, elderberries, and reeds. Trees include cottonwood, poplars, greasewood and willows. This type of growth indicates a high water table. These plants may be located on a dry river bed. To get to the water, dig into the ground 30–60 cm (1–2 feet) and water will accumulate in this pit.

An alternate place to search for water is at the base of a cliff where there is vegetation.

## SEARCHING IN VALLEY BOTTOMS

Look in valley bottoms where water will naturally drain. If there are no obvious streams or pools, look for patches of green vegetation and dig there. There may be water just below the surface, which will collect in the hole. Digging in gullies and dry streambeds may reveal a spring beneath the surface, especially in gravel areas. In mountain valleys, look for water trapped in crevices.



Pools or streams with no vegetation growing are likely to be polluted by a high concentration of minerals or chemicals that have been leached from the bedrock or close to the surface.

Any water collected from pools should be boiled prior to drinking.

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What type of birds do not necessarily indicate that there is water nearby?
- Q2. What are the best indicators of water?
- Q3. What types of plants should you look for when seeking a water source?

### ANTICIPATED ANSWERS

- A1. Water birds can travel long distances without stopping to feed or drink so they do not necessarily indicate water nearby. Hawks, eagles and other birds of prey get water from their victims and cannot be taken as a sign that local water is nearby.
- A2. Mammals.
- A3. Look for green leaf plants and trees that require a lot of water. These plants include cattails, bulrush, elderberries, and reeds. Trees include cottonwood, poplars, greasewood, and willows.

---

### Teaching Point 2

### Explain and Demonstrate Methods of Collecting Water

Time: 15 min

Method: Demonstration

---



As each method is identified, explain and demonstrate it to the cadets.

Collecting water can be difficult and it is important to take into consideration the time of year and the weather when looking for and collecting water.

## DIGGING WELLS

Wells are dug in hopes of finding a reliable and ample supply of water. If a well is being dug in a survival situation, it must be done when the survivor has lots of strength and stamina.

Wells cannot be dug much deeper than the water table because it will continuously fill with water. In a dry season, when the water table falls, the well depth can be increased.



**Water Table.** The upper limit of groundwater that occurs naturally.

An example of a simple well is the soil moisture pit.



### Soil Moisture Pit

1. Dig a pit 2 m x 2 m deep x 1 m (6.5 feet x 6.5 feet x 3.2 feet).
2. Take an empty water bottle and cut the top off.
3. Make a small hole in the centre of the plastic for the bottle.
4. Cover the the pit with a sheet of plastic wrap.
5. Place a small rock on the plastic wrap over the water bottle.
6. Let the sun do its job.

The water bottle will fill at least once a day, which is enough to keep you alive. This method will most likely not work in cooler weather.

## COLLECTING PRECIPITATION



Precipitation can be in the form of rain, snow, hail, sleet, dew and frost.

Rainwater collected in clean containers or in plants is usually safe for drinking. However, purify water from lakes, ponds, swamps, springs, or streams, especially water found near populated areas or in the tropics.

Acid rain, or polluted rain can pollute soil, but generally all rain is drinkable.

Use as many containers as possible. Plastic, wood, bark and holes dug in clay can be used to catch water.

## COLLECTING DEW

Although dew does not provide a large quantity of water, it is still a good source of water. Dew accumulates on grass, leaves, rocks and equipment at dawn and dusk. This is also when dew should be collected before potential freezing or evaporation.

Heavy dew can provide water. Tie rags or tufts of fine grass around your ankles and walk through dew-covered grass before sunrise. As the rags or grass tufts absorb the dew, wring the water into a container. Repeat the process until you have a supply of water or until the dew is gone. Australian natives sometimes mop up as much as a litre an hour this way.

## COLLECTING CONDENSATION



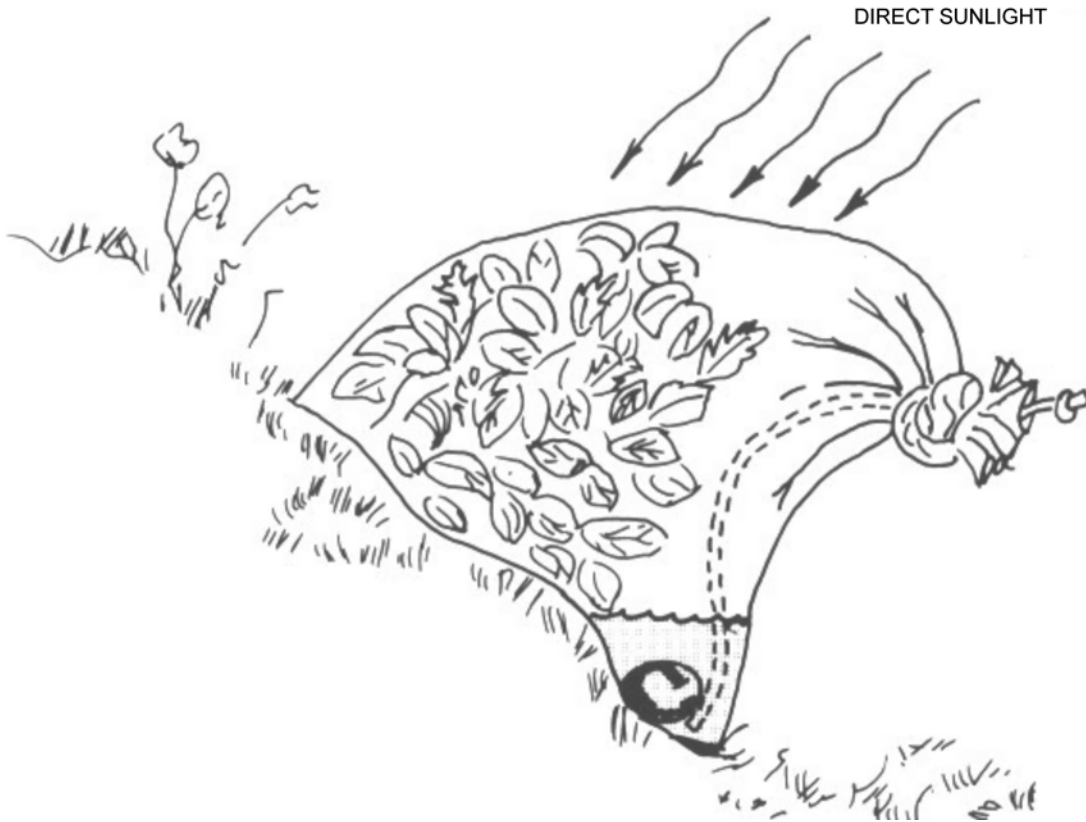
**Condensation.** The process of water vapour in the air turning into liquid. Drops on the outside of a cold glass are condensed water. Condensation is the opposite of evaporation.

### Vegetation Bags

A vegetation bag is quite simply a container to collect condensation from vegetation. A section of shrubs, bushes and trees are covered in a vegetation bag and the condensation from the sun is collected within the bag.

To construct a vegetation bag, one will need a clear plastic bag and an ample supply of healthy, non-poisonous vegetation. A 1- to 2-m (4- to 6- foot) section of surgical tubing is also helpful.

1. Open the plastic bag and fill it with air.
2. Fill the bag one half to three quarters full with lush green vegetation. Be careful not to puncture the bag.
3. Place a small rock or similar item into the bag. If you have surgical tubing, slide one end inside and toward the bottom of the bag. Tie the other end with an overhand knot.
4. Tie off the bag as close to the opening as possible.
5. Place the bag on a sunny slope so that the opening is slightly higher than the bag's lowest point.
6. Position the rock and surgical tubing at the lowest point in the bag.
7. For best results, change the vegetation every two to three days.
8. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. If no tubing is used, loosen the tie and drain off available liquid. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the vegetation.



G. Davenport, *Wilderness Survival* (2<sup>nd</sup> ed), Stackpole Books (p. 144)

Figure 14-2-1 Vegetation Bag

## Transpiration Bags



**Transpiration.** Process by which water absorbed by plants, usually through the roots, is evaporated into the atmosphere from the plant surface, such as leaf pores.

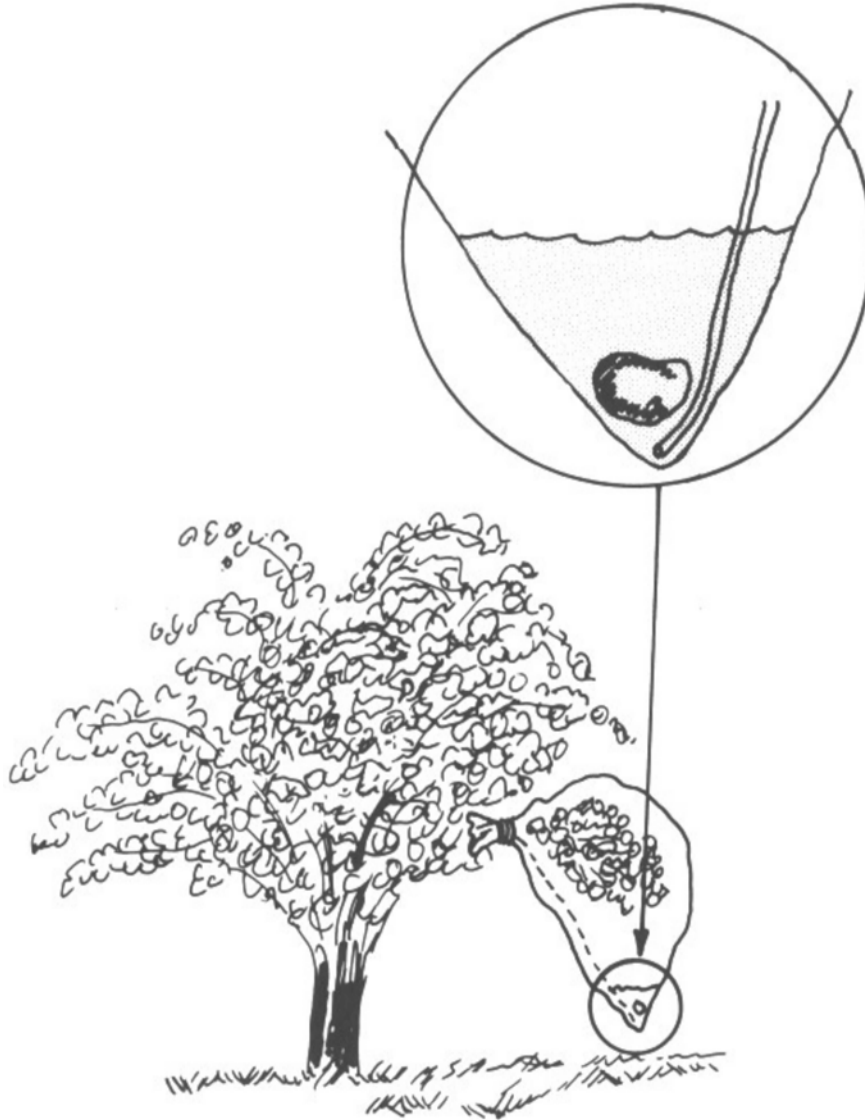
A transpiration bag is better than a vegetation bag because the same vegetation can be reused allowing time for it to rejuvenate. Water transpiration bags are beneficial because, they yield more, are easier to assemble, and often have a better taste.

To construct a transpiration bag, one will need a clear plastic bag and a non-poisonous bush or tree.

A 1- to 2-m (4- to 6- foot) section of surgical tubing is also helpful.

1. Open the plastic bag and fill it with air.
2. Place the bag over the lush leafy vegetation of a tree or bush, being careful not to puncture the bag. Be sure the bag is on the side of the tree or bush with the greatest exposure to the sun.
3. Place a small rock or similar item into the bag's lowest point, and if you have surgical tubing, place one end at the bottom of the bag next to the rock.
4. Tie the other end of the tubing with an overhand knot.
5. Tie off the bag as close to the opening as possible.

6. Change the bag's location every two to three days to ensure optimal outcome and to allow the previous site to rejuvenate so it might be used again later.
7. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the tree or bush.



*G. Davenport, Wilderness Survival (2<sup>nd</sup> ed), Stackpole Books (p. 144)*

Figure 14-2-2 Transpiration Bag

---

## CONFIRMATION OF TEACHING POINT 2

---

### QUESTIONS

- Q1. How does the water table affect well depth?
- Q2. How is dew collected?
- Q3. What are the benefits of a transpiration bag?

## ANTICIPATED ANSWERS

- A1. Wells cannot be dug much deeper than the water table.
- A2. Dew is collected by tying rags or tufts of long grass to your ankles and walking through dew-covered grass before sunrise.
- A3. Transpiration bags are beneficial because they have a high yield, are easier to assemble, and often have a better taste.

---

### Teaching Point 3

### Explain Methods of Transporting Water

Time: 5 min

Method: Interactive Lecture

---



This TP is designed to introduce the cadets to the different methods of collecting water in a survival situation.

Water in a survival situation may require transportation from one location to another. If possible, having or finding a water container which can hold a minimum of one litre with a wide-mouth opening is ideal.

Improvised water containers are sometimes necessary. Anything sturdy can hold water.

### STORAGE CASE

Any container, including the case that holds a survival kit can be used. The storage case for matches, bags that contain food, and metal cases can hold water.

### CONDOM

Condoms are great for water storage provided they are non-lubricated and non-spermicidal. In addition, a condom will have to be placed in a scarf or other forming structure to give it extra strength.

### PONCHO

A poncho is made of a great material to transport water and is already watertight. The poncho can be folded, bent and rolled into shapes to collect and carry water. Create a bowl from the poncho by securing the corners to tree limbs.

### NATURAL CONTAINER

Natural containers such as hollowed-out wood pieces are excellent for storing water. The wood in the container will give strength and stability for larger quantities of water. Large leaves can be folded and held in the hand for smaller quantities of water.

### PLASTIC BAG

Plastic bags are a useful piece of equipment in survival situations. A large plastic bag such as a large polythene bag about 200 cm by 60 cm (7 feet by 2 feet) can be used in many ways, particularly to collect large amounts of water.

---

**CONFIRMATION OF TEACHING POINT 3**

---

**QUESTIONS**

- Q1. What are different ways to transport water?
- Q2. What is the benefit of using a poncho for transporting water?
- Q3. What are examples of natural containers?

**ANTICIPATED ANSWERS**

- A1. Transporting water can be done using a storage case, condom, poncho, natural container and plastic bag.
- A2. A poncho is beneficial to transport water as it is already watertight.
- A3. Natural containers are hollowed-out wood pieces and large leaves.

---

**END OF LESSON CONFIRMATION**

---

**QUESTIONS**

- Q1. What is potable water?
- Q2. What is the water table?
- Q3. How is a transpiration bag constructed?

**ANTICIPATED ANSWERS**

- A1. Potable water is water of higher quality which is suitable for drinking.
- A2. The water table is the upper limit of groundwater that occurs naturally.
- A3. To construct a transpiration bag:
1. Open the plastic bag and fill it with air.
  2. Place the bag over the lush leafy vegetation of a tree or bush, being careful not to puncture the bag. Be sure the bag is on the side of the tree or bush with the greatest exposure to the sun.
  3. Place a small rock or similar item into the bag's lowest point, and if you have surgical tubing, place one end at the bottom of the bag next to the rock.
  4. Tie the other end of the tubing with an overhand knot.
  5. Tie off the bag as close to the opening as possible.
  6. Change the bag's location every two to three days to ensure optimal outcome and to allow the previous site to rejuvenate so it might be used again later.
  7. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the tree or bush.

---

**CONCLUSION**

---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 6 (324 EC-02).

**CLOSING STATEMENT**

Collecting water may mean the difference between survival and death. Knowing how and where to collect water will assist the cadets in combating the enemies of survival and keep them healthy and hydrated during the experience.

**INSTRUCTOR NOTES/REMARKS**

Cadets will be required to collect water during the bivouac FTX.

---

**REFERENCES**

---

- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2002). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.
- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-150 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival* (2<sup>nd</sup> ed.). Mechanicsburg, PA: Stackpole Books.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 3

### EO M324.03 – LIGHT A FIRE WITHOUT MATCHES

Total Time:

120 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy instructions located at Annexes A to D for each cadet.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TP 1 to orient cadets to methods of lighting a fire without matches and generate interest in the topic.

Demonstration was chosen for TP 2 as it allows the instructor to demonstrate and explain different methods of lighting a fire without matches.

Performance was chosen for TP 3 as it allows the cadets to practice lighting a fire without matches while under supervision.

### INTRODUCTION

#### REVIEW

The review for this lesson is taken from EO M224.05 (Prepare, Light, Maintain and Extinguish a Fire, A-CR-CCP-702/PF-001, Chapter 14, Section 5).



Before conducting training in provincial or national parks, one must confirm that fires are allowed. Open fires are normally only allowed in designated areas. Open fires are fires that are not contained in a structure or housing that ensures the fire will not spread (eg, barrel or fireplace).

Each park will clearly state their fire regulations and restrictions.

Parks commonly follow the Fire Weather Index, which provides an assessment of relative fire potential that is based solely on weather observations. Check with park administration for rules and regulations when planning to light fires within the park boundaries.

**CANADIAN FOREST FIRE DANGER RATING SYSTEM (CFFDRS)**

The CFFDRS is Canada’s national system for rating forest fire danger. The system evaluates and integrates data to help managers predict woodland fire potential.

The CFFDRS provides an index (as illustrated in Figure 14-3-1) on how easy it is to ignite vegetation, how difficult a fire may be to control, and how much damage a fire may do.

BLUE	GREEN	YELLOW	ORANGE	RED
LOW	MODERATE	HIGH	VERY HIGH	EXTREME

*Director Cadets 3, 2007, Ottawa, ON: Department of National Defence*

Figure 14-3-1 CFFDRS Fire Index


**Low.** Low chance of fires occurring. Fires that do occur are likely to be self-extinguishing and new ignitions are unlikely.

**Moderate.** Moderate chance of fires starting. These fires are creeping or gentle surface fires. They are easily contained by ground crews with water pumps.

**High.** High chance of fire starting. These fires are challenging for ground crews to handle and heavy equipment (tanker trucks and aircraft) are often required to contain the fire.

**Very High.** Very high chance of a fire starting. These fires are fast spreading and are of high intensity. They are hard to control and require aircraft support.

**Extreme.** The environment is very dry and chances of fire are extreme. These fires are fast spreading, of high intensity and very difficult to control.



Review this information by looking up the CFFDRS on the Internet at <https://nofc1.cfsnet.nfis.org/mapserver/cwfis/index.phtml>.

**MAINTAINING A SAFE FIRE SITE**

Prior to starting a fire, ensure fire safety equipment is available.

**Shovel.** A shovel provides a means to smother the fire. Shovelling dirt, gravel or sand on a fire reduces oxygen, thus extinguishing the fire.

**Rake.** A rake allows one to disperse burning material away from the fire. A rake can also be used to smother the fire by raking dirt, gravel, or sand onto the fire.

**Pail Filled With Sand or Water.** A pail of water or sand can be immediately thrown over a fire if it starts to get out of control and can be refilled as many times as required.

**Fire Extinguisher.** A fire extinguisher is designed to tackle a fire for a short duration. It is very effective in extinguishing a small fire that is getting out of control.

**CHOOSING A SAFE FIRE LOCATION**

Before beginning to build a fire, think about the location. It should be placed for maximum warmth and convenience without sacrificing safety. Consider the following when choosing a safe fire location:

- The fire site should be high and dry.
- The area should be sheltered and away from windy areas to reduce flare ups.
- The site should be clear of over-hanging boughs and branches.
- All combustible materials shall be cleared from the fire site.
- The site should be 1.8 m (4–6 feet) from the shelter entrance.

## OBJECTIVES

By the end of this lesson the cadet shall follow the process to light a fire without matches.

## IMPORTANCE

It is important for cadets to be able to light a fire without matches. The second element of the survival pattern is fire, which provides heat, light and comfort. A fire also provides a means to cook food, scare away animals and signal rescuers if the cadet becomes lost and is in a survival situation without a survival kit.

---

### Teaching Point 1

### Identify Methods of Lighting a Fire Without Matches

Time: 20 min

Method: Interactive Lecture

---



This information in this TP is background information relating to the different methods of lighting a fire without matches.

## ALTERNATIVE METHODS OF LIGHTING A FIRE

In a survival situation, there may not be matches available to light a fire. In these situations it is necessary to find alternative methods to light a fire.

### Bow and Drill

The bow and drill uses friction and pressure to heat a piece of wood and create a fine black powder that will light tinder. This method takes practice, but can easily be repeated over and over with materials found in the environment.

### Fire Saw

The fire saw is a method that involves rubbing the bevelled edge of a stick in the notch of a fireboard. This method is commonly used in the jungle or a moist environment.

### Flint and Steel

This is the best method to light tinder aside from matches. The flint and steel method uses shavings that have been struck from flint by a sharp knife to ignite timber.



A magnesium fire block is similar to flint and steel but incorporates a chunk of magnesium in aluminium that can be shaved off to assist in lighting. Cut or scratch shavings off the block which are ignited by striking the back of a knife on the flint rod. Magnesium generates tremendous heat. Be careful that no shavings land on skin or clothing.

## Sun and Glass

A convex lens (a lens where the centre bulges out) from binoculars, a lens from a camera or telescope, the bottom of an old pop bottle or can, a piece of ice or a magnifying glass may be used to light tinder with the help of the sun.

Fire can be created from an old pop can and a chocolate bar. The bottom of the pop can is shaped like a lens but is not very reflective. Polish the bottom of the can with chocolate, like polishing a pair of boots until it has a mirror finish. Use the sun to focus the light onto tinder. This method takes a lot of time, but it works.

---

### CONFIRMATION OF TEACHING POINT 1

---

#### QUESTIONS

- Q1. What are different methods of lighting a fire?
- Q2. How does the bow and drill method work?
- Q3. How does the flint and steel method work?

#### ANTICIPATED ANSWERS

- A1. Bow and drill, fire saw, flint and steel and sun and glass are different methods of lighting a fire.
- A2. The bow and drill method uses friction and pressure to heat a piece of wood and create a fine black powder that will light tinder.
- A3. The flint and steel method uses shavings that have been struck from flint by a sharp knife to ignite timber.

---

#### Teaching Point 2

#### Demonstrate Methods of Lighting a Fire

Time: 30 min

Method: Demonstration

---



Demonstrate the following methods of lighting a fire. There is no requirement to create fire, but each method should be explained and demonstrated.

#### Bow and Drill (Spindle)

The following steps are required to light a fire with a bow and drill:

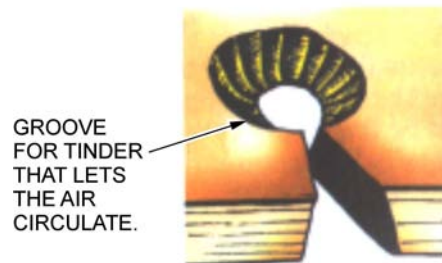
1. Collect the following materials:
  - a. one hardwood shaft 2 cm thick and 30 cm long,
  - b. one softwood base 5 cm wide, 20 cm long and 2 cm thick,
  - c. one bearing block or socket,
  - d. one stick 60–90 cm long to make the bow (green wood from a sapling is best), and
  - e. one piece of cord.
2. Cut a groove in the bearing block or socket 3–5 cm deep for the hardwood shaft to fit (as illustrated in Figure 14-3-2).



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

Figure 14-3-2 Bearing Block

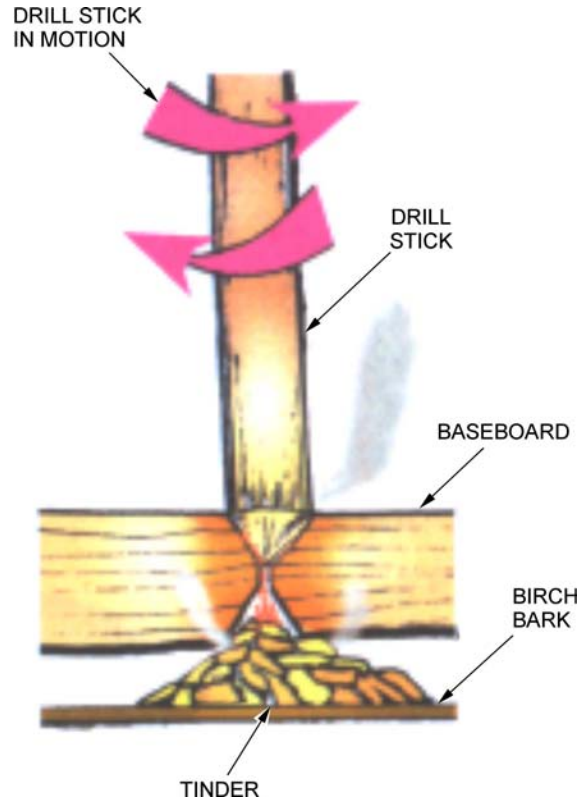
3. Cut a groove into the softwood base in which the hardwood shaft will spin. The groove should be open on one end for the heat and embers to escape (as illustrated in Figure 14-3-3).



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

Figure 14-3-3 Softwood Base

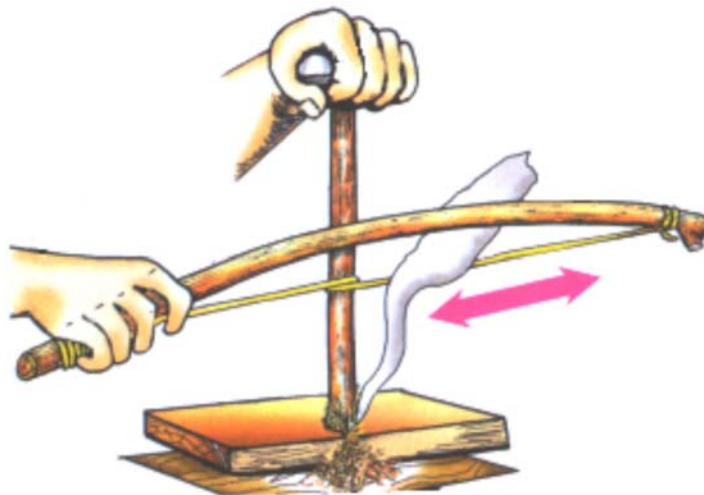
4. Carve one end of the hardwood shaft into a small point.
5. Place tinder in the opening in which the embers will fall.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

Figure 14-3-4 Drill

6. Wrap the bow around the hardwood shaft and place it into the groove of the softwood base.
7. Place the bearing block on the top of the shaft.
8. Slowly at first, start a sawing motion with the bow back and forth so the hardwood shaft spins back and forth.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

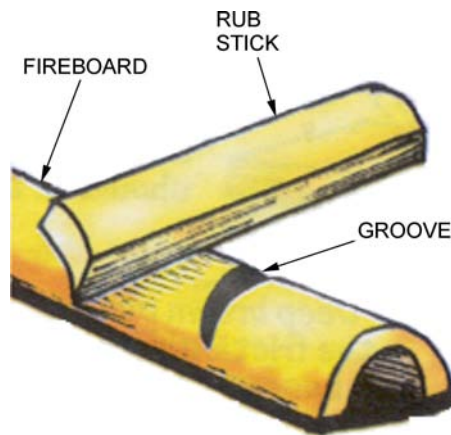
Figure 14-3-5 Fire Bow and Drill

9. Maintain a constant motion back and forth; consistency is more important than speed.
10. Once smoke appears increase speed and look for embers to start to appear.
11. Once the tinder begins to smoke, stop and lightly blow on the tinder to start combustion.
12. When the tinder lights, apply gathered kindling and fuel as required.

### FIRE SAW

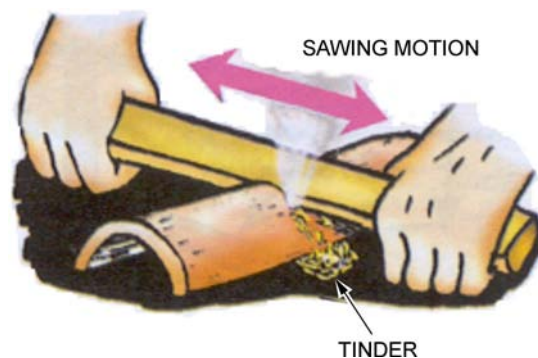
The fire saw consists of two pieces of dry wood: one rubbed vigorously against the other in a sawing motion.

Use a half a piece of split wood as the fireboard and a piece of softwood as a rub stick. Good tinder for the fire saw is material that is light and fluffy such as dried mosses or lichen such as old man's beard.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

Figure 14-3-6 Fire Saw

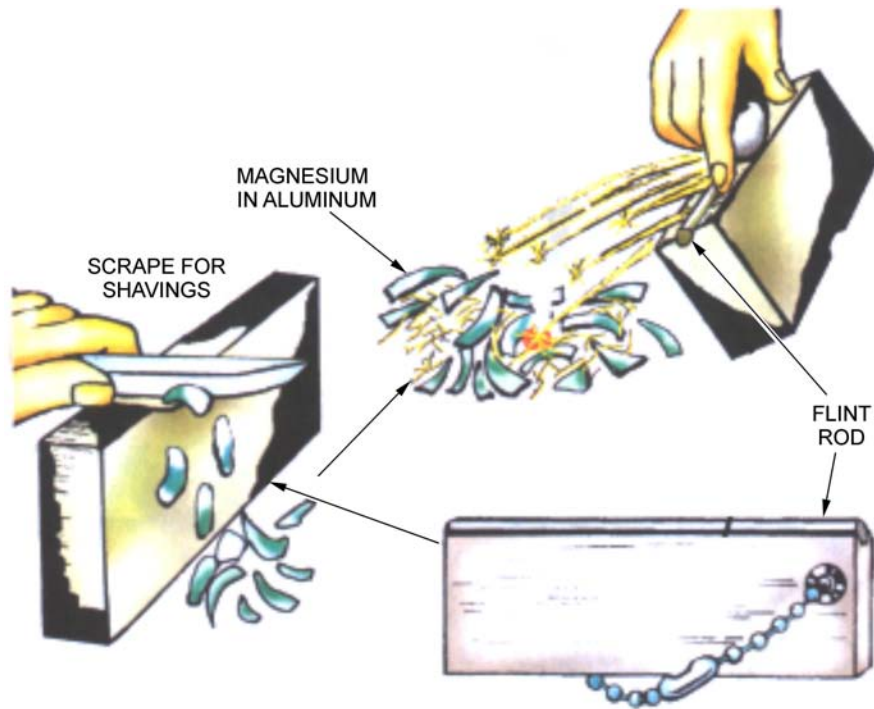


*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

Figure 14-3-7 Fire Saw in Motion

### FLINT AND STEEL

Hold the flint as close to the tinder as possible and strike it with the back of a knife blade or a small piece of carbon steel. Strike downward to scrape magnesium so that the sparks fall into the tinder. When the tinder begins to smoulder, fan or blow gently into a flame.

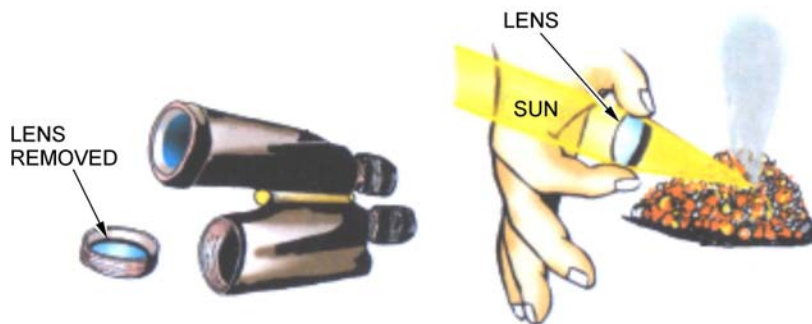


*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 436)*

Figure 14-3-8 Flint and Steel

## SUN AND GLASS

Use a piece of convex glass to concentrate rays of the sun on the tinder and hold until the tinder begins to smoke.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 437)*

Figure 14-3-9 Sun and Glass

---

### CONFIRMATION OF TEACHING POINT 2

---

The cadets' participation in the activity in TP 3 will serve as the confirmation of this TP.

**Teaching Point 3****Have the Cadets Practice Lighting a Fire**

Time: 60 min

Method: Performance



The cadets will practice lighting a fire without matches. There is no requirement for the cadet to create fire.

If time allows, a subsequent method should be attempted.

**ACTIVITY****OBJECTIVE**

The objective of this activity is to have the cadets construct and practice lighting a fire without matches.

**RESOURCES**

- Flint and steel,
- Glass,
- 1.8-kg (4-lb) axe with a 91-cm (36-inch) handle,
- 60-cm (24-inch) bow saw,
- Pail filled with sand or water,
- Tinder,
- Kindling,
- Knife,
- Hardwood shaft 2 cm thick and 30 cm long,
- Softwood base 5 cm wide, 20 cm long and 2 cm thick,
- One bearing block or socket,
- One stick 60–90 cm long to make the bow (green wood from a sapling is best),
- Cord,
- Water, and
- Shovel.

**ACTIVITY LAYOUT**

N/A.

**ACTIVITY INSTRUCTIONS**

1. Have the cadets attempt to light a fire without matches, using one of the following methods:
  - a. bow and drill,

- b. fire saw,
  - c. flint and steel, and
  - d. sun and glass.
2. Have the cadets choose a method from the ones listed above.
  3. Distribute the handouts of instructions located at Annexes A to D.
  4. Distribute materials to cadets.



There is no requirement for the cadets to light a fire, since it is a challenging skill to master. Cadets are only required to construct and attempt one method, but may attempt another, if time permits.

### **SAFETY**

- Firefighting equipment must be present during the lighting of fires.
- Additional instructors may be required to all cadets are attempting this activity simultaneously.

---

### **CONFIRMATION OF TEACHING POINT 3**

---

The cadets' participation in practicing to light a fire will serve as the confirmation of this TP.

---

### **END OF LESSON CONFIRMATION**

---

The cadets' participation in practicing to light a fire by bow and drill, fire saw, flint and steel or sun and glass will serve as the confirmation of this lesson.

---

### **CONCLUSION**

---

### **HOMEWORK/READING/PRACTICE**

N/A.

### **METHOD OF EVALUATION**

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 6 (324 EC-03).

### **CLOSING STATEMENT**

It is important for cadets to be able to light a fire without matches. The second element of the survival pattern is fire, which provides heat, light and comfort. A fire also provides a means to cook food, scare away animals and signal rescuers if the cadet becomes lost.

### **INSTRUCTOR NOTES/REMARKS**

N/A.

---

**REFERENCES**

---

- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2002). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.
- C2-008 (ISBN 0-00-265314-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C2-148 (ISBN 978-0-8118-3292-5) Davenport, G. (2006) *Wilderness Survival* (2<sup>nd</sup> ed.). Mechanicsburg, PA: Stackpole Books.

THIS PAGE INTENTIONALLY LEFT BLANK



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 4

### EO M324.04 – PREDICT WEATHER

Total Time:

30 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TPs 1 and 2 to introduce the cadet to weather fronts and weather indicators that will influence predicting weather.

A practical activity was chosen for TP 3 as it is an interactive way to introduce cadets to predicting weather in a safe, controlled environment. This activity contributes to the development of survival skills and knowledge in a fun and challenging setting.

### INTRODUCTION

#### REVIEW

N/A.

#### OBJECTIVES

By the end of this lesson the cadet shall be expected to predict weather for a 24-hour period.

#### IMPORTANCE

It is important for cadets to learn to predict weather so they can factor the weather into their survival plan if they become lost. The weather will play an important role when selecting the best action to take while waiting for assistance from rescuers, when deciding the type of shelter to seek and if/when making a decision to move.

**Teaching Point 1****Describe Weather Indicators**

Time: 10 min

Method: Interactive Lecture



This TP allows the cadets to view the clouds while learning their different characteristics.

Some information on types of clouds was taken from EO M224.03, (Predict Weather Using Cloud Formations, A-CR-CCP-702/PF-001, Chapter 14, Section 3).

Allow the cadets to view cloud formations for a short time before describing the characteristics of each one.

**CLOUDS**

**Cumulus.** These clouds are large, individual puffy clouds. They resemble cauliflower or cotton balls, with bottoms which often appear dark and flat. They can often be seen on a warm day. When these clouds are in the sky one can expect fair weather, unless they begin to extend upward.

Cumulus clouds may bring the following associated weather:

- black or grey – possible thunderstorm,
- may develop into cumulonimbus – possible storm, and
- small isolated patches – good weather.



*E. Brotak, Wild About Weather, Lark Books (p. 88)*

Figure 14-4-1 Cumulus Clouds

**Alto cumulus.** These clouds are very big and can be white or grey. They appear as a layer or a series of patches of rounded masses. Alto cumulus clouds can be seen before fair or bad weather and have little value as an indicator of future weather developments.

Alto cumulus clouds may bring the following associated weather:

- domed shape – possible thunderstorm, and
- small isolated patches – good weather.



*E. Brotak, Wild About Weather, Lark Books (p. 87)*

Figure 14-4-2 Altocumulus Clouds

**Stratocumulus.** These appear as sheets of big puffy white or grey clouds. Stratocumulus clouds often appear in dark patches or rolls and are often thin with blue sky showing through the breaks. Snow or showers of rain are possible and can be heavy.

Stratocumulus clouds may precede or follow a storm.



*E. Brotak, Wild About Weather, Lark Books (p. 88)*

Figure 14-4-3 Stratocumulus Clouds

**Cirrus.** These clouds are wispy and look like cotton candy being pulled. They appear to be whitish wisps of cloud and are usually an indicator of fair weather.

Cirrus clouds may bring the following associated weather:

- drifting slowly or standing still – fair weather; and
- moving rapidly, followed by more clouds – foul weather.



*E. Brotak, Wild About Weather, Lark Books (p. 87)*

Figure 14-4-4 Cirrus Clouds

**Cirrostratus.** These clouds are whitish sheets that completely cover the sky. Cirrostratus clouds are normally see-through. When these clouds are in the sky, one can expect precipitation in a day or two.

Cirrostratus clouds indicate changeable weather.



*E. Brotak, Wild About Weather, Lark Books (p. 87)*

Figure 14-4-5 Cirrostratus Clouds

**Nimbostratus.** These appear as dark grey layers of large, puffy clouds. When they produce precipitation, it is in the form of continuous rain or snow. The bottom of this cloud is often hidden by heavy falling rain or snow.

Nimbostratus clouds indicate upcoming rainfall.



*E. Brotak, Wild About Weather, Lark Books (p. 88)*

Figure 14-4-6 Nimbostratus Clouds



A figure illustrating the cloud types in the atmosphere is included at Annex E. Distribute Annex E to each cadet.



Being able to forecast weather using clouds is a great tool in a survival situation.  
Ask cadets if they know any signs that indicate weather may change.

### **SIGNS OF BAD WEATHER**

When the weather is going to change for the worse, cloud formations will change. Signs of change for bad weather are:

- Clouds, regardless of their formation, are thicker (darker), increase in numbers or join together to form layers lower in the sky.
- Clouds form banks in the west with winds from the south.
- Clouds move in all directions or contrary to the wind on the ground.
- Altocumulus clouds move quickly across the sky or form towers in the morning.
- Cumulus clouds form in the morning and stack in the afternoon or move from the south or southwest.



A halo around the sun or moon indicates bad weather.

## SIGNS OF GOOD WEATHER

When the weather is going to change for the better, cloud formations will change. Signs of a change for good weather are:

- Cloud cover lifts, becomes lighter and small patches of blue sky develop.
- Cumulus clouds form in the afternoon or float alone.
- Stratocumulus clouds drift with the prevailing wind and remain scattered.
- The condensation trail (contrail) left by high altitude aircraft disperses quickly.
- Morning fog is burnt off before noon.

## THUNDERSTORMS

Thunderstorms are most common in the summertime. They are formed by cumulus clouds, feeding off warm and moist air. These clouds grow quickly during the day, driven by the heat from the sun. When dark cumulonimbus clouds begin to approach, one can expect a thunderstorm. Thunderstorms not only have thunder, but very often lightning as well.

**Lightning.** Lightning is an electrical discharge in the atmosphere. When cumulus clouds grow tall, they develop an electrical field. The top of the cloud, where there are lots of ice crystals, is normally positive. The bottom part of the cloud, filled with rain droplets, is normally negative. The ground has a positive charge. An electrical charge builds up and the atmosphere produces lightning.

**Ground Lightning.** Ground lightning happens when the charges are exchanged by the clouds and ground. These flashes affect people greatly, often causing injury or death and disrupting power and communications and starting forest fires. People can be injured a significant distance from the point where the lightning strikes as the current travels through the ground.

**Thunder.** Thunder is the sound made when a lightning bolt heats the air and expands quickly. Since sound moves much slower than light, one can judge how far away a lightning bolt is by counting the seconds between seeing the flash and hearing the thunder. Each three-second interval equals about one km (0.6 miles).

### Calculate the Speed of an Approaching Storm

Count the seconds between the flash and the thunder clap. (Each second represents a 300 m [984 feet] distance) from the lightning strike. The speed and distance of the approaching storm can be calculated by comparing the time delay between the lightning and the thunder from several lightning strikes.

## ACTIONS TO TAKE IN THE EVENT OF A THUNDERSTORM

A thunderstorm can arrive quickly and lightning can strike in front of the storm. Seek shelter well before a storm hits.

### Avoid High Points

Make sure not to be the prominent high point in the area (in a field, on a beach, in the water) and not next to a prominent high point (next to an isolated tree, steeple, flag pole).

### Avoid Running

Walk fast, but do not run as rapid movement may cause air currents that attract an electric strike.

### Stay Low in Open Areas

If in the open, crouch very low and try to insulate the body from the ground by standing on a backpack (with no metal), raincoat, jacket or air mattress. The importance of this insulation is that the ground charge cannot rise through the body to attempt to reach the lightning discharge.



Keep hands off the ground especially if the ground is wet or if it is humid.

### Avoid Metal Objects

Stay away from any metal tent poles, backpack frames, walking poles, etc. Abandon these items, in a flat field, as they may create a better potential impact point other than the body. Avoid being in a boat or in water during a storm.

### Avoid Grouping Together

Do not group together during a storm. According to author Paul Tawrell, *Camping and Wilderness Survival: The Ultimate Outdoors Book*, Tawrell Books (p. 224) “a flash of lightning killed 504 sheep that had huddled together during a storm.”



Make sure that the storm has completely passed before moving so that you do not attract the last lightning strike.

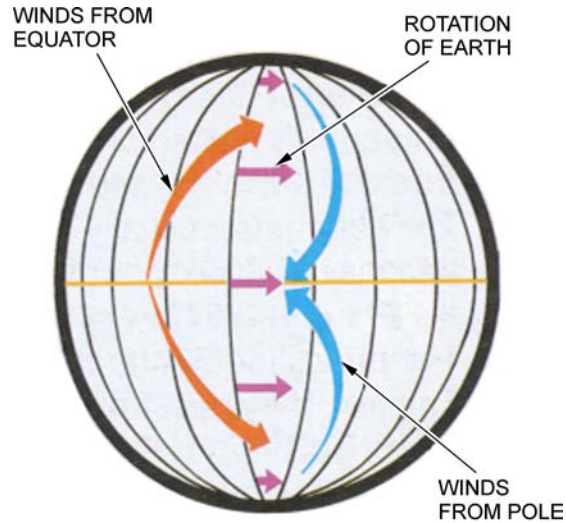
## WIND

Defined as the horizontal motion of air across the earth's surface. Wind is produced by air pressure and is different from place to place. Local winds result from thermal differences that generate local pressure gradient. Wind speed is expressed in kilometres per hour (km/h), metres per second (mps) or knots (kt).

The two principle properties of wind are speed and direction. Winds are named for the direction from which they originate. For example, a wind from the west is a westerly wind (it blows eastward). The most important factor affecting wind is the Coriolis effect. The Coriolis effect is zero at the equator and increases as it reaches the poles. The effect is proportional to the wind speed.



Coriolis effect is the deflection of moving objects on earth from a straight path, in relation to the differential speed of rotation at varying latitudes.



*P. Tawrell, Camping and Wilderness Survival, Tawrell Books (p. 607)*

Figure 14-4-7 Coriolis Effect

Wind will flow from a high air pressure area to a low air pressure area. Due to the rotation of the earth and friction, wind will flow around the outside of the high or low pressure areas. Wind strengths are directly related to the difference between high and low air pressure areas; the larger the difference, the stronger the winds.

## WEATHER LORE

Meteorologists use lots of equipment and science to forecast weather. However, people whose livelihoods depend on weather – farmers and sailors – often use the things around them to predict the weather. Nature, animals and even humans may give clues to future weather patterns. Certain species of plants and animals are affected by the slightest change in their environment. Weather lore is often considered to be old wives tales and superstitions.

## NATURE SIGNS

There are signs in nature that can show change in air pressure. Some are very obvious changes while others are of a more subtle nature.

**Smoke.** Smoke rising from a fire straight into the air means fair weather (high pressure) and smoke hanging low, (low pressure) means rain is on the way.

**Red Sky.** A red sky at either dusk or dawn is a beautiful natural sign one can use to predict weather. At dusk, a red sky indicates that the next day will be dry and clear day. This is due to the sun shining through dust particles being pushed ahead of a high pressure system bringing in dry air. A red sky at dawn often means that an approaching low pressure system is bringing in a lot of moisture. This is a fair indication that a storm is approaching. Do not confuse a red sky in the morning with a red sun in the morning. If the sun itself is red and the sky is a normal colour, the day will be fair.



Remember the old rhyme:

“Red sky at night, sailor’s delight. Red sky at morning, sailors take warning”

**Sun Halo.** When a halo rings the moon or sun, rain is approaching.

## PLANTS

**Flowers.** Flowers and plants will close before a storm.

**Leaves.** When the leaves of trees turn over, windy conditions and severe storms will not be far behind.

**Pine Cones.** Pine cones close up in moist weather to protect their seeds. If the weather is dry, the pine cone will open.

**Seaweed.** In coastal areas, kelp shrivels and feels dry in fine weather, and swells and becomes damp if rain is in the air.

## ANIMALS

**Lying Cows.** When cows are lying down in a field, rain is on the way. The cows sense the moisture in the air and are making sure they have somewhere dry to lie down.

**Squirrels Tails.** If a squirrel's tail is very bushy, or they are collecting big stores of nuts in autumn, a severe winter may be expected (little scientific evidence supports this theory).

**Birds and Bats.** Birds and bats have a tendency to fly much lower to the ground right before rain due to the "thinning" of the air. They prefer to fly where the air is densest and where they get greater lift for their wings. With high pressure and dry air, the atmosphere becomes denser and birds can easily fly at higher altitudes. Some birds, like cockerels, sing when a thunderstorm approaches.

**Crickets.** When crickets are in cool grass, count the number of chirps they make. The number of chirps will indicate the temperature.

**Household Pets.** Cats and dogs in houses can sense storms and often seek a comfortable warm place to sleep.

## HUMAN OBSERVATIONS

**Senses.** Mountains and other faraway objects will appear to be much closer and more sharply focused as wet weather approaches and the air pressure drops. The dust particles in the air begin to settle to the ground and the air clears allowing one to see more details of faraway objects. As high pressure approaches and the air becomes thicker, more dust particles become suspended in the air and landmarks take on their normal hazy appearance.

Sounds become sharper and more focused prior to stormy weather. Instead of travelling upward and outward into the atmosphere, sound waves are bent back to the earth and their range extended. Even birdcalls sound sharper. This is why some people think the air is clean and fresh and bird songs and calls sound sharper before a rain.

**Aches and Pains.** When cold is expected, many humans claim to experience aches and pains in joints and muscles.

**Hair.** When there is a lot of humidity, human hair often becomes frizzy. When air is moist (indicating rain), hair swells and straightens.

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What signs of cloud formation signal changes for bad weather?
- Q2. What should you do in an open field when a thunderstorm is approaching?

Q3. What is weather lore?

**ANTICIPATED ANSWERS**

A1. Signs of change for bad weather are:

- Clouds, regardless of their formation are thicker (darker), increase in numbers or join together to form layers, and/or lower in elevation.
- Clouds form banks in the west with winds from the south.
- Clouds move in all directions, or contrary to the wind on the ground.
- Altostratus clouds darken and lower.
- Altocumulus clouds move quickly across the sky or form towers in the morning.
- Cumulus clouds form in the morning and stack in the afternoon or move from the south or southwest.

A2. Make sure you are not the prominent high point in the area or that you are not next to a prominent high point.

A3. Weather lore is a way of predicting weather.

---

**Teaching Point 2**

**Explain Weather Systems**

Time: 5 min

Method: Interactive Lecture

---



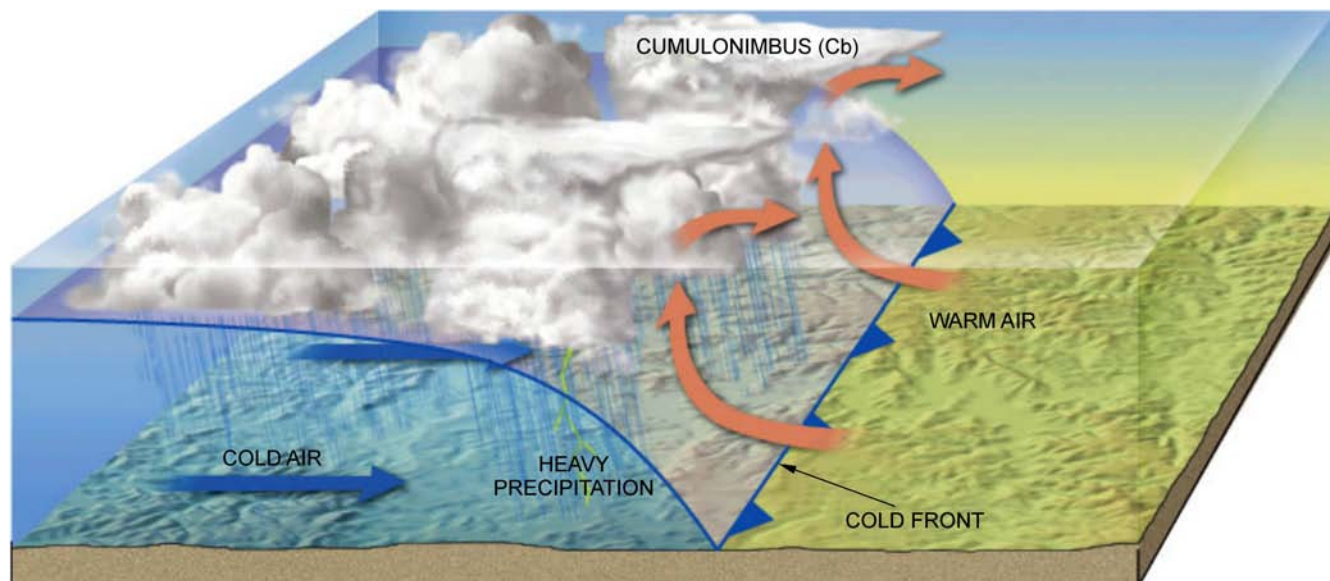
The information in this TP is designed to give cadets background knowledge of weather systems which will aid them in predicting weather.

**FRONTS**

**Weather Front.** A boundary that separates two air masses that have different characteristics. As two air masses collide they will mix along their boundary, but will retain their distinct characteristics.

**Cold Front.** Cold (more dense) air mass moving into a warmer (less dense) air mass and is characterized by the following:

- abrupt uplift along the frontal boundary;
- cumulus (flat based or anvil-shaped) development;
- short duration heavy rain and thunderstorms; and
- shown as a line of blue triangles on surface weather maps.

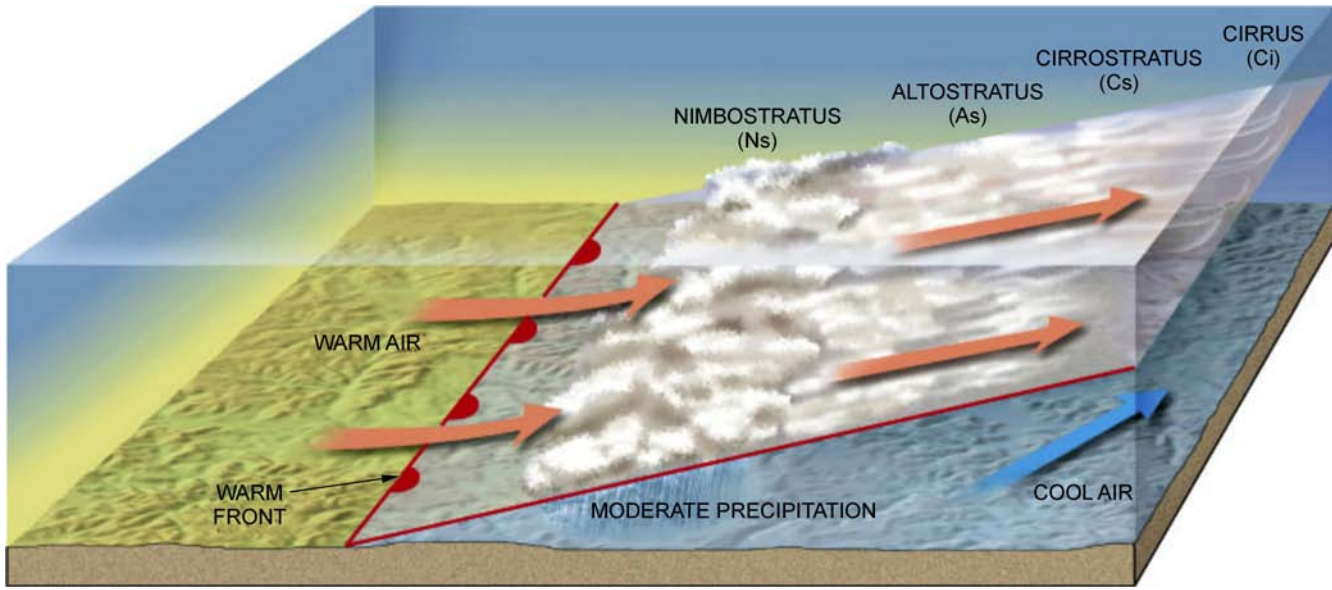


*"Fronts", by The Atmosphere, Lutgens and Tarbuck, (8<sup>th</sup> ed). Copyright 2001 by John Stimac. Retrieved November 19, 2007, from <http://www.ux1.eiu.edu/~jpstimac/1400/fronts.html>*

Figure 14-4-8 Cold Front

**Warm Front.** A warm (less dense) air mass moving into a cold air mass and is characterized by the following:

- gentle uplift;
- stratiform (stratus) cloud cover (the leading clouds, cirrus, are a good indicator of an impending change in the weather);
- long duration moderate rainfall; and
- shown as a line of red semicircles on surface weather maps.




*"Fronts", by The Atmosphere, Lutgens and Tarbuck, (8<sup>th</sup> ed.) Copyright 2001 by John Stimac. Retrieved November 19, 2007, from <http://www.ux1.eiu.edu/~jpstimac/1400/fronts.html>*

Figure 14-4-9 Warm Front

## HIGHS AND LOWS

**Air Pressure.** The force of the air pushing down on the earth's surface. Air pressure is higher near sea level because there is more air at lower altitudes than on the top of a mountain. Changing weather is a result of changing air pressure. Understanding the effects of low and high air pressure is important in predicting weather.


**Low Pressure Area.** A low (an "L" on weather maps) is a region of air where the pressure is lowest in relation to the surrounding area. Lows are associated with stronger winds and rising air. This rising air expands and cools and cannot hold as much water, resulting in condensation and cloud formation.



Think about the air rising above a campfire. The air molecules, as they are heated, begin to expand and leave the earth's surface, putting less pressure on it. On a large scale, this hot air creates an area of low pressure.

**High Pressure Area.** A high ("H" on weather maps) is a region where the air pressure is highest with relation to the surrounding area.

An area of high pressure is a section of air that is sinking. As the air sinks, it warms, allowing it to hold more water. Highs are often associated with fair weather.



Ask the cadets if they were to open a window on a cold winter night and stand in the middle of the room what part of their bodies would be first to feel the cold?

Answer: Feet.

This is because cold air is dense and the molecules are sinking. On a large scale, cold air masses push down on the earth's surface creating an area of high pressure.

---

**CONFIRMATION OF TEACHING POINT 2**

---

**QUESTIONS**

- Q1. What is a weather front?
- Q2. What is a low pressure area?
- Q3. What is high pressure?

**ANTICIPATED ANSWERS**

- A1. A boundary that separates two air masses that have different characteristics. As two air masses collide, they mix along their boundary, but retain their distinct characteristics.
- A2. A low pressure area (an “L” shown on weather maps) is a region of air where the pressure is lowest in relation to the surrounding area.
- A3. An area of high pressure is a section of air that is sinking.

---

**Teaching Point 3****Have the Cadets Predict Weather for the Next 24-Hour Period**

Time: 10 min

Method: Practical Activity

---

---

**ACTIVITY**

---

**OBJECTIVE**

The objective of this activity is to have the cadet predict weather conditions for the next 24 hours.

**RESOURCES**

- Pen or pencil, and
- Paper.

**ACTIVITY LAYOUT**

N/A.

**ACTIVITY INSTRUCTIONS**

1. Have the cadets observe the clouds, weather and natural features around them.
2. Have the cadets write down what they think might happen in the next 24 hours.
3. Divide the cadets into small groups, of no more than four and have them discuss weather predictions over the next 24 hours.
4. Follow up with the cadets' predictions in a few days time.

**SAFETY**

N/A.

---

**CONFIRMATION OF TEACHING POINT 3**

---

The cadets participation in the activity will serve as the confirmation of this TP.

---

**END OF LESSON CONFIRMATION**

---

The cadets' participation in predicting weather will serve as the confirmation of this lesson.

---

**CONCLUSION**

---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 6 (324 EC-04).

**CLOSING STATEMENT**

Being able to predict weather is a great tool when in a survival situation. Weather is an important aspect of planning in any survival situation with respect to the type of shelter selected and the best course of action to take.

**INSTRUCTOR NOTES/REMARKS**

Time shall be provided during a corps FTX to allow cadets to continue to practice the skill of predicting weather.

---

**REFERENCES**

---

- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2002). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.
- C2-157 The Old Farmer's Almanac. *Cricket Chirps to Temperature*. Retrieved February 1, 2008, from <http://www.almanac.com/outdoors/crickets.php>.
- C2-162 Clouds R Us.com-Weather Features. *Weather Lore*. Retrieved February 1, 2008, from <http://www.rcn27.dial.pipex.com/cloudsrus/lore.html>.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 5

#### EO M324.05 – DETERMINE WHEN TO SELF-RESCUE

---

Total Time:	30 min
-------------	--------

---

#### PREPARATION

---

##### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare trail markings.

##### PRE-LESSON ASSIGNMENT

N/A.

##### APPROACH

An interactive lecture was chosen for this lesson to give background information on the factors to consider when deciding to break camp and search for help and generate interest in survival.

---

#### INTRODUCTION

---

##### REVIEW

The review for this lesson is from EO M224.01 (Identify Immediate Actions to Take When Lost, A-CR-CCP-702/PF-001, Chapter 14, Section 1).

##### FIVE ELEMENTS OF SURVIVAL

After successfully completing the S.T.O.P. action and recognizing a survival situation, the lost individual shall take inventory of all the food and equipment on hand and address the five elements of survival. The five elements of survival, listed in order of priority, are:

1. **Attitude.** Maintaining a positive attitude is essential. One can survive by staying calm, using all available resources, and prioritizing personal needs.
2. **Shelter.** A shelter is designed to provide protection from the weather and, depending on the conditions, protect a person from either hot or cold temperatures. Hypothermia and hyperthermia are two of the greatest dangers in a survival situation. A proper shelter can help prevent these from occurring. In a desert, for example, the goal is to stay under a shelter, shaded from the sun. In cold weather situations, the shelter will provide insulation.

3. **Water.** Water is the most essential nutrient for the human body. Even when thirst is not extreme it can dull the mind. Lack of water will slowly degrade the ability to survive. With adequate shelter and water one can survive for weeks.
4. **Fire.** In a survival situation, fire provides heat and light, and signals for rescuers. Cold weather not only lowers the ability to think, but it also lowers one's will to do anything. A drop of a few degrees in body temperature can affect the ability to make reasonable decisions.
5. **Food.** Individuals in good physical condition can go for many days or even weeks without food. The goal in a wilderness survival situation is to be located in the shortest time possible, so in most cases one will be located before food becomes a survival issue. However, it is always important to prepare for the worst and find ways to supply the body with substance, such as berries, fish, animals, birds, etc.

### QUESTIONS

- Q1. What are the five elements of survival?
- Q2. What is the one essential nutrient the body requires to function?
- Q3. What does a shelter provide?

### ANTICIPATED ANSWERS

- A1. Attitude, shelter, water, fire and food.
- A2. Water.
- A3. Shelter provides protection from the weather and depending on the conditions, protects you from either hot or cold temperatures.

### OBJECTIVES

By the end of this lesson the cadet shall be able to determine when to self-rescue.

### IMPORTANCE

It is important for cadets to be able to make the decision to move from their survival site and search for help. The decision to move is crucial and there are many considerations before changing location.

---

#### Teaching Point 1

#### Discuss the Factors to Consider When Deciding to Self-Rescue

Time: 10 min

Method: Interactive Lecture

---



This TP is designed to introduce the cadets to the factors to consider when deciding to self-rescue.



It is usually easier to locate food and water supplies from a permanent base than constantly being on the move. The first choice is to stay put.



Making the decision to self-rescue requires many considerations and should only happen as a last resort.

It is important to consider all the factors before leaving the survival site. When an analysis of the factors indicates that a site will not be able to provide resources critical to sustaining life, a move should be considered.

Behaviour in survival situations depends on the knowledge and attitude of the survivor. Hunters traditionally form the largest number of individuals lost. This is due to the adrenaline pushing them past their limits and being unprepared for adverse conditions.

Hikers and backpackers form the smallest group of lost individuals, yet they are prone to the hardships of being lost as they rarely carry survival equipment. This group typically goes out in good weather and gets stranded due to sudden storms.

## FOOD AND WATER RESOURCES

### Time Without Water

An area without water, or with a limited supply of water, will not be beneficial in the long run.

The body is estimated to be made up of two thirds water. Water is the most essential nutrient for survival and the human body can last just a few days without it.

During a normal non-strenuous day, a healthy individual will require 2 to 3 L of water. When physically active or in extreme hot or cold environments, that same person would need at least 4 to 6 L. Even when thirst is not extreme it can dull the mind. Lack of water will slowly degrade the ability to survive.

Drinking water wards off dehydration and environmental injuries. A person who is mildly dehydrated may become thirsty and become irritable and weak. As this becomes more serious, individuals will show a decrease in mental capacity and coordination.

In a survival situation, water is procured from the earth or from the sky, and sources can include surface water, groundwater, precipitation, condensation and plants.

### Time Without Food

The human body can last for a few weeks without food. In a survival situation, energy must be conserved and food resources planned and monitored.

In general, the requirements for food should be de-emphasized. Do not eat if water is not available. If water is available, more food can be taken in to sustain the energy level.

### Proper Nutrition

In a survival situation, getting the nutrients and vitamins a person needs is difficult. When choosing food sources, it is worthwhile to choose foods from four groups:

- carbohydrates,
- protein,
- fats, and
- minerals.

**Carbohydrates.** Easily digested foods that provide rapid energy. Fruits and vegetables are good sources of carbohydrates and should be checked for bug infestation before eating.

**Protein.** Builds body cells. Fish, game and poultry are good sources of protein but should be cooked thoroughly before eating.

**Fats.** Slowly-digestible food that provides long-lasting energy. Animal fats, eggs and nuts are excellent sources in survival situations.

**Minerals.** Aid in building and repairing the skeletal system. Water provides adequate minerals in survival situations.



Alternative food sources can be found in EO C324.01 (Identify Animal and Insect Food Sources, Section 6).

## FIRE AND SHELTER RESOURCES

Fire and shelter provides personal protection in survival situations; playing a vital role in protecting a cadet from the realities that can be dealt by nature. Fire and shelter serve many functions: removing the cadet from inclement weather, providing light, purifying water, drying clothes, warding off wildlife, and signalling. In addition, both fire and shelter reduce stress and keep the cadet comfortable.

It is important to have fire resources available in a survival situation. Hardwoods such as maple, ash, oak and hickory will burn longer and produce less smoke. If there are limited sources of hardwoods, softwoods can be used. Supplies will be used up quickly as softwoods burn hotter and faster.

As time passes and the need for wood dwindles the surrounding resources, survivors are required to go further and further to gather wood.



Information regarding shelter construction can be found in M224.04 (Identify Emergency Shelters, A-CR-CCP-702/PF-001, Chapter 14, Section 4), as well as M324.01 (Construct an Improvised Shelter, Section 1).



Information regarding fire construction can be found in M224.05 (Prepare, Light, Maintain and Extinguish a Fire, A-CR-CCP-702/PF-001, Chapter 14, Section 5) as well as M324.03 (Light a Fire Without Matches, Section 3).

## ENVIRONMENTAL DANGERS

Environmental dangers including weather, fire and wildlife will necessitate a move away from the danger.

## HEALTH OF PARTY MEMBERS

The health and well-being of all members must be considered prior to moving. If the cadet is alone and injured, moving should be a last resort.

Before moving, procure enough food and water to last at least two weeks.

In survival situations, there is a risk of disease from staying in one spot for too long. Even if the strictest sanitary management is kept, there is still a risk of illness or disease.

If injured members are staying behind, it is important to leave one healthy person behind to care for the injured and gather supplies.

### **RISK OF FURTHER INJURY**

Moving will be necessary if there is risk further injury to members of the group. As members get weaker, the risk of injury increases. Areas where there are hills, cliffs and large rocks are dangerous areas because of potential slides and avalanches.

### **THE STAY OR GO DECISION**

The decision to move away from the initial survival site is dependent on the many factors listed above; staying is the best scenario. Many lost people waste valuable energy and risk injury by panicking, running aimlessly, continuing to travel after dark, or walking in circles. If a lost person attempts to find their location, in most cases they will become more lost, increasing the distance between the last known point of their route. This wandering will only increase the size of the search area, time it will take for a rescue team to locate an individual or group. As long as there is no immediate danger, stay in one place.

Ideally, the survivor or group should establish a small area search. Complete the Star Compass Search to determine the decision to move.

#### **Star Compass Search**

To complete the Star Compass Search:

1. Visualize the starting point. Look around your current location. Make note of what is surrounding you such as obvious landmarks.
2. Mark the starting point using a stick or rock cairn.
3. Taking all your gear with you, walk 100 m (328 feet) in a straight line from the starting point along one of the cardinal compass points (N, S, E, W) and then back to the starting point.
4. Repeat step three for the remaining compass points.
5. Walk 200 m (656 feet) in a straight line from the starting point along one of the intercardinal compass points (NE, NW, SE, SW) and back again.
6. Repeat step five for the remaining compass points.

This will create a star pattern and allow the cadet to search the area for usable resources like water.

The decision to move will invariably depend on the survivors' experiences, knowledge and skills and answers to questions regarding:

- **Food and Water Resources.** Is there a water source? Are there food sources?
- **Fire and Shelter Resources.** Are there shelter-building resources? Is there wood for fire?
- **Environmental Dangers.** Is the area safe?
- **Health of Party Members.** Can everybody travel? Are there injured members who need to stay in one spot?
- **Risk of Further Injury.** Is there a risk of more injuries if we stay?

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What is the most important nutrient the body requires?
- Q2. How long can the human body last without food?
- Q3. What factors should be considered when deciding to move?

### ANTICIPATED ANSWERS

- A1. The most important nutrient the body requires is water.
- A2. The human body can last a few weeks without food.
- A3. Factors to consider include food and water resources, fire and shelter resources, environmental dangers, health of party members and risk of further injury.

---

### Teaching Point 2

### Discuss Planning a Route to Search for Help

Time: 5 min

Method: Interactive Lecture

---



This TP is designed to introduce cadets to the factors for planning a route when the decision to self-rescue has been made.

When the decision to move has been made, it is important to leave signs that the group has been there and has decided to move.

Leaving a message or sign that the group has moved, will assist rescuers when they find the initial camp and try to follow the group.

### IDENTIFYING DIRECTION

#### Determine Direction Using a Shadow Stick

In a survival situation one may not have a map of the area, a compass or a watch. It will be necessary to use natural phenomena, to determine direction. The sun can be used to find north using a branch or stick to cast a shadow on the ground.

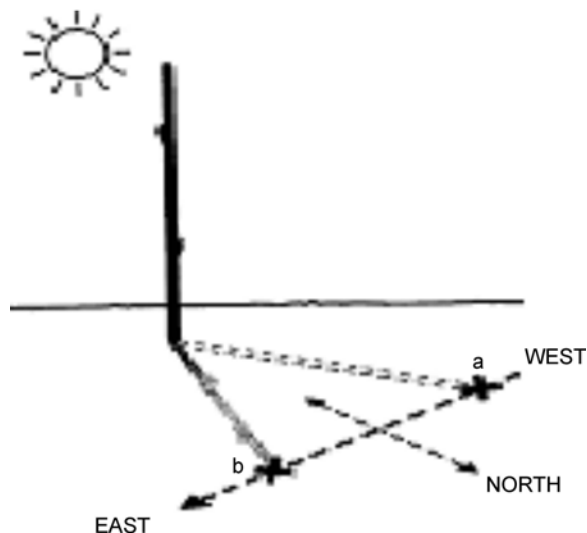
A shadow stick works because the sun always travels east to west, even though it may not rise at exactly 90 degrees or set at exactly 270 degrees. The tip of the shadow stick's shadow moves in the opposite direction, so the first shadow tip is always west of the second, anywhere on earth. Improvised methods are only general indicators of direction. The shadow stick is more accurate and easier to read when the stick is narrow.



The line drawn in Figure 14-5-1 indicates the east-west line. The first mark made is west and the last mark made is east. A line perpendicular to the east-west line is a north-south line.

Steps to make a shadow stick:

1. Find a level, vegetation-free spot. Push the 45- to 60-cm straight stick into the ground about 10 cm so it will remain upright. Incline it by 5–10 degrees to get a longer, bigger shadow if necessary.
2. Mark the tip of the shadow with a stone. Wait until the shadow tip moves a few inches (10–15 minutes with a 45-cm stick).
3. Mark the new position of the shadow tip.
4. Draw a straight line from the first mark through the second mark, and about 30 cm past it.



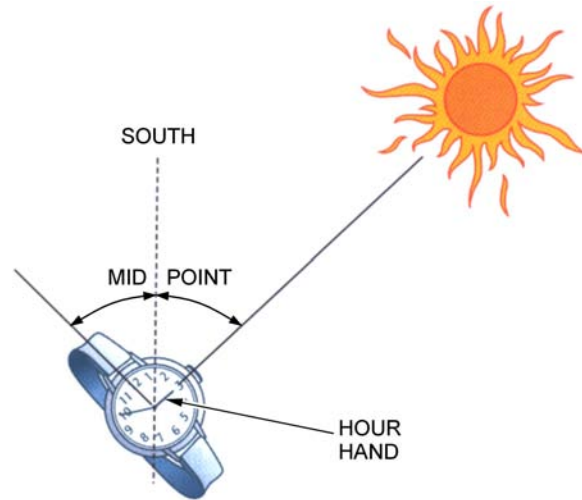
*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 353)*

Figure 14-5-1 Shadow Stick

### Determining Direction Using an Analog Watch

An analog watch can help determine direction using either standard or daylight savings time.

Point the hour hand towards the sun and determine the halfway point between the hour hand and 12 o'clock or 1 o'clock (daylight savings time). The halfway point indicates a north-south line (south in the northern hemisphere and north in the southern hemisphere).



*National Association of Search and Rescue, Fundamentals of Search and Rescue, Jones and Bartlett Publishers, Inc. (p. 76)*

Figure 14-5-2 Analog Watch

## **FOLLOWING RIVERS**

Following rivers will automatically increase survival because it provides the necessary life-support of water. Most waterways will lead to civilization, inland lakes or an ocean.

Rivers offer clearly defined routes to follow although there may be difficult terrain on the shorelines. Steep, rocky and slippery routes along the shore should be avoided. Following the general course of the river will bring the survivor to the same location.

A river cutting through level ground will be easier to follow and most likely have animal trails.

## **MAINTAINING DIRECTION**

When a direction has been decided on, maintain it as best as possible. Choose a prominent feature in the distance and walk towards it.

In a group, use the relay system where one person moves forward, stops and rests and another takes over. This is both to maintain the direction and conserve energy.

## **Walking in a Straight Line**

**Indian Line.** A group of hikers in an open area become landmarks themselves. Hikers are spaced so that the last individual is far enough back to see the leader and the line. The last person lines up the leader with the people in the line. When the leader deviates, they can be signalled to fall back into line.

A distant noise can be followed to reach a destination. Verify direction by cupping the ears and rotating the head to determine the direction of the highest sound intensity.

## **Estimating Distance**

When walking in a straight line, the following table outlines the distances at which objects can be seen.

<b>DISTANCE</b>	<b>ITEM</b>
40 m (132 feet)	Mouth and eyes are clearly distinguished.
90 m (295 feet)	Eyes are dots.
180 m (590 feet)	General details of clothing can be distinguished.
270 m (885 feet)	Faces can be seen.
450 m (1476 feet)	Colours of clothing can be distinguished.
700 m (2297 feet)	People look like posts.
1.5 km (4921 feet)	Trunks of large trees can be seen.
4 km (13 123 feet)	Chimneys and windows can be distinguished.
8 km (26 246 feet)	Large houses, silos and towers can be recognized.
10 km (32 808 feet)	Average height church steeples can be seen.

### **Following Animal Trails**

Following animal trails will most likely lead to a water source. Animals have a set territory near suitable water sources and rarely stray from it.

### **Bushwhacking**

Bushwhacking is the most difficult form of keeping direction. Brush, forests and shores can be quite dense and in warmer climates the vegetation along river shores gets more light and water and is able to grow thicker and stronger. This will inhibit the survivor's ability to move smoothly.

---

## **CONFIRMATION OF TEACHING POINT 2**

---

### **QUESTIONS**

- Q1. What are two ways to determine direction?
- Q2. What are the benefits of following rivers?
- Q3. If one were to follow animal trails, where would they lead?

### **ANTICIPATED ANSWERS**

- A1. Using a shadow stick and an analog watch.
- A2. The benefits of following rivers are they offer clearly defined routes and lead to civilization, inland lakes or an ocean.
- A3. Following animal trails will most likely lead to a water source. Animals have a set territory that is near suitable water sources and rarely stray from it.

**Teaching Point 3****Identify Ways of Marking a Trail**

Time: 10 min

Method: Interactive Lecture



This TP is designed to introduce cadets to marking a trail.

**REASONS FOR MARKING A TRAIL**

Most trails are marked coming and going so that they can be seen from both directions of travel. Trails are also marked to ensure the people using them do not get lost or rerouted.

**Leaving and Returning to the Site**

When searching for water or finding higher ground to build a signal fire, the survivor may have to walk for a kilometre or more. Marking will help to establish the route one can follow to return to the survival site.

**Acting as a Guide to a Ground Search and Rescue Party**

Signs on the ground will draw attention to any presence or past presence and the direction markers will help rescuers follow the survivor's trail.

**TRAIL-MARKING TECHNIQUES**

A large arrow to indicate the direction in which one is travelling. It should be visible from the air. Other direction markers can be interpreted at ground level. Direction markers could include:

- rocks or debris placed in an arrow shape;
- a stick left in a crooked support, with the top pointing in the direction taken;
- grasses tied in an overhand knot with the end hanging in the direction followed;
- forked branches laid with the fork pointing in the direction of travel;
- arrowhead-shape notches cut out of tree trunks indicating a turn;
- small rocks set upon larger rocks, with small rocks beside indicating the direction; and
- a cross of sticks or stones meaning 'Not this way'.

When travelling, continue to mark trails, not only for people to follow but to establish a route to retrace and guide someone who needs to go back on the trail.

Leave a message or sure signs that the group has moved. Hang them from tripods or trees and draw attention to them with markers.



Show the cadets the previously prepared marked trail with grass and rocks. Allow the cadets to ask questions.

## Trees

Trees are great for marking trails.

To mark a trail with branches:

1. Find a route to follow for 100 m (328 feet).
2. Gather branches which are already on the ground.
3. Place the branches along the route in the direction of travel for 100 m (328 feet).
4. Turn the branches around when returning to the starting point.
5. Return the branches to the environment.

## Saplings

Saplings can be used to mark trails as they bend easily and can be contorted to indicate the direction of travel.

## Long Grass

Long grass or straw can be tied together to indicate direction.

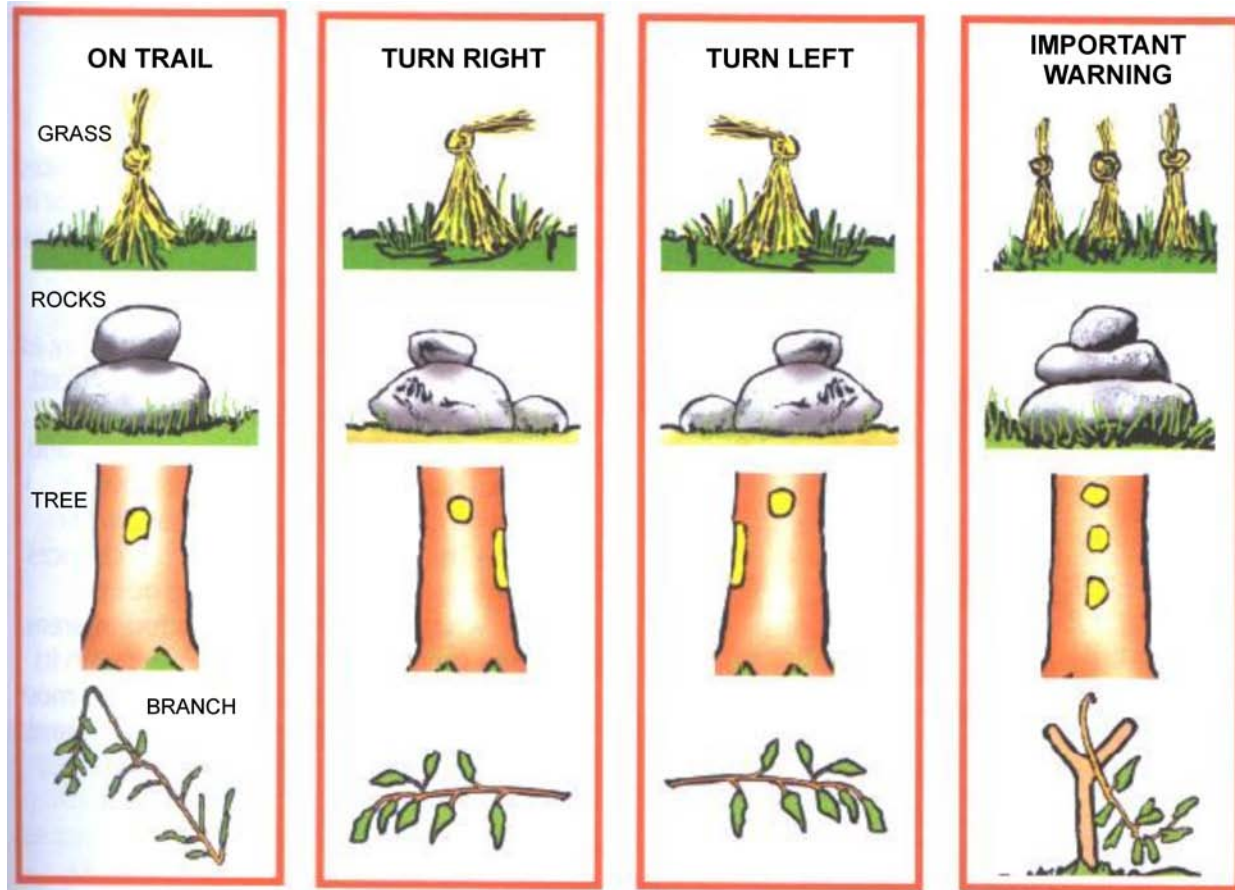
## Cairns

Cairns are piles of rocks used to illustrate where the trail leads. They vary in size from a small grouping of three or four rocks to large piles that can be seen in thick fog. When a trail is marked by cairns, they may be harder to locate than a marking at eye level because they are easy to miss being lower to the ground. Cairns should be used to mark a trail in rocky terrain.



*K. Berger, Backpacking and Hiking, DK Publishing Inc. (p. 158)*

Figure 14-5-3 Cairn



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 547)*

Figure 14-5-4 Trail-Marking Techniques

---

### CONFIRMATION OF TEACHING POINT 3

---

#### QUESTIONS

- Q1. What are the different ways to mark a trail?
- Q2. How is a trail marked with branches?
- Q3. How is a trail marked in rocky terrain?

#### ANTICIPATED ANSWERS

- A1. The different ways to mark a trail are with trees, saplings, long grass and cairns.
- A2. To mark a trail with branches:
  - 1. Find a route to follow for 100 m (328 feet).
  - 2. Gather branches which are already on the ground.
  - 3. Place the branches along the route in the direction of travel for 100 m (328 feet).
  - 4. Turn the branches around when returning to the starting point.

5. Return the branches to the environment.

A3. Trails in rocky terrain are marked by cairns.

---

### END OF LESSON CONFIRMATION

---

#### QUESTIONS

Q1. What are the factors to consider when deciding to self-rescue?

Q2. When planning a route to search for help, what are three things to consider?

Q3. What are some direction markers used when leaving a survival site?

#### ANTICIPATED ANSWERS

A1. Factors to consider include food and water resources, fire and shelter resources, environmental dangers, health of party members and risk of further injury.

A2. Identifying direction, following rivers and maintaining direction.

A3. Direction markers include:

- rocks or debris placed in an arrow shape;
- a stick left in a crooked support, with the top pointing in the direction taken;
- grasses tied in an overhand knot with the end hanging in the direction followed;
- forked branches laid with the fork pointing in the direction of travel;
- arrowhead-shape notches cut out of tree trunks indicating a turn;
- small rocks set upon larger rocks, with small rocks beside indicating the direction; and
- a cross of sticks or stones meaning 'Not this way'.

---

### CONCLUSION

---

#### HOMEWORK/READING/PRACTICE

N/A.

#### METHOD OF EVALUATION

N/A.

#### CLOSING STATEMENT

There are many factors to consider when making a decision to move and search for help in survival situations. Knowing the considerations and what to do when moving will assist the cadet in finding help or being rescued quicker.

#### INSTRUCTOR NOTES/REMARKS

N/A.

---

**REFERENCES**

---

- A2-046 B-GG-217-001/PT-001 Director Air Operations Training (1983). *Down But Not Out*. Ottawa, ON: Department of National Defence.
- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2006). *Camping and Wilderness Survival: The Ultimate Outdoors Book* (2<sup>nd</sup> ed.). Green Valley, ON: Paul Tawrell.
- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C2-148 (ISBN 978-0-8118-3292-5) Davenport, G. (2006). *Wilderness Survival* (2<sup>nd</sup> ed.). Mechanicsburg, PA: Stackpole Books.
- C2-163 (ISBN 0-9694132-0-3) Ferri, G. (1989). *The Psychology of Wilderness Survival*. Hanover, ON: Skyway Printing.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 6

#### EO C324.01 – IDENTIFY ANIMAL AND INSECT FOOD SOURCES

---

Total Time:

60 min

---

### PREPARATION

---

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter, 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Complete a reconnaissance of area used to teach the lesson. Locate different signs of animals and their tracks for TP3

Photocopy the handouts located at Annexes F and G.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TPs 1 and 2 to introduce daily energy requirements and orient the cadet to food sources when lost.

A demonstration was chosen for TP 3 as it allows the instructor to explain and demonstrate finding animal and insect food sources.

A practical activity was chosen for TP 4 as it is an interactive way to allow the cadets to demonstrate identifying animal and insect food sources in a safe, controlled environment. This activity contributes to the development of their outdoor survival skills in a fun and challenging setting.

---

### INTRODUCTION

---

#### REVIEW

N/A.

#### OBJECTIVES

By the end of this lesson the cadet shall be expected to identify animal and insect food sources.

## IMPORTANCE

It is important for cadets to be able to identify animal and insect food sources in the field. For those participating in expedition training the need to live off natural resources while in the field may become a realistic situation. In a survival situation, a cadet may rely on and make appropriate choices to supplement nutrition and avoid a situation of accidental poisoning or illness.

---

### Teaching Point 1

### Discuss the Daily Energy Requirements for an Average Person When Surviving in the Field

Time: 10 min

Method: Interactive Lecture

---

## ENERGY REQUIREMENTS

The body needs food to:

- supply heat;
- supply energy;
- speed recovery after hard work or injury; and
- help fight off disease and maintain mental and physical capabilities.

A healthy body can survive for several days, even weeks without food, depending on environmental conditions. Food replenishes the nutritional substances that a body uses. It provides vitamins, minerals, salts, and other elements essential to good health.



A calorie is a unit of heat – it is the amount needed to raise the temperature of 1 L of water by one degree Celsius. It is the way energy is expressed when discussing nutrition.

## ENERGY NEEDS

The average person in a completely restful state requires 70 calories per hour to maintain their basic metabolism. The simplest activities that make up an ordinary day demand another 45 calories per hour (eg, standing up, sitting down, lighting a fire, etc). That makes a total of about 2040 calories a day without major activities. Participating in a strenuous activity could burn up a further 3500 calories daily. Even mental effort or anxiety will burn additional calories.

Calories are not produced equally by all foods. In general, the energy values of the basic food types are:

- **Carbohydrates.** 1 g produces 4 calories;
- **Fat.** 1 g produces 9 calories; and
- **Protein.** 1 g produces 4 calories.

Consuming more than one source of food will avoid the possibility of nutrient deficiencies. Nutrients must include a combination of carbohydrates, fats and proteins, minerals and other trace elements and vitamins. A balanced diet is important for long-term survival. Do not rely on the easiest source of food for a balanced diet.

### Carbohydrates

Carbohydrates form the bulk of our diets and are a primary source of energy for the body, not just for physical effort but also for fuelling the body and running the nervous system. There are two types of carbohydrates:

- **Fibre.** A complex carbohydrate, and
- **Sugar.** A simple carbohydrate.

### Fats

Fats contain the same elements as carbohydrates but are combined differently. They are a concentrated source of energy, providing twice as many calories as carbohydrates. Fat is stored in the body as a layer under the skin and around the organs. Fats heat and insulate the body, protect organs, lubricate the alimentary tract and build an energy reserve. They are found in meat, eggs, milk and nuts.



The alimentary tract is the passage along which food is passed from the mouth to the anus during digestion.

### Proteins

Proteins build muscles, bones, and teeth and are found in a variety of foods such as meat, poultry, fish, legumes, nuts, milk products, and grain products. Proteins are the only food ingredient containing nitrogen and are therefore essential for the growth and repair of the body. If carbohydrates and fats are missing from the diet, protein is used to generate energy but at the expense of the body's other needs; the body will burn its own tissue muscle for energy.

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What nutrients provide calories for energy?
- Q2. How many calories will an average person at a completely restful state burn in a day?
- Q3. When doing strenuous work how many calories could the body burn?

### ANTICIPATED ANSWERS

- A1. Carbohydrates, fats, and proteins.
- A2. A average person at rest will burn approximately 2040 calories.
- A3. Strenuous work may burn upward of 3500 calories.

---

### Teaching Point 2

### Identify Edible Insects and Their Habitat

Time: 10 min

Method: Interactive Lecture

---



This TP should be conducted somewhere close to rotting logs, stones, boards or any other materials lying on the ground providing good nesting sites for insects. During the TP provide examples of insects and grubs found under one of the listed objects above.

Be cautious when overturning objects, as dangerous or poisonous insects or creatures may be found underneath (snakes, spiders, bees, wasps, etc).

## EDIBLE INSECTS

Insects are the most abundant life form on earth and are easily caught. They provide ample amounts of proteins, fats, carbohydrates, calcium and iron. This makes insects a valuable food source for survival.

Although a fair number of insects can be eaten raw, it is best to cook them in order to avoid ingesting parasites. Collect only living specimens. Avoid any that look sick or dead, have a bad smell or produce skin irritation or a rash when handled. The nutritional value per 100 g of various insects is illustrated in the chart at Figure 14-6-1.



Individuals with known allergies to insects or arthropods should exercise caution. Insects and shellfish are in the same category. People who suffer allergic reactions to lobster, shrimp, crayfish, and other such foods should avoid eating insects.

## NUTRITIONAL VALUE

One gram of carbohydrates equals four calories. This calculation relates to the amount of calories that must be consumed to maintain strength and basic functions when surviving in the field. Note that there is a significant amount of protein that comes from insects.



Distribute handout Annex G.

Have cadets, based on the chart, determine what two insects they would eat. Have them then calculate the amount of insects they would have to eat in order to make up half of their daily caloric intake (roughly 1020 calories).

Insect (per 100 g)	Protein (g)	Fats (g)	Carbohydrates (g)	Calcium (mg)	Iron (mg)
<b>Crickets</b>	<b>12.9</b>	<b>5.5</b>	<b>5.1</b>	<b>75.8</b>	<b>9.5</b>
<b>Small grasshoppers</b>	<b>20.6</b>	<b>6.1</b>	<b>3.9</b>	<b>35.2</b>	<b>5.0</b>
<b>Giant water beetles</b>	<b>19.8</b>	<b>8.3</b>	<b>2.1</b>	<b>43.5</b>	<b>13.6</b>
<b>Red ants</b>	<b>13.9</b>	<b>3.5</b>	<b>2.9</b>	<b>47.8</b>	<b>5.7</b>
<b>Silkworm pupae</b>	<b>9.6</b>	<b>5.6</b>	<b>2.3</b>	<b>41.7</b>	<b>1.8</b>
<b>Termites</b>	<b>14.2</b>	<b>n/a</b>	<b>n/a</b>	<b>0.050</b>	<b>35.5</b>
<b>Weevils</b>	<b>6.7</b>	<b>n/a</b>	<b>n/a</b>	<b>0.186</b>	<b>13.1</b>

*G. Davenport, Wilderness Survival, Stackpole Books (p. 161)*

Figure 14-6-1 Nutritional Value

## INSECT HABITAT

Rotting logs, stones, boards or any other materials lying on the ground provide good nesting sites and are excellent places to find a variety of insects including ants, termites, beetles and grubs. Grassy areas are

good areas to search because insects are easily seen. The following insects can commonly be found in most locations.

**Grasshoppers.** Most commonly found in open fields. Watch for them jumping out of the way when walking. Eaten raw or cooked, remove the legs.



*Discover Entomology, by Carl D. Patrick, Grasshoppers and Their Control, Copyright 2008 by Texas A&M University Department of Entomology. Retrieved March 5, 2008, from <http://insects.tamu.edu/extension/bulletins/l-5201.html>*

Figure 14-6-2 Grasshopper

**Beetles.** Often found under rotting logs, stones, boards or any other material lying on the ground. Insects with hard outer shells will have parasites so cook them before eating.



*Canadian Biodiversity Information Facility, Ground Beetles of Canada. Retrieved March 5, 2008, from [http://www.cbif.gc.ca/spp\\_pages/carabids/phps/image1\\_e.php#Bembidiini](http://www.cbif.gc.ca/spp_pages/carabids/phps/image1_e.php#Bembidiini)*

Figure 14-6-3 Beetles

**Worms.** Worms are an excellent source of protein, a large proportion of essential amino acids and are easily collected. Dig for them in damp soil or watch for them on the ground after rain. After collecting them, drop them into clean, potable water for a few minutes. The worms will naturally purge or wash themselves out, after which they can be eaten raw.



*Cheshire Wildlife Trust, Find Out About Earth Worms, Copyright 2004 by Cheshire Wildlife Trust. Retrieved March 5, 2008, from [http://www.wildlifetrust.org.uk/cheshire/watch\\_earthworms.htm](http://www.wildlifetrust.org.uk/cheshire/watch_earthworms.htm)*

Figure 14-6-4 Earth Worm

**Grubs.** Known as insect larva, grubs are often found under rotting logs, stones, boards or any other materials lying on the ground.



*Green Smiths, Grub Worms. Retrieved March 5, 2008, from <http://www.greensmiths.com/grubs.htm>*

Figure 14-6-5 Grubs

**Aquatic Insects.** Many species of edible insects exist around the edges of lakes, or ponds, or the ocean. Cook any hard shell insects.



*P. Tawrell, Camping and Wilderness Survival (2<sup>nd</sup> ed.), Paul Tawrell (p. 912)*

Figure 14-6-6 Water Insects

---

## CONFIRMATION OF TEACHING POINT 2

---

### QUESTIONS

- Q1. What nutritional value will insects provide for survival?
- Q2. Where would insects be generally located?
- Q3. How would someone find worms?

### ANTICIPATED ANSWERS

- A1. Insects will provide ample amounts of proteins, fats, carbohydrates, calcium and iron.
- A2. Under rotting logs, stones, boards or any other materials lying on the ground providing good nesting sites and are excellent places to find a variety of insects.
- A3. Dig for them in damp soil or watch for them on the ground after rain.

---

### Teaching Point 3

### Discuss Finding Small Animals

Time: 15 min

Method: Demonstration

---



During this TP move about the training area pointing out different signs of animals. Identify their tracks and habitat to the cadets.

### IDENTIFYING TRACKS AND HABITAT

All animals can be a source of nourishment. The more one knows about animals, the better the chances of locating an animal. To find an animal in the wild, one must be observant for signs. If a person can recognize the signs an animal leaves, and identify the animal, one can devise a method to hunt and trap it.

Most mammals are on the move at dawn and dusk (first light, last light), using regular routes between their watering spots, feeding places and homes. Animal tracks and trails can be identified by looking for specific signs.

The following are tips to locate and identify animals:

- Tracks are more obvious on wet ground snow and damp sand.
- The size of the impression is left from their tracks.
- The age of the track can be identified by its sharpness and moisture content.
- The clearer the track the more recent it is. If water or rain has seeped into it, it may be older.
- Heavy vegetation reveals regularly used routes or paths.
- Some animals never travel very far; any tracks likely mean they are in the area.
- Smaller animals make tunnels through dense underbrush.
- Broken twigs along a route, will identify direction of travel and the height of the animal.

### **Rabbits and Hares**

Rabbits and hares are easy to catch. They live either in burrows or above ground and most often use a specific run that they routinely retrace. Rabbits and hares have long hind legs with small front paws. When looking for rabbits or hares, keep the following in mind:

- They leave little detail on soft ground.
- They have a narrow hind foot with four toes.
- They leave tracks with their hind feet in front of the forefoot instead of side by side.
- They eat tree bark and may nibble the base of a tree.
- They warn other rabbits and hares by using their paws to create sounds. The sound emitted sounds like a thump or someone hitting a cushion.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 35)*

Figure 14-6-7 Rabbit and Tracks

## Squirrels

Squirrels are alert and very nimble. Most are active day and night – feeding on nuts, fruits, shoots and for some bird's eggs. Their nests are usually the size of a small day pack, made of sticks and leaves, high in trees. However, squirrels seek out tree hollows for winter dens. Squirrels are small and their tracks are barely noticeable. Signs of squirrel presence include:

- chewed cones,
- cone scales piled about, and
- loud and almost continuous high-pitched squeals and chirps.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 49)*

Figure 14-6-8 Squirrel and Tracks

## Marmots (Groundhogs)

The groundhog is most commonly found in pastures, on roadsides, and overgrown fields. Groundhogs live alone in burrows up to 9 m long (30 feet), excavated under stumps, rocks or edges of buildings. Normally there are three entrances to the burrows. They are visible, measuring 20–30 cm (8–12 inches) across, with big mounds of dirt nearby.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 91)*

Figure 14-6-9 Marmot (Groundhog) and Tracks

## Porcupines

The porcupine is the second largest rodent. It has sharp quills that are solid at the base and barbed at the tip. This animal feeds mainly on grasses, acorns and twigs and is fond of salt. Their tracks and signs include:

- footprints, where the front paws have four toes and hind paws have five toes,
- trees with bark stripped in irregular patches, and
- nipped twigs littering the ground.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 109)*

Figure 14-6-10 Porcupine and Tracks

## Beavers

Beavers are known as dam builders. They are aquatic animals with scaly, padded-like tails. They can be found using regular runs along streams, lakes, or bogs/marshes and reside in a den known as a beaver house, where they can be trapped. Their tracks and signs include:

- fore footprints that have five toes with claw marks but, often only four show,
- rear footprints that are webbed, roundish and larger,
- water levels that are higher than normal in lakes, bogs or marshes,
- the presence of a beaver dam, lodges, fallen and chewed saplings, and
- the presence of bark shavings near water.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 110)*

Figure 14-6-11 Beaver and Tracks

## Raccoons

The “masked bandit” lives in a variety of habitats, from forests to prairies to city parks. They prefer to be in the vicinity of water and trees and are most abundant in wooded swamps. They reside in dens often in a hollow tree or log, rock crevice, cave or abandoned building. A raccoon’s diet from land sources includes nuts, fruit, insects, small rodents, and birds. Near water they will eat frogs, fish, molluscs and insects. Their tracks and signs include:

- a hind track that is about 7.62 cm (3 inches) long with 5 toes, and
- a front paw that is like a small hand with five fingers.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 99)*

Figure 14-6-12 Raccoon and Tracks

## DETECTING SIGNS OF FEEDING

A skilled eye can often identify the species of animal by the pattern left by teeth or beak marks on a nut, or the way in which a pine cone has been stripped to get at its seeds. Some signs of feeding that may be found in the wilderness include:

- bark stripped from trees,
- the gnawed shells of nuts,
- partially-eaten fruits,
- bitten-off shoots,
- the remains of prey, and
- remains of carnivores or the destruction of nests.

Discarded fruits or nuts are often found when food is plentiful – an animal finds one piece not to its liking and drops it to try another. They not only disclose an animal's presence but suggest bait for traps.

## FINDING DROPPINGS

Droppings (sometimes called scat) are one of the best indications of whether an animal is a herbivore or a carnivore. The size of the animal can be judged from the mass and quantity of droppings. The dropping's dryness is an indication of how long it has been since they were passed. Old droppings will be hard and odourless. Fresh droppings will be wet, still smell and may be covered by flies.

The composition of droppings can be used to figure out what kind of animal deposited it. Bits of plant material (stems, seeds, husks, and stalks) indicate a herbivore (plant eater). There is almost no scent to the droppings of a plant eater, although those that have gorged on berries leave sweet smelling scat.

Droppings filled with animal material (scales, bones, and fur) left by a carnivore, usually has a rank smell. A mass of flies indicate a pile of fresh droppings.



If flies can be heard buzzing but they can not be spotted, there may be fresh kill from a ferocious wild animal. Leave the area immediately.

## IDENTIFYING ROOTINGS

Some animals root up the ground in search of insects and tubers. If the earth is still crumbly and fresh an animal is likely to have been active on the spot. Small scratches may be where a squirrel or other rodents have been digging for shoots.

## DETECTING SCENTS AND SMELLS

Be alert and if you smell anything out of the ordinary. Try and register the smells. They may be indications of wildlife present. Where one kind of animal exists, there will also be others.

---

### CONFIRMATION OF TEACHING POINT 3

---

## QUESTIONS

Q1. When are most animals moving about their environment?

Q2. What route does a rabbit usually follow?

Q3. If you were lost in a wooded area near a lake, what animals may you find?

### ANTICIPATED ANSWERS

A1. Most animals move about their environment during dawn and dusk.

A2. A rabbit will usually follow a specific route that they routinely retrace.

A3. You may find beavers and racoons.

---

### Teaching Point 4

**Conduct an Activity Where Cadets, in Pairs, Will Search the Local Area for Animal and Insect Food Sources by Identifying Two Signs of Recent Activity That Will Lead Them to Food**

Time: 20 min

Method: Practical Activity

---

### ACTIVITY

---

#### OBJECTIVE

The objective of this activity is to have the cadets identify animals and insect food sources by finding signs of recent activity in the field.

#### RESOURCES

Animal and insect handout.

#### ACTIVITY LAYOUT

N/A.

#### ACTIVITY INSTRUCTIONS

1. Divide the cadets into pairs.
2. Distribute the handout located at Annex F.
3. Have the cadets search the training area and identify animals and/or insect food sources by finding signs of recent activity in the field.
4. Have the cadets describe the signs of recent activity, to include:
  - a. type of animal and or insect; and
  - b. estimated size of the animal or insect.

#### SAFETY

- Set boundaries around the areas of use.
- Additional staff can be used to help supervise during this task.

---

### CONFIRMATION OF TEACHING POINT 4

---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

### END OF LESSON CONFIRMATION

---

#### QUESTIONS

- Q1. If a person was to consume 1 g of carbohydrates, how many calories would this produce?
- Q2. What is the danger of consuming only one type of food when in a survival situation?
- Q3. Where would you most likely find a beaver?

#### ANTICIPATED ANSWERS

- A1. 1 g of carbohydrates produces four calories.
- A2. Consuming only one type of food may limit the necessary nutrients the body needs to survive.
- A3. Beavers can be found using regular runs along streams, lakes, or bogs/marshes and residing in their den known as a beaver house.

---

### CONCLUSION

---

#### HOMEWORK/READING/PRACTICE

N/A.

#### METHOD OF EVALUATION

N/A.

#### CLOSING STATEMENT

A person who becomes lost in the field will find themselves in a scary and dangerous situation if they are unaware of how to deal with the situation. Cadets have been provided with knowledge of where and how to locate edible animal and insect food sources that will provide the necessary nutrients to survive.

#### INSTRUCTOR NOTES/REMARKS

N/A.

---

### REFERENCES

---

- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2006). *Camping and Wilderness Survival: The Ultimate Outdoors Book* (2<sup>nd</sup> ed.). Lebanon, NH: Paul Tawrell.
- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C2-148 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival*. Mechanicsburg, PA: Stackpole Books.
- C2-155 (ISBN 978-1-58574-556-2) The Lyons Press. (2002). *U.S. Army Survival Handbook*. Guilford, CT: The Lyons Press.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 7

### EO C324.02 – CONSTRUCT SNARES

---

Total Time:

120 min

---



---

### PREPARATION

---

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare 60 cm (2 feet) lengths of non-ferrous wire for each cadet.

Prepare examples of the different snares and traps for demonstrations on how they work.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TP 1 to introduce constructing snares.

Demonstration and performance was chosen for TPs 2–4 as it allows the instructor to explain and demonstrate constructing snares while providing an opportunity for the cadet to practice these skills under supervision.

---

### INTRODUCTION

---

#### REVIEW

N/A.

#### OBJECTIVES

By the end of this lesson the cadet shall have constructed snares.

#### IMPORTANCE

Non-ferrous wire is a common component in a survival kit. It is used in the construction of snares in a survival situation. It is important for cadets to know how to construct snares because in a survival situation, snares will trap game and provide nourishment.

**Teaching Point 1****Discuss Types of Snares**

Time: 10 min

Method: Interactive Lecture

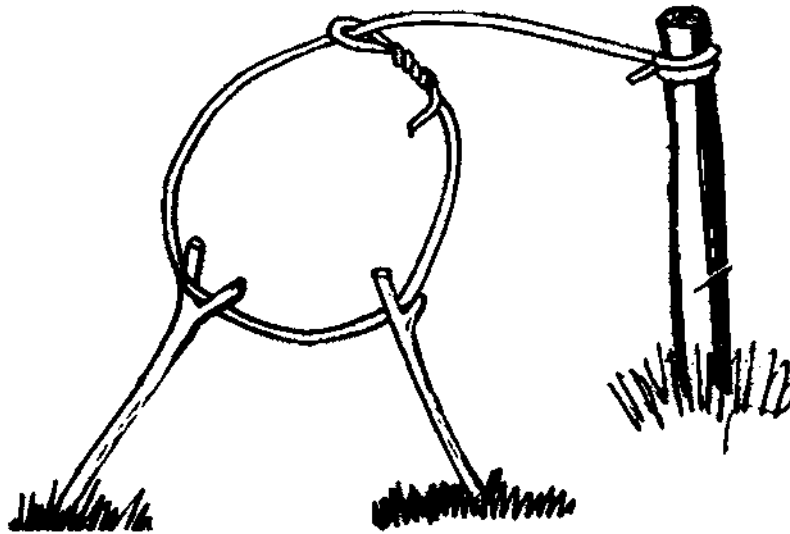


Discuss the different types of snares that can be made to catch wild game.

Snares are the simplest traps and snare wire should be part of any survival kit. Snares are made from non-ferrous wire (wire that is not iron or steel) with a running eye at one end through which the other end of the wire passes before being firmly anchored to a stake, rock or tree. A snare is a free running noose which can catch small game around the throat and larger game around the leg.

**TYPES OF SNARES****Simple Snare**

A simple snare may be made of non-ferrous wire, string, plant cordage, roots, horse hair, rawhide, dried animal entrails, etc. The best material for constructing a simple snare is non-ferrous wire because it keeps its round shape and is easily twisted to make a loop through which the moving part of the wire will slide.

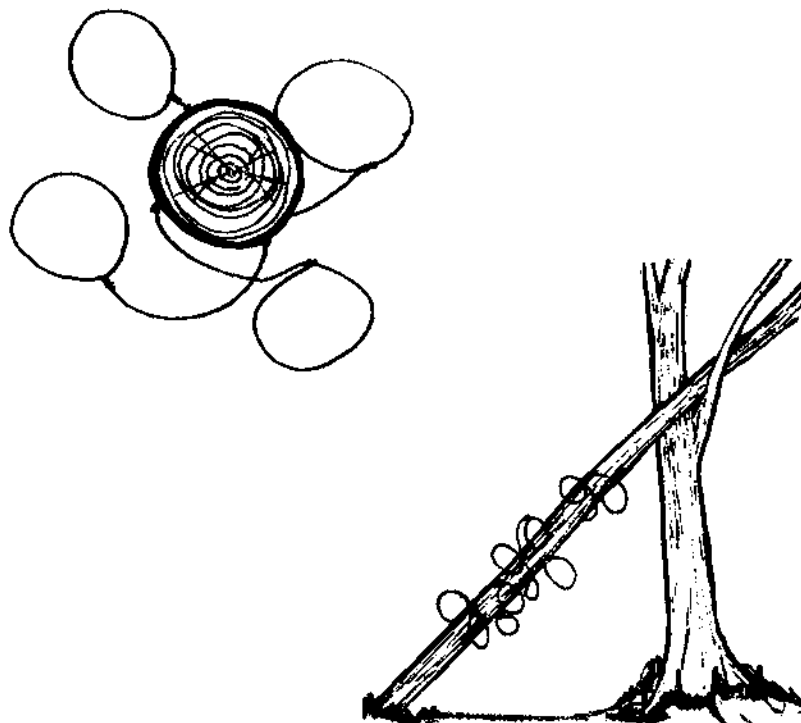


*P. Tawrell, Camping & Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 160)*

Figure 14-7-1 Simple Snare

**Squirrel Trap**

A squirrel trap is made with several small nooses on an inclined log. The squirrel will pass its head through the noose and fall off the log causing the snare to tighten. The dangling squirrel will not deter other squirrels from being caught.

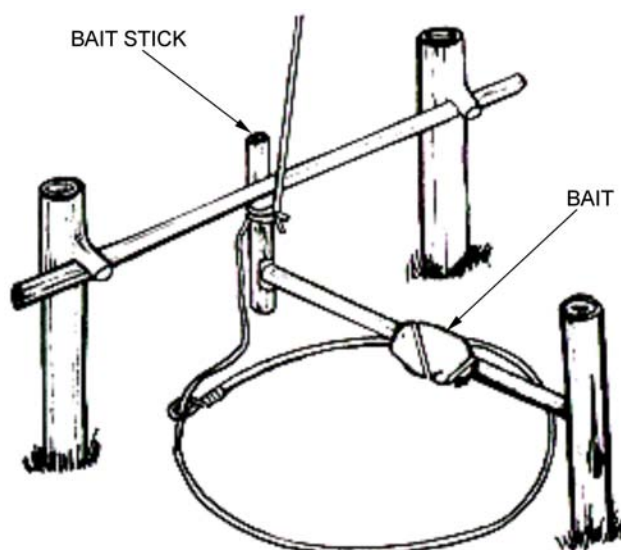


*P. Tawrell, Camping & Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 160)*

Figure 14-7-2 Squirrel Snare

### Baited Spring Snare

A baited spring snare tempts game with food. Once caught, the snare will lift game off the ground. The noose is laid on the ground and the bait strung above. As game takes the bait, the trigger is released. The baited spring snare is suited for medium-sized animals, such as foxes. This trap can be located in an open area as the bait will attract animals. A small clearing in the woods is a good site for the baited spring snare.



*P. Tawrell, Camping & Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 160)*

Figure 14-7-3 Baited Spring Snare

---

## CONFIRMATION OF TEACHING POINT 1

---

**QUESTIONS**

- Q1. Name the three types of snares.
- Q2. Which snare is made with several small nooses on an inclined log?
- Q3. Which snare has a noose laid on the ground?

**ANTICIPATED ANSWERS**

- A1. The three types of snares are a simple snare, a squirrel trap and a baited spring snare.
- A2. A squirrel trap is made with several small nooses on an inclined log.
- A3. The baited spring snare has a noose laid on the ground.

**Teaching Point 2****Explain, Demonstrate and Have the Cadet Construct a Simple Snare**

Time: 35 min

Method: Demonstration and Performance



For this TP, it is recommended that instruction take the following format:

1. Explain and demonstrate constructing a simple snare while cadets observe.
2. Explain and demonstrate each step required to construct a simple snare. Monitor cadets as they imitate each step.

**Note:** Assistant instructors may be employed to monitor the cadets' performance.

**SIMPLE SNARE****Constructing A Simple Snare**

Instructions for constructing a simple snare:

1. **Select the Site.** Find the game trails or runs, which lead from the animal's home to where it feeds or waters. Look for natural bottlenecks along the route where it will have to pass through (deadwood fall or a place where the track goes under an obstruction). Guidelines to set a snare include:
  - **Avoid Disturbing the Environment.** Do not walk on the game trail. Do all preparation off the trail and do not leave any sign that you have been there.
  - **Hide Scent.** When constructing or handling traps do not leave a scent on them. Handle as little as possible and wear gloves. Make a trap of the same type of wood that is in the surrounding environment. Each tree gives off its own smell. Animals have an acute sense of smell and may be wary of a different scent. Exposing a snare to smoke can mask any human scent.
  - **Camouflage.** Hide freshly cut ends of wood with mud. Cover any snare on the ground to blend it as naturally as possible with its surroundings.
2. **Make the Snare From Wire.** Use non-ferrous wire, to make a loop, fist-width wide, and twist the end of the loop to ensure its stability while allowing the moving part to slide easily.

3. **Set the Snare.** Keep in mind the type of animal that is being trapped and set the snare above the ground, next to an obstruction on the trail (for a rabbit use four fingers above the ground and one hand width from the obstruction).
4. **Anchor Securely.** Check that the snare is anchored securely, with twigs to support the loop, if necessary. A snared animal is fighting for its life. It will exert a lot of energy in an attempt to escape. Any weakness in the trap will be exposed.
5. **Make a Funnel.** The animal run can be directed to the trap increasing the likelihood of a successful capture. To make a funnel place twigs and boughs and other obstructions that will guide animals into the snare.

---

## ACTIVITY

Time: 25 min

---

### OBJECTIVE

The objective of this activity is to have the cadets construct a simple snare.

### RESOURCES

- Non-ferrous wire, and
- Knife.

### ACTIVITY LAYOUT

N/A.

### ACTIVITY INSTRUCTIONS

1. Divide the cadets into pairs.
2. Provide each pair with non-ferrous snare wire and a knife.
3. Have the cadets construct a simple snare as demonstrated at the beginning of the lesson. Snares shall be constructed to simulate trapping rabbits.
4. Have the cadets tour each site. Debrief the cadets on each snare identifying strengths and weaknesses.
5. Have the cadets disassemble the snares and return materials.

### SAFETY

N/A.

---

## CONFIRMATION OF TEACHING POINT 2

---

The cadets' participation in the activity will serve as the confirmation of this TP.

**Teaching Point 3****Explain, Demonstrate and Have the Cadets Practice  
Constructing a Squirrel Trap**

Time: 35 min

Method: Demonstration and Performance



For this TP, it is recommended that instruction take the following format:

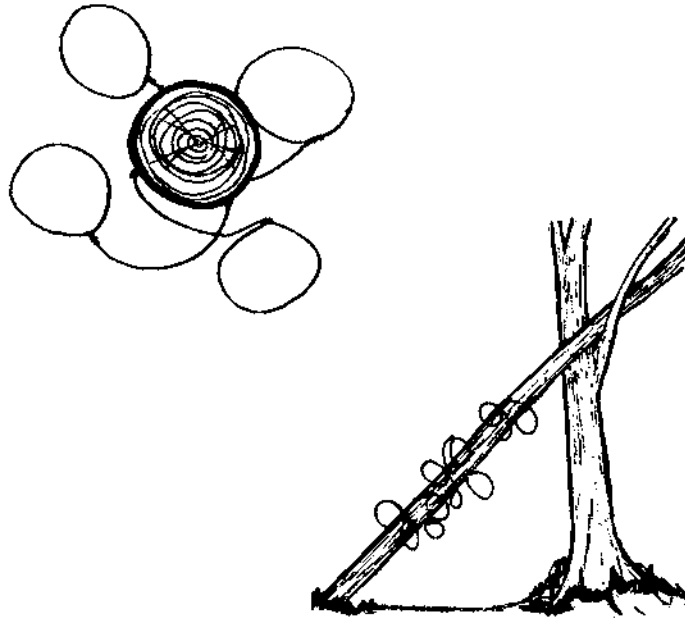
1. Explain and demonstrate constructing a squirrel trap while cadets observe.
2. Explain and demonstrate each step required to construct a squirrel trap. Monitor cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

**Note:** Assistant instructors may be employed to monitor the cadets' performance.

**SQUIRREL TRAP**

Instructions for constructing a squirrel trap:

1. **Select the Site.** Find the game trails or runs, which lead from the animals' home to where it feeds or waters. When setting the squirrel trap identify the squirrel's run by locating a worn down route or tracks. Look for natural bottlenecks along the route where the squirrel will have to pass through or over and set the trap in combination with the following guidelines:
  - **Avoid Disturbing the Environment.** Do not walk on the game trail. Do all preparation off the trail and do not leave any sign that you have been there.
  - **Hide Scent.** When constructing or handling traps do not leave your scent on them. Handle as little as possible and wear gloves. Make a trap of the same type of wood that is in the surrounding environment. Each tree gives off its own smell. Animals have an acute sense of smell and may be wary of a different scent. Exposing a snare to smoke can mask any human scent.
  - **Camouflage the Trap.** Hide freshly cut ends of wood with mud. Cover any snare on the ground to blend it as naturally as possible with its surroundings.
2. **Make Several Small Nooses.** Use non-ferrous wire to make a loop, fist-width wide, and twist the end of the loop to ensure its stability while allowing the moving part to slide easily. Make several nooses as illustrated in Figure 14-7-4.



*P. Tawrell, Camping & Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 160)*

Figure 14-7-4 Squirrel Trap

3. **Arrange Nooses on an Inclined Trunk.** Arrange several small nooses on an inclined trunk. The squirrel will pass its head through the noose and fall off the log. The dangling squirrel will not deter other squirrels from being caught.

## ACTIVITY

Time: 25 min

### OBJECTIVE

The objective of this activity is to have the cadets construct a squirrel trap.

### RESOURCES

- Non-ferrous wire, and
- Knife.

### ACTIVITY LAYOUT

N/A.

### ACTIVITY INSTRUCTIONS

1. Divide the cadets into pairs.
2. Provide each pair with non-ferrous snare wire and a knife.
3. Have the cadets construct a squirrel trap as demonstrated at the beginning of the lesson.
4. Have the cadets tour each site. Debrief the cadets on each snare identifying strengths and weaknesses.
5. Have the cadets disassemble the snares and return materials.



During the debriefing ask cadets how many of them made the traps with their bare hands. Remind cadets how scent can deter animals, and how important it is to try and conceal their scent while setting traps.

## SAFETY

N/A.

---

### CONFIRMATION OF TEACHING POINT 3

---

The cadets participation in the activity will serve as the confirmation of this TP.

---

## Teaching Point 4

### Explain, Demonstrate and Have the Cadets Practice Constructing a Baited Spring Snare

Time: 35 min

Method: Demonstration and Performance



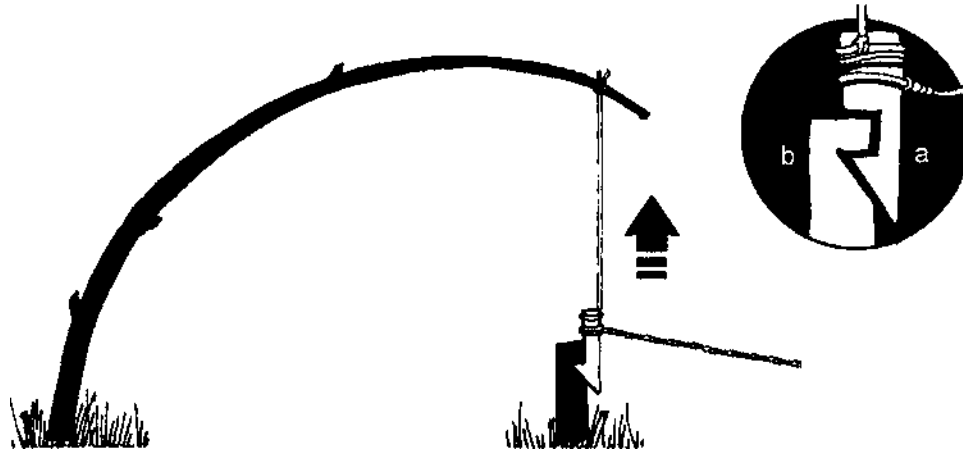
For this TP, it is recommended that instruction take the following format:

1. Explain and demonstrate constructing a baited spring snare while cadets observe.
2. Explain and demonstrate each step required to construct a baited spring snare. Monitor cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

**Note:** Assistant instructors may be employed to monitor the cadets' performance.

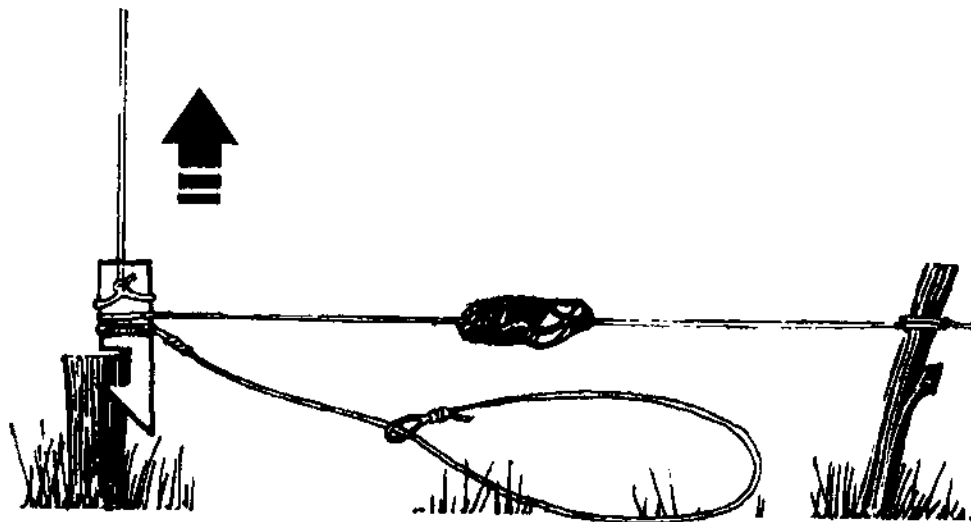
## BAITED SPRING SNARE

A baited spring snare is situated in the open and lures animals to it with food. The bait is laid on the ground or strung above. As the game takes the bait, the trigger is released. When game is caught the trigger bar disengages and the game is lifted off the ground. This snare is good for animals such as rabbits and foxes, as it will trap game coming in both directions and is situated in an open area, as the bait will attract attention.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 188)*

Figure 14-7-5 Squirrel Snare



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 188)*

Figure 14-7-6 Baited Spring Snare

Instructions for constructing a baited spring snare:

1. **Locate a Spring.** Find the game trail or run close to an open area close to a possible spring snare. The spring should be a small tree, two to five years old, that is flexible and can hold the weight of a small animal. The guidelines when constructing a baited spring snare are:
  - **Avoid Disturbing the Environment.** Do not walk on the game trail. Do all your preparation off the trail and do not leave any sign that you have been there.
  - **Hide Scent.** When constructing or handling traps do not leave a scent on them. Handle as little as possible and wear gloves. Make a trap of the same type of wood that is in the surrounding environment. Each tree gives off its own smell. Animals have an acute sense of smell and may be wary of a different scent. Exposing a snare to smoke can mask any human scent.
  - **Camouflage.** Hide freshly cut ends of wood with mud. Cover any snare on the ground to blend it as naturally as possible with its surroundings.

2. **Make a Trigger Bar.** A trigger bar is the string that stretches across and above the trap (this can be a stick as well). It is created by stretching a string from a stake to the release mechanism. Bait is placed or attached to the string and when moved will release the spring mechanism, catching the animal.
3. **Cut Release Notches.** The release notches are cut to resemble a sharp end with a notch located a few centimetres down from the tip. The notch locks the two bars together until the bar is moved as illustrated in Figure 14-7-5.
4. **Bait the Line.** Determine the animal to be caught and bait it accordingly. The bait should be wrapped tightly to the trigger bar or string, forcing the animal to bite the bait roughly. The movement will release the spring.
5. **Set the Noose.** Once all parts have been constructed set a snare on the ground under the bait and:
  - a. Attach the snare to the release notch system (Part A as seen in Figure 14-7-5).
  - b. Attach baited string to release (Notch A as seen in Figure 14-7-5).
  - c. Drive a stake into the ground with Notch B. The stake must be able to handle the pulling of the spring. Drive the stake in on an angle to add strength to the stake.
  - d. Set spring by attaching a string to the tip of the spring. The string should reach release Notch A however the spring must have a bend (bow) in it. When tripped it will release with force pulling the snare, trapping the animal and lifting the animal into the air.
  - e. Pull the spring to the ground.
  - f. Set release notches together and slowly allow the system to establish tension.
  - g. Have the spring and lines hold under the tension of all parts. Any jolt to the system should release the notches and activate the spring, pull the snare and catch the animal.

---

## ACTIVITY

Time: 25 min

---

### OBJECTIVE

The objective of this activity is to have the cadets construct a baited spring snare.

### RESOURCES

- String,
- Simulated bait,
- Knife, and
- Non-ferrous snare wire.



Bait can be anything small that attaches to the line. The idea here is to attach something that will simulate the use of bait, luring the game to the trap.

### ACTIVITY LAYOUT

N/A.

**ACTIVITY INSTRUCTIONS**

1. Divide the cadets into pairs.
2. Provide each pair with non-ferrous snare wire, string, simulated bait and a knife.
3. In pairs, have the cadets construct a baited spring snare as demonstrated at the beginning of the lesson.
4. Have the cadets tour each site. Debrief the cadets on each snare identifying the strengths and weaknesses.
5. Have the cadets disassemble the snares and return materials to the instructor.



During the debriefing ask cadets how many of them made the traps with their bare hands. Remind cadets of how scent can deter animals, and how important it is to try and conceal their scent while setting traps.

**SAFETY**

The spring snare can be dangerous when setting. Caution cadets to be careful not to accidentally release the spring on themselves. The spring should not lift cadets off the ground, however. the tree can afflict injury to an eye or other body parts.

---

**CONFIRMATION OF TEACHING POINT 4**


---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

**END OF LESSON CONFIRMATION**


---

The cadets' participation in constructing snares will serve as the confirmation of this lesson.

---

**CONCLUSION**


---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

If a cadet is in a survival situation, the cadet may rely on their training to construct snares and traps to catch wild game to provide their nutritional requirements until rescue.

**INSTRUCTOR NOTES/REMARKS**

Additional instructors may be required to help with the construction of snares and supervision of cadets during activity sessions.

Instructors are to clearly communicate that the intent of this lesson is to prepare cadets for a survival situation. Cadets should not be encouraged to actually trap game during this lesson.

---

**REFERENCES**

---

- C2-004 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.
- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 8

### EO C324.03 – CATCH A FISH

Total Time:

90 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Check provincial fishing regulations prior to conducting a fishing activity; a provincial permit must be purchased if required.

Prepare examples of each fishing instrument in TP 2 to aid in the explanations and demonstrations.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TPs 1 and 2 to introduce and orient the cadet to catching a fish.

Demonstration and performance was chosen for TP 3 as it allows the instructor to explain and demonstrate constructing fishing instruments while providing an opportunity for the cadet to practice under supervision.

A practical activity was chosen for TP 4 as it is an interactive way to allow the cadets to practice fishing with constructed fishing instruments. This activity contributes to the development of their outdoor survival skills in a fun and challenging setting.

### INTRODUCTION

#### REVIEW

N/A.

#### OBJECTIVES

By the end of this lesson the cadet shall have attempted to catch a fish.

#### IMPORTANCE

Fishing equipment is a common component in a survival kit. This equipment is used to catch fish in a survival situation. It is important for cadets to learn how to catch fish because fish are a valuable food source, containing

protein, vitamins and fats. Knowing when, where and how to catch fish will be a key survival skill in the event a cadet becomes lost.

---

### Teaching Point 1

### Explain Fishing

Time: 5 min

Method: Interactive Lecture

---



Some cadets may have experience fishing, allow them to provide their personal experiences.

### WHERE TO FISH

Fish constantly swim in bodies of water and can be found in locations where there is a food source. The location is affected by temperature and time of day.

**Hot Weather.** If it is a hot day and the water is low, fish will usually be found in deeper water where there is shade and it is cooler.

**Cold Weather.** In cold weather, fish choose a shallow area where the sun has warmed the water. Lake fish tend to keep to the edges, which are warmer.

**Rivers.** Fish are found in areas where a tributary feeds the mainstream with less flow, under shelter of banks, below rocks and under submerged logs. If a river is flooding, fish will stay where the water is not rushing – on the outside of a bend.

### WHEN TO FISH

In the summer it is more likely to catch fish in the morning between first light and 1030 hours. They tend to hit better if the water is dead calm and the skies are clear.



**Hit.** Fish bite the bait or strike the bait.

In early spring, fish tend to feed during different hours of the day. As a general rule, leave lines out overnight and check them just before first light, some fish will feed at night during a full moon. If a storm is imminent, fish before it breaks. Fishing is poor in a river after heavy rain.

Signs that fish are feeding, and therefore likely to take the bait, are when they jump out of the water, or there are frequent clear ring ripples breaking out where fish are taking flies off the surface. Lots of little fish darting about may mean larger fish are pursuing.



Arctic Alaska's Kiana Lodge. Retrieved April 11, 2008, from [http://www.alaskasheefishing.com/alaska\\_fishing.htm](http://www.alaskasheefishing.com/alaska_fishing.htm)

Figure 14-8-1 Fish Jumping



Ingram Publishing, by Ingram Publishing. Retrieved April 11, 2008, from <http://www.jupiterimages.com/popup2.aspx?navigationSubType=itemdetails&itemID=22741844>

Figure 14-8-2 Ripples on a Lake

### CONFIRMATION OF TEACHING POINT 1

#### QUESTIONS

- Q1. If it is a hot day where would a person usually find fish?
- Q2. In cold weather where can fish be found in a lake?
- Q3. In the summer when would be the best time to go fishing?

#### ANTICIPATED ANSWERS

- A1. If it is a hot day, fish will usually be found in deeper areas where the water is cooler.
- A2. Lake fish tend to keep to the edges which are warmer.
- A3. In the summer it is more likely to catch fish in the morning between first light and 1030 hours.

#### Teaching Point 2

#### Discuss Fishing

Time: 5 min

Method: Interactive Lecture



Discuss with cadets the materials that are required to go fishing and the different types of bait that can be used.

Some cadets may be experienced anglers, have them discuss their experiences and knowledge to encourage class participation during instruction.

#### FISHING TACKLE

Fishing tackle is a general term that refers to the equipment used to fish with. The following are some types of tackle required to fish when in a survival situation:

**Hook.** Used to catch a fish, it is often found tied to the end of a fishing line. The hook is swallowed by a fish and impales the body allowing the angler to retrieve the fish.

Some commonly used hooks are skewers and shank hooks (made from bone, wood, or plastic) and safety pin hooks. Large hooks will catch large fish like salmon and pike. Small hooks will catch a range of sizes, but will also be able to catch small fish like perch, bass and trout.



*Welcome to Fishing Reports, Copyright 1996–2006 by Fish Reports.net. Retrieved April 11, 2008, from <http://www.fishreports.net/fishing-gear/images/fishing-hook.jpg>*

Figure 14-8-3 Fishing Hook



**Cast.** To throw out a fishing line into the water.

**Line.** A line is used to cast the hook into the water. When the fish is caught on the hook, the line allows the fisherman to retrieve the fish by pulling in the line. Lines can be made by twisting bark or cloth fibres together.



Although a line can be attached to a single pole it is more efficient to set multiple lines tied to the end of one or several long, straight branches. By sticking these poles into the ground, one can catch fish while attending to other chores.

**Float.** A float is a object that attaches to the fishing line and floats restricting the hook from resting on the bottom of the lake (eg, Styrofoam, plastic bottle, bobber, wood etc). The float should be easily seen from shore and identifies when a fish has taken the bait by bobbing in the water or moving about.

The float should be attached to the line where it will allow the bait to be suspended approximately 30 cm (12 inches) off of the bottom of the lake. The float's position will help control casting and where the line descends.

**Weight.** A weight is used to sink the hook. In a river, the current can cause the hook to float. By adding weights, the hook can trail in a deeper position. Weights can be made from anything heavy in comparison to the line and hook (pebbles, lead, wire, flat washer, nut or bolt).

Small weights between the float and the hook will stop the line from following a current while trailing. To obtain a deeper hook position, extend the line below the hook and attach weights to the end of the line.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 16)*

Figure 14-8-4 Weights

## BAIT

Bait is what is used to lure fish to a hook. The bait increases the chances of catching a fish. Bait may be berries that hang over the water or insects that breed in and near the water. Scavenger fish will take pieces of meat, raw fish, ants and other insects. Using bait native to the fishes' water is most likely to be successful. If one type of bait is unsuccessful, change to another.



Once you have a catch, examine the stomach contents of the fish and eliminate the guess work as to diet.

**Live.** Worms, maggots, insects and small fish can be used as live bait. Cover the hook completely with the bait. You can place the hook through the meat part of a small fish without killing them, or through the body of a grasshopper. Their distressed movement in the water will attract the fish. Small fish are easy to catch, and can be used as bait to catch bigger fish.



*Discover Entomology, by C.D. Patrick, Grasshoppers and Their Control, Copyright 2008 by Texas A&M University Department of Entomology. Retrieved March 5, 2008, from <http://insects.tamu.edu/extension/bulletins/l-5201.html>*

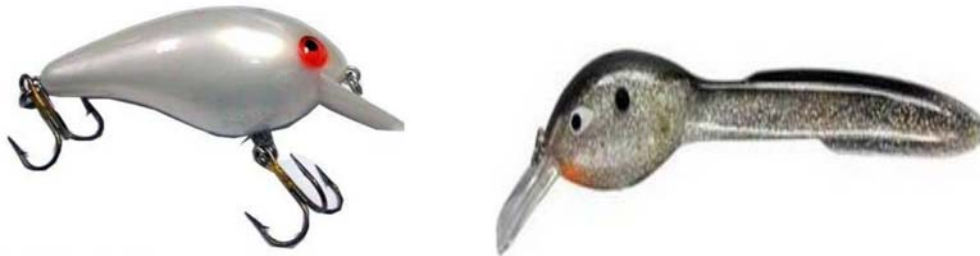
Figure 14-8-5 Grasshopper



*Cheshire Wildlife Trust, Find Out About Earth Worms, Copyright 2004 by Cheshire Wildlife Trust. Retrieved March 5, 2008, from [http://www.wildlifetrust.org.uk/cheshire/watch\\_earthworms.htm](http://www.wildlifetrust.org.uk/cheshire/watch_earthworms.htm)*

Figure 14-8-6 Earth Worm

**Lures.** A lure is an object attached to the end of the fishing line and designed to resemble and move like prey. The purpose of the lure is to use movement, vibrations, and colour to catch the fish's attention and make them bite the hook. Lures are equipped with one or more single, double, or triple hooks that are used to hook fish when they attack the lure. Fishing with a hook and line is the common way of fishing. Hooks and lines are part of most survival kits. Hooks may also be constructed from wire, pins, bones, wood and even thorns.



*Canadian Tire, Copyright 1997–2008 by Canadian Tire Corporation, Limited. Retrieved April 15, 2008, from <http://www.canadiantire.ca/home.jsp>*

Figure 14-8-7 Fishing Lures

**Berries.** Wild berries that grow around the water's edge may be bait. When the wind blows over hanging trees drop berries into the water and fish will eat them. Baiting the line with the berries may increase the chances of catching a fish.

---

## CONFIRMATION OF TEACHING POINT 2

---

### QUESTIONS

- Q1. What materials can hooks be made from?
- Q2. What are the types of fishing tackle?
- Q3. What are the types of bait available?

## ANTICIPATED ANSWERS

- A1. Hooks can be made from bone, wood, or plastic. (Answers may vary, keep an open mind of the possible solutions when accepting answers to this question.)
- A2. The types of fishing tackle include hooks, line, floats and weights.
- A3. The types of bait are live, lures and berries.

### Teaching Point 3

### Explain, Demonstrate and Have the Cadets Practice Constructing Fishing Instruments

Time: 35 min

Method: Demonstration and Performance



For this TP, it is recommended that instruction take the following format:

1. Explain and demonstrate the complete skill while cadets observe.
2. Explain and demonstrate each step required to complete the skill.
3. Have the cadets practice the skill.

**Note:** Assistant instructors may be employed to monitor the cadets' performance.



Show the cadets how to exactly make and set up each instrument. Be thorough in the examples and demonstrations given. The cadets may experience difficulty making the automatic fishing rod.

## HOOK AND LINE

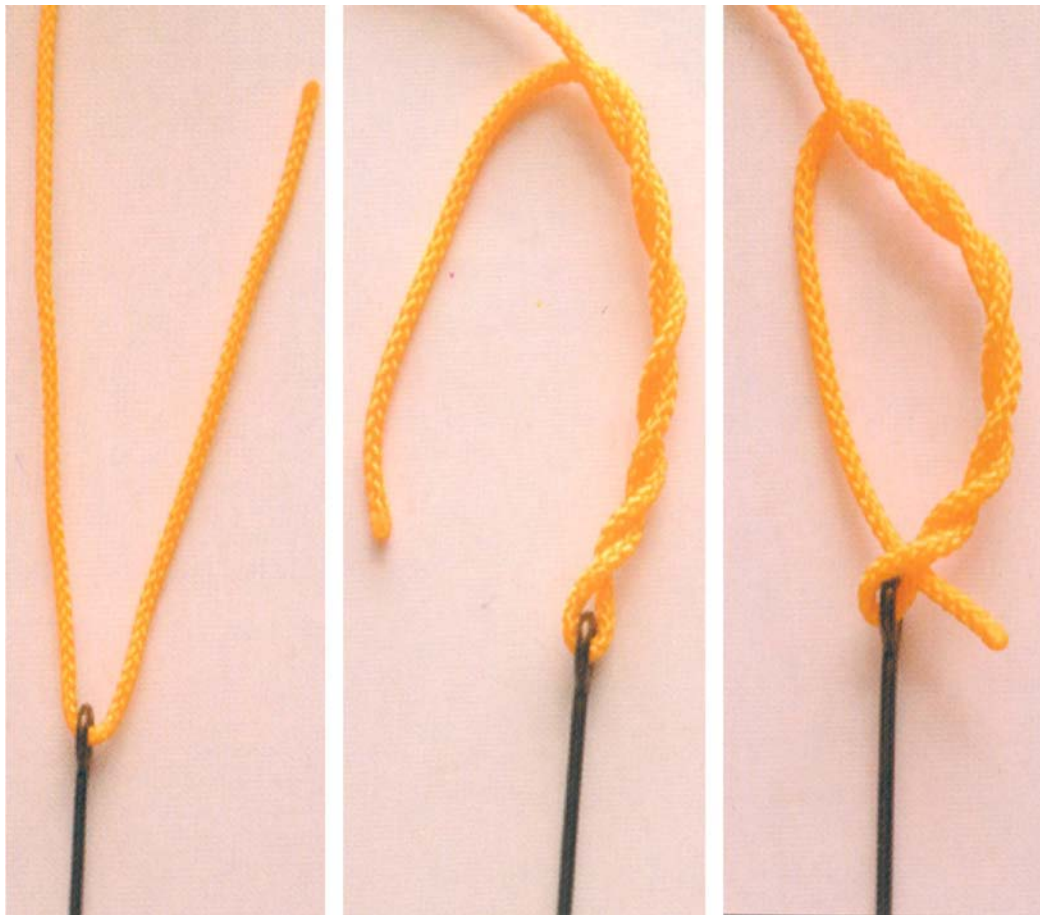
A person does not require a rod to fish. Using just a hook and line is effective and usually in a survival kit. Initially, people may find that fishing with a hook and line is the most effective for a given water source. This technique is familiar to most people, takes little time and skill. The only disadvantage is that it often requires a sizable length of line or cordage and proper bait. Hooks for this instrument may be made of bone, wood, plastic or any other suitable materials.

**Standard Hook.** This hook is manufactured and fashioned in a factory made of metal and has an eye loop on one end with a sharp barb on the other end as seen in Figure 14-8-9. Tie the fishing line to the hook securely using an improved clinch knot (as illustrated in Figures 14-8-8 and 14-8-9.)



To make a clinch knot complete the following steps:

1. Put the end of the line through the eye of the hook.
2. Twist the short end a round the main part of the line three or four times.
3. Tuck the end of the line back through the start of the twist.
4. Pull tight (practice line may need a little coaxing and nylon a little lubrication).



*D. Pawson, Pocket Guide to Knots and Splices, Chartwell Books, Inc. (p.158–159)*

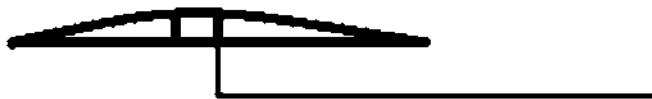
Figure 14-8-8 Clinch Knot Steps 1, 2 and 3



*D. Pawson, Pocket Guide to Knots and Splices, Chartwell Books, Inc. (p.159)*

Figure 14-8-9 Clinch Knot Steps 4 and Finished Knot

**Skewer Hook.** A skewer hook is a sliver of wood or plastic that is notched and tied at the middle. When baited, this hook is turned parallel to the line making it easier for the fish to swallow. Once the fish takes the bait, a simple tug on the line will turn the skewer sideways, lodging it in the fish's mouth.



*Director Cadets 3, 2008, Ottawa, ON: Department of National Defence*

Figure 14-8-10 Skewer Hook

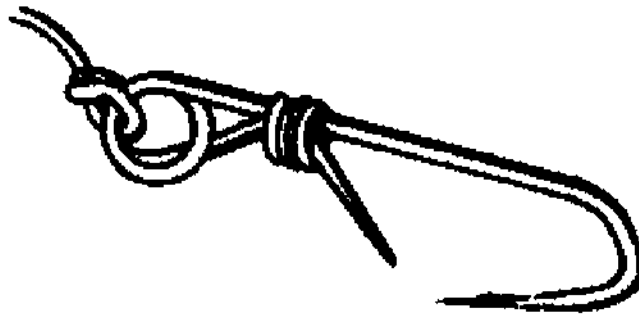
**Shank Hook.** A shank hook is made by carving a piece of wood or plastic until it takes on the shape of a hook that is notched and tied to the line at the top (Figure 14-8-11 depicts a piece of wood that has been carved down to a hook). When the fish swallows the hook, a tug on the line will set it by causing the hook end to lodge in the fish's throat.



*G. Davenport, Wilderness Survival, Stackpole Books (p. 167)*

Figure 14-8-11 Shank Hook

**Safety Pin Hook.** A safety pin can be manipulated to create a hook. Depending on the size of the safety pin, this system can catch fish of various sizes and is a good option.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 225)*

Figure 14-8-12 Safety Pin Hook

## **AUTOMATIC FISHING ROD**

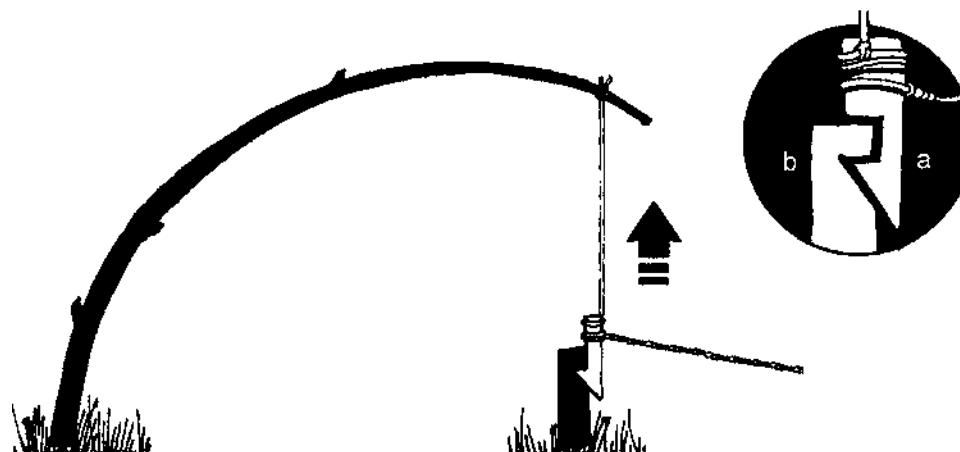
The automatic fishing rod works similarly to the baited spring snare in EO C324.02 (Construct Snares, Section 7). To construct an automatic fishing rod:

1. **Tying Several Hooks Onto a Line.** Make a hook and line. The line should have many hooks attached to it increasing the chances of a catch.
2. **Locating a Fishing Rod.** The automatic fishing rod requires a flexible tree, bush or branch close to the water's edge that is capable of, when released, pulling on the line hooking the fish.
3. **Setting the Fishing Rod With a Trigger.** The fishing rod will have to be set up to release when a fish eats the bait and attempts to swim away. The movement on the line should activate the spring and hook the fish.

Follow these steps to create a fishing rod with a trigger:

1. Find a small tree or flexible bush or branches close the water's edge that is suitable to lift a fish into the air.
2. Attach a string to the top of the tree or flexible bush or branches that will be used as the spring.
3. Construct a trigger release by:
  - a. finding a stake you can drive into the ground that will be able to support the weight of the spring;
  - b. making a notch in the stake (as illustrated in Figure 14-8-13); and
  - c. finding a similar size piece of wood that will link to the stake as the trigger release, cut a release notch in it (as illustrated in Figure 14-8-13).

4. Make a hook and line. The line should have many hooks attached to it increasing the chances of a catch.
5. Bait the hooks.
6. Attach the hook and line to trigger release A.
7. Cast the hook and line into the water and then tie the string from the tree to trigger release A.
8. Set trigger release A into B and gradually release the tree allowing tension to arm the automatic fishing rod.
9. Wait for a fish to activate the release mechanism.



*J. Wiseman, The SAS Survival Handbook, HarperCollins publishers (p. 188)*

Figure 14-8-13 Automatic Fishing Rod

## SPEAR

The spear is the simplest of all fishing instruments to construct, however, the hardest to be successful with. It is a straight green stick or sapling with a sharpened point and barbs (as illustrated in Figure 14-8-14). Spearing a fish is difficult except when the stream is small or the body of water is shallow and the fish are large and numerous as during spawning season or when the fish congregate in pools. Shallow water makes it easier to see fish and spear them.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 169)*

Figure 14-8-14 Barbed Spear

Follow these steps to make a spear:

1. **Sharpening a Long Stick.**
  - a. Find or cut a long, straight sapling or stick.
  - b. Sharpen the end to a point using a knife or the friction of a rock.
  - c. It is also possible to use the 'Y' of a hardwood branch. Cut the branch, sharpen the end and tie to the spear.



Some sticks may still be green and fragile. To make a spear more durable, harden the wood by holding the tip of the spear over an open flame to dry the wood. It is dry once the ends turn brown.

2. **Adding Barbs.** Barbs will stop the fish from sliding off the spear when impaled. To add barbs, on the sharp side cut angled notches into it. The notches will have to be cut in the direction of the sharp point (as illustrated in Figure 14-8-13).
3. **Aiming.** To aim a spear consider the following:
  - Aiming can be tricky as water diffracts light (similar to what a magnifying glass does to the view you see that is distorted) and the fish will not be where it looks like it is. The fish will actually be closer than it appears, so the person will have to aim low.
  - To learn how to judge the fish's position, point the spear at a rock under water and push toward it without throwing the spear into the water.
  - The chances of hitting the rock on the first attempt will be slim but the person will learn the angle which is required to spear the rock.

---

### CONFIRMATION OF TEACHING POINT 3

---

#### QUESTIONS

- Q1. What kind of hooks can you use for a hook and line fishing instrument?
- Q2. How does an automatic fishing rod work?
- Q3. How can you make a spear more durable?

#### ANTICIPATED ANSWERS

- A1. The hooks that can be used on a hook and line fishing instrument are a standard, skewer, shank and a safety pin hook.
- A2. An automatic fishing rod works similarly to the baited spring snare.
- A3. To make a spear more durable harden the wood by holding the tip of the spear over an open flame to dry the wood. It is dry once the ends turn brown.

**Teaching Point 4****Have the Cadets Attempt to Catch a Fish Using One Type of Fishing Instrument**

Time: 35 min

Method: Practical Activity

**ACTIVITY****OBJECTIVE**

The objective of this activity is to have cadets attempt to catch a fish using one type of fishing instrument.

**RESOURCES**

- Fishing line,
- Hooks,
- Safety pin, and
- Knife.

**ACTIVITY LAYOUT**

N/A.

**ACTIVITY INSTRUCTIONS**

1. Have the cadets select one of the following fishing instruments:
  - a. hook and line,
  - b. automatic fishing rod, or
  - c. a spear.



Cadets who choose to make an automatic fishing rod will be in a group of three to speed construction and save resources.

2. Have the cadets construct a fishing instrument and attempt to catch a fish.
3. Have the cadets who are successful at catching a fish, construct another instrument and attempt to catch another fish.
4. Have the cadets disassemble their fishing instrument.
5. Complete a group discussion about the cadets' experience and what they learned about using constructed fishing instruments.



Cadets are not required to keep the fish they catch. If a fish sustains only minor injuries during the catching process, release the fish back into the water. Catch and release practices will be encouraged.

## **SAFETY**

Cadets will be close to a body of water. Additional supervision is required to monitor the cadets.

---

### **CONFIRMATION OF TEACHING POINT 4**

---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

### **END OF LESSON CONFIRMATION**

---

The cadets' participation in fishing with constructed fishing instruments will serve as the confirmation of this lesson.

---

### **CONCLUSION**

---

## **HOMEWORK/READING/PRACTICE**

N/A.

## **METHOD OF EVALUATION**

N/A.

## **CLOSING STATEMENT**

By learning when, where and how to catch fish cadets can rely on fishing as a means of providing a valuable food source. Fish contain protein, vitamins and fats, the key ingredients for nourishment. This food source will prolong survival while waiting to be rescued.

## **INSTRUCTOR NOTES/REMARKS**

Cadets are not required to keep the fish they catch. If a fish sustains only minor injuries during the catching process, release the fish back into the water. Catch and release practices will be encouraged.

---

### **REFERENCES**

---

- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C2-148 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival*. Mechanicsburg, PA: Stackpole Books.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 9

### EO C324.04 – COLLECT EDIBLE PLANTS

Total Time:

120 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Instructors are recommended to research local flora and provide examples where necessary throughout the lesson.

Conduct a reconnaissance of the surrounding area and collect examples for this lesson.

Locate edible plants in the surrounding area to use as examples for TP 2.

Photocopy Annexes H and I for each cadet.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

An interactive lecture was chosen for TPs 1 and 3 to orient cadets to poisonous plants and illustrate the application of rules when identifying poisonous plants.

Demonstration was chosen for TPs 2 as it allows the instructor to explain and demonstrate ways to determine if plants are edible.

A practical activity was chosen for TP 4 as it is an interactive way to allow the cadets to demonstrate identifying edible plants in a safe, controlled environment. This activity contributes to the development of their outdoor survival skills in a fun and challenging setting.

Demonstration and performance was chosen for TP 5 as it allows the instructor to explain and demonstrate how to conduct the universal edibility test while providing an opportunity for the cadets to practice this skill under supervision.

### INTRODUCTION

#### REVIEW

N/A.

## OBJECTIVES

By the end of this lesson the cadet shall be expected to collect edible plants.

## IMPORTANCE

It is important for the cadets to know how to identify and collect edible plants. In a survival situation, plants are an excellent source of nutrition that can be beneficial to nutritional requirements.

---

### Teaching Point 1

### Discuss Ways to Determine if Plants are Edible

Time: 25 min

Method: Interactive Lecture

---

In a survival situation, a person should always be on the lookout for familiar wild foods. Even in the most static survival situation, maintaining health through a complete and nutritious diet is essential to maintaining strength and peace of mind.

Nature can provide food that will enable a cadet to survive any ordeal. Cadets should therefore learn as much as possible about the flora of the region where they will be training.



The critical factor in using plants for food is to avoid accidental poisoning. Eat only those plants that can be positively identified and are known to be safe to eat.

## THE BERRY RULE

In general, the edibility of berries can be classified according to their colour and composition. The berry rule is a general guide to determine whether the edibility test needs to be performed. The only berries that should be eaten without testing are those that can be positively identified as non-poisonous.

The following is the berry rule:

- Green, yellow and white berries are 10 percent edible.
- Red berries are 50 percent edible.
- Purple, blue and black berries are 90 percent edible.
- Aggregate berries (berries that are a collection of units formed into one body) such as thimbleberries, raspberries and blackberries are considered 99 percent edible.

## EDIBLE PARTS OF A PLANT

Some plants are completely edible, whereas others have both edible and poisonous parts. Plants can be broken down into several distinct components.

### Stems, Roots and Leaves

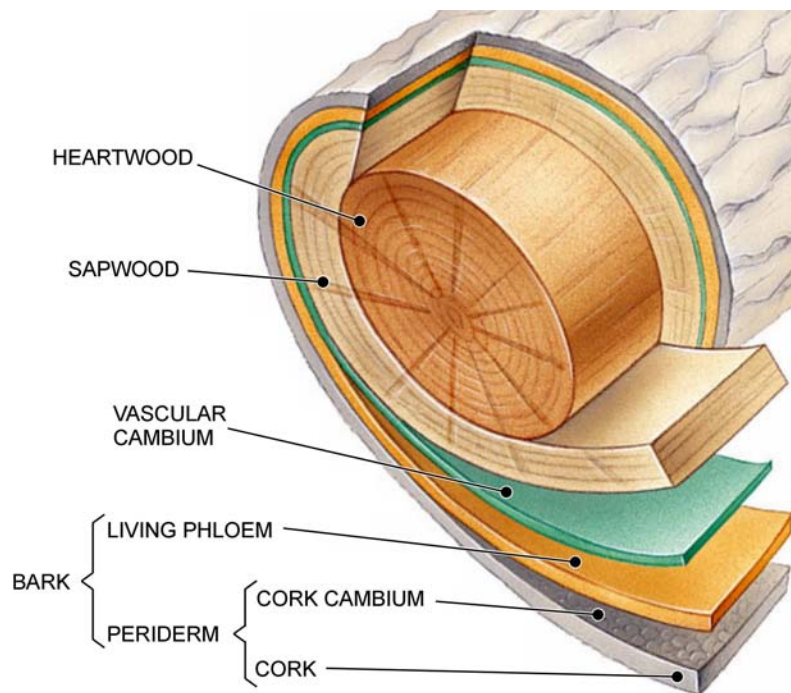
Plants that have stems, roots and leaves are probably the most abundant source of edible vegetation in the world. Their high vitamin content makes them a valuable component of our daily diet. Shoots grow like asparagus and are best when boiled twice (boiled five minutes, drained off and boiled again until done). Some examples of these plants are bracken fern, young bamboo and cattail (as per Figure 14-9-1).

Leaves may be eaten raw or cooked but to achieve the highest nutritional value, they are best eaten raw. The pith, found inside the stem of some plants, has a very high food value. Some examples are sago, rattan, coconut and sugar. Cambium is the inner bark found between the bark and the wood of a tree (as per Figure 14-9-2). It can be eaten raw, cooked, or dried and then pulverized into flour.



"Cattails", Aquasprings, 2007, Retrieved November 15, 2007, from <http://www.aquaspringsinfo.com/cattails.jpg>

Figure 14-9-1 Cattail



UIC, *Plant Structures and Function: UIC*. Retrieved November 15, 2007, from <http://uic.edu/classes/bios/bios100/lectf03am/tree/trunk.jpg>

Figure 14-9-2 Cambium

### **Flowers, Buds and Pollen**

Flowers, buds and pollens are high in food value and are often eaten raw or in a salad. Some examples include hibiscus (flower), rosehips (buds), and cattail (pollen).



*About .com, Holistic Healing, Copyright 2007 by About, Inc. Retrieved November 15, 2007, from <http://healing.about.com/od/floweressences/jg/Flower-Essence-Gallery/Hibiscus.htm>*

Figure 14-9-3 Hibiscus

### **Fruits (Sweet and Non-Sweet)**

Fruits are the seed-bearing part of the plant and can be found in all areas of the world. They are best eaten raw to retain all of their nutritional value, but may also be cooked. Examples of sweet fruits are apples, prickly pears, saskatoon berries and wild strawberries. Examples of non-sweet fruits include tomatoes, cucumber, plantains and horseradish.

### **Nuts**

Nuts are high in fat and protein and can be found around the world. Most can be eaten raw but some, like acorns, require leaching (soaking in water), with several changes of water, to remove their tannic acid.

### **Seeds and Grains**

The seeds and grains of many plants are a valuable food resource and should not be overlooked. Some examples are grasses and millet, best eaten when ground into flour or roasted. Purple or black grass seeds should not be eaten; they often contain a fungal contamination.

### **Seaweed and Algae**

One plant that should never be overlooked is seaweed. It is a form of marine algae found on or near shores. There are also some edible freshwater varieties. Seaweed is a valuable source of iodine, other minerals, and vitamin C.

When gathering seaweed for food, find living plants attached to rocks or that are floating free. Seaweed washed ashore for any length of time may be spoiled or decayed. Freshly harvested seaweed can be dried for later use.

Preparation for eating depends on the type of seaweed. Thin and tender varieties can be dried in the sun or over a fire until crisp. Crush and add to soups or broths. Boil thick, leathery seaweeds for a short time to soften them. Eat them as a vegetable or with other foods. Some varieties can be eaten raw after testing for edibility. Some examples are dulse, green seaweed, irish moss, kelp, laver, mojaban, and sugar wrack.



*Wilderness Survival, "Plants", Copyright 2007 Jalic Inc. Retrieved November 15, 2007, from <http://www.wilderness-survival.net/plants-1.php>*

Figure 14-9-4 Seaweed

---

### CONFIRMATION OF TEACHING POINT 1

---

#### QUESTIONS

- Q1. Which berries are 99 percent edible?
- Q2. Which grass seeds should not be eaten?
- Q3. What should you look for when gathering seaweed?

#### ANTICIPATED ANSWERS

- A1. Aggregate berries such as thimbleberries, raspberries and blackberries are 99 percent edible.
- A2. Purple or black seeds should not be eaten.
- A3. Living plants attached to rocks or that are floating free should be looked for when gathering seaweed.

**Teaching Point 2****Identify Edible Plants**

Time: 15 min

Method: Demonstration



Demonstrate to the cadets where these plants are located and what they look like.

When available, fruits and nuts are one of the survivor's most important foods.

**FRUITS**

**Blackberries/Raspberries.** These berries grow in scrub, woods and on open ground. They have leaves that are toothed and flowers that are white or sometimes pinkish in blackberries. Look for straggly bushes with arching thorny stems and juicy segmented berries, which ripen from green through red to purplish blackberries in late summer. Raspberries are less straggly, have fewer prickles, and ripen to a rich red earlier in the summer. All are edible raw.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 142)*

Figure 14-9-5 Blackberry

**Wild Strawberries.** Wild strawberries grow on small scrambling plants in dry grassy places and woodland areas. The fruits resemble small cultivated strawberries and are sometimes found underneath the leaves. These fruits are rich in vitamin C and are best eaten fresh.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 142)*

Figure 14-9-6 Wild Strawberries

**Crab Apples.** Crab apples are short spiny trees found in scrubland and woods. They can be identified by oval, toothed, often downy leaves, usually reddish-brown twigs and white, pink or red flowers. The fruit, often very bitter, looks like cultivated apples. Too many of the yellowish-green, pectin-rich apples will cause diarrhea and are best cooked with other fruits.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 143)*

Figure 14-9-7 Crab Apples

**Plums.** Plums exist in many varieties, in scrub and woodland, and in virtually all temperate areas. Small scrubs or trees, similar to wild cherries, are larger fruit, downy, blackish-purple, red or yellow in colour. Some are too tart to eat.



*Food Network, Plums, Copyright 2008 by CW Media INC. Retrieved May 2, 2008, from <http://www.foodtv.ca/content/recipes/ContentDetail.aspx?ContentId=2661&Category=Recipes>*

Figure 14-9-8 Plums

**Wild Cherries.** This fruit grows in woodland areas, growing to 24 m (80 feet) tall with small, pale green to reddish leaves, usually shiny-reddish brown bark, and white or pinkish flowers. The fruit is red or black in colour and depending on the kind may taste sour.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 143)*

Figure 14-9-9 Wild Cherries

**Blueberries.** This berry is abundant on northern moors, bogs, tundra, and sometimes in wooded areas. Bushes vary in size, but all are woody and shrubby with small oval leaves and small globe-shaped flowers varying from white to pink or greenish.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 144)*

Figure 14-9-10 Blueberry

### ROOTS, LEAVES AND STEMS

In spring and summer young shoots are tender and easy to pick. Some can be eaten raw, but many are better cooked. Wash them in clean water, rub off any hairs and boil in a small amount of water so that they cook in the steam. The leaves are very rich in vitamins and minerals. Together with young shoots, they are the survivor's easiest source of food. Most shoots taste better cooked, however avoid overcooking because it destroys the vitamins.

**Dandelion.** This plant grows in many forms almost everywhere. Look for large yellow to orange flower heads or the rosette of deeply-lobed leaves. Eat the young leaves raw, but boil the older ones, changing the water to remove the bitter taste. Boil the roots or roast for coffee. Dandelion juice is rich in vitamins and minerals.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 132)*

Figure 14-9-11 Dandelions

**Cattail or Reedmace.** This plant is found in and around swamps and marshy areas. Peeled roots can be eaten raw or cooked. They are an excellent survival food as they can be extracted from the ground if it is not frozen. Roots can be dried and ground into flour. Heads, when green, can be cooked and eaten as corn.



*Aquasprings, 2007, Cattails. Retrieved November 15, 2007, from <http://www.aquaspringsinfo.com/cattails.jpg>*

Figure 14-9-12 Cattail

**Reed.** This plant is located in fresh water almost everywhere, growing to 4 m (13 feet) high, with greyish-green leaves and spreading, brownish-purple flower heads on tall canes. When cooked, if the cane is punctured it will exude an edible sugar-rich gum.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 136)*

Figure 14-9-13 Reed

**Pine.** Found in North America, it has needles that can be chewed. During the spring, the inner bark can be eaten raw or cooked. To cook, cut the bark lengthwise into strips and cook like spaghetti. It can also be dried and ground into flour.



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 972)*

Figure 14-9-14 Pine

**Maple.** Found in the forests of North America, its seeds can be eaten after removing the shell. Maple can be dried and stored. Young leaves are rich in sugar and can be eaten raw, or cooked after being cut into spaghetti-like strips. To collect maple sap, cut a “V” into the tree and drill a 5 cm (2 inch) deep hole and insert a spout.



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 972)*

Figure 14-9-15 Maple

**Sweet Flag.** Found in wetlands and lakes, this flower, stem and leaves can be eaten raw in the spring.



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 975)*

Figure 14-9-16 Sweet Flag

**Willow.** The young leaves of this plant and its inner bark can be eaten raw.



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 975)*

Figure 14-9-17 Willow

## NUTS

**Pine Nut.** This nut comes from the familiar cone-bearing pine tree, seen with clusters of slim evergreen needles found in most temperate and northerly areas. Heat matures the pine cone to release the nuts. They are tasty raw, but delicious roasted. Roasted nuts can be stored.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 146)*

Figure 14-9-18 Pine Nut

**Chestnut.** This nut is found on the tree, ranging from 5–30 m (15–90 feet) high, with large, toothed hairless leaves and bearing catkins. Nuts are borne in globe-shaped, thick prickly green husks. Smash open the husks, peel the nuts, boil and mash to eat.



Do not confuse the chestnut with the horse chestnut which has large palmate leaves, like the fingers on a hand. The horse chestnut is poisonous.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 146)*

Figure 14-9-19 Chestnuts

**Hazelnut.** This nut is found on tall shrubs of thickets and waste ground. It has toothed–oval–heart– shaped leaves and brownish-yellow catkins. The highly nutritious nuts come in ovoid, leafy, bristly, or hairy husks.



*J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 146)*

Figure 14-9-20 Hazelnut

---

## CONFIRMATION OF TEACHING POINT 2

---

### QUESTIONS

- Q1. What fruits are edible?
- Q2. What releases nuts (seeds) from a pine cone?
- Q3. What do the blackberry bushes look like?

### ANTICIPATED ANSWERS

- A1. The fruits that are edible are:
- blackberries/raspberries,
  - wild strawberries,
  - crab apples,
  - plums,
  - wild cherries, and
  - blueberries.
- A2. Heat releases the nuts (seeds) from a pine cone.
- A3. Blackberry bushes have leaves that are toothed and flowers of white or sometimes pink in blackberries. Look for straggly bushes with arching thorny stems and juicy segmented berries.

**Teaching Point 3****Identify How People are Poisoned by Plants**

Time: 15 min

Method: Interactive Lecture



Distribute Annexes H and I to the cadets.

**HOW PEOPLE ARE POISONED BY PLANTS**

There are two common poisons in the plant world:

**Hydrocyanic Acid.** It has the taste and smell of bitter almonds or peaches. The most notable example is the cherry laurel.

**Oxalic Acid.** Its salts occur naturally in some plants, for instance, wild rhubarb and wood sorrel. It is recognized by the sharp, dry, stinging or burning sensation when applied to the skin or tongue.

Plants generally poison by:

**Ingestion.** When a person eats a part of a poisonous plant.

**Contact.** When a person makes contact with a poisonous plant that causes any type of skin irritation or dermatitis.



Dermatitis is the inflammation of the skin.

**Absorption and Inhalation.** When a person either absorbs poison through the skin or inhales it into the respiratory system.

**POISONOUS PLANTS****Plants to Avoid**

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>plants with a milky sap, unless positively identified as safe (such as dandelion).</li> <li>red plants. The red-streaked stalk of wild rhubarb is edible but its leaf is poisonous. Hemlock has reddish-purple splotches on its stem.</li> <li>fruits which are divided into five segments.</li> <li>bulbs (resembling onion or garlic).</li> <li>carrot like leaves, roots or tubers.</li> <li>bean and pea like appearance.</li> <li>shiny leaves or fine hairs.</li> </ul> | <ul style="list-style-type: none"> <li>grasses and other plants with tiny barbs on their stems and leaves.</li> <li>old or wilted leaves. The leaves of some trees and plants develop deadly hydrocyanic acid when they wilt – including blackberry, raspberry, cherry, peach and plum. All may be safely eaten when young, fresh and dry.</li> <li>all mushrooms. Mushroom identification is very difficult and must be precise, even more so than with other plants. Two types of mushroom poisoning are gastrointestinal and central nervous system.</li> </ul> |
|--|--|

### **Plants Which Cause Dermatitis**

The following plants cause dermatitis:

- poison ivy,
- poison oak, and
- poison sumac.

### **Plants Which Cause Ingestion Poisoning**

The following plants cause ingestion poisoning:

- castor bean,
- death camas,
- oleander,
- poison and water hemlock,
- skunk cabbage, and
- stinging nettle.

---

### **CONFIRMATION OF TEACHING POINT 3**

---

#### **QUESTIONS**

- Q1. What are the names of two fairly common poisons in the plant world?
- Q2. What colour plant should be avoided?
- Q3. Name three plants which cause dermatitis.

#### **ANTICIPATED ANSWERS**

- A1. Two names of fairly common poisons in the plant world are hydrocyanic acid and oxalic acid.
- A2. Red plants should be avoided.
- A3. Three plants that cause dermatitis are poison ivy, poison oak and poison sumac.

---

**Teaching Point 4****Conduct an Activity Where the Cadets, in Pairs, Will Search and Collect Two Types of Edible Plants Within the Local Area**

Time: 30 min

Method: Practical Activity

---

---

**ACTIVITY**

---



If poison ivy or other poisonous plants are known to be in the search area, ensure the area is kept off limits to the cadets.

**OBJECTIVE**

The objective of this activity is to have the cadets collect two types of edible plants.

**RESOURCES**

Gloves.

**ACTIVITY LAYOUT**

N/A.

**ACTIVITY INSTRUCTIONS**

1. Divide the cadets into pairs and distribute a pair of gloves to each cadet.
2. Have the cadets search for edible plants.
3. Gather cadets into a group and have them present their plants to the group.
4. Have the group confirm if the plant presented is edible and why.
5. Supervise and give feedback on the cadets' findings.

**SAFETY**

- Cadets should wear gloves when collecting plants. This will avoid any accidental contact with poisonous plants.
- Ensure the cadets do not eat any of their findings until they have been inspected by the instructor.

---

**CONFIRMATION OF TEACHING POINT 4**

---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

**Teaching Point 5****Demonstrate and Have the Cadet Perform the Universal Edibility Test**

Time: 25 min

Method: Demonstration and Performance

---



Always adopt the following procedure when trying potential food sources. NEVER take short cuts and complete the whole test. If in any doubt, do NOT eat the plant.

**UNIVERSAL EDIBILITY TEST**

The universal edibility test is a method a person can use when it is unknown if a plant is safe to eat. This test is not a guarantee that the plant will be safe; however, it will provide some certainty of the plant's edibility. To conduct the test, follow this sequence:

1. **Inspect.** Separate the plant into its basic sections (leaves, stems, roots and flowers). Inspect each section one at a time. Ensure that the plant is not slimy or worm-eaten. Some plants, when old, change their chemical content and become toxic.
2. **Smell.** Crush a small portion. Smell the plant for strong or acid odours. If it smells of bitter almonds or peaches DISCARD.
3. **Rub the Plant on the Skin.** Rub slightly or squeeze some of the juice onto a tender part of the body (under the arm between the armpit and the elbow, for instance). If any discomfort, rash or swelling is experienced DISCARD and reject for future use. Wait 15 minutes and if there is not a reaction, continue.
4. **Place the Plant on the Lips, Mouth and Tongue.** If there is no irritation to the skin proceed with the following steps, going on to the next step after waiting three minutes if there is not an unpleasant reaction:
  - a. Place a small portion on the lips.
  - b. Place a small portion in the corner of the mouth.
  - c. Place a small portion on the tip of the tongue.
  - d. Place a small portion under the tongue.
  - e. Chew a small portion.

In all cases, if any discomfort is felt, such as soreness to the throat, irritation, stinging or burning sensations discard.

1. **Swallow.** Swallow a small amount and wait eight hours. During this period do not eat or drink anything else.
2. **Eat.** If there is no reaction, such as soreness to the mouth, repeated belching, nausea, sickness, stomach pains, griping pains in the lower abdomen or any other distressing symptoms, the plant may be considered safe. Eat a larger portion and wait eight hours again.

---

**ACTIVITY**Time: 15 min

---

**OBJECTIVE**

The objective of this activity is to have the cadets perform the universal edibility test.

**RESOURCES**

- Local vegetation plants,
- Lemons,
- Celery stalks,
- Onions,
- Berries (in season), and
- Spinach leaves.

**ACTIVITY LAYOUT**

N/A.

**ACTIVITY INSTRUCTIONS**

The cadets do not have to wait the eight hours before being able to eat again for this TP.

Ensure the cadets follow the format for testing for poison. Have the cadets:

1. take a piece of fruit or vegetable;
2. inspect the fruit or vegetable;
3. smell the fruit or vegetable;
4. rub the fruit or vegetable on their arm or underside of the wrist;
5. place a small portion of the fruit or vegetable on their lips;
6. place a small portion of the fruit or vegetable in the corner of their mouths;
7. place a small portion of the fruit or vegetable on the tip of their tongue;
8. place a small portion of the fruit or vegetable under their tongue;
9. chew a small portion of the fruit or vegetable;
10. choose another piece of fruit or vegetable; and
11. repeat Steps 1. to 10. until all have had a chance to try at least three different textures and tastes.

**SAFETY**

Ensure the cadets do not share the fruits and vegetables being used in the activity.

---

**CONFIRMATION OF TEACHING POINT 5**


---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

**END OF LESSON CONFIRMATION**

---

The cadets' participation in the collecting of edible plants and completing the universal edibility test will serve as the confirmation of this lesson.

---

**CONCLUSION**

---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

It is important for the cadets to know how to perform the universal edibility test, identify both poisonous and non-poisonous plants and be able to collect plants in a survival situation. Plants are an excellent source of nutrition when animals are not abundant. Many plants have health benefits which are also important in a survival situation.

**INSTRUCTOR NOTES/REMARKS**

Instructors will research any plants they anticipate to use for a test. Ensure the plants have no known poisons or toxins.

---

**REFERENCES**

---

- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2006). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Lebanon, NH: Paul Tawrell.
- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C2-155 (ISBN 978-1-58574-556-2) The Lyons Press. (2002). *U.S. Army Survival Handbook*. Guilford, CT: The Lyons Press.



## ROYAL CANADIAN ARMY CADETS

### SILVER STAR

### INSTRUCTIONAL GUIDE



### SECTION 10

### EO C324.05 – PREPARE A MEAL FROM FIELD FOOD SOURCES

Total Time:

90 min

### PREPARATION

#### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy Annex J for each cadet.

Prepare all resources for TPs 2 and 3.

Choose a cooking method and set up area for TP 3.

Cadets who feel uncomfortable observing the skinning of a small animal do not have to attend that portion of the class but should be present for the TP on preparing a fish.

Only one rabbit should be caught or purchased and skinned for demonstration purposes. Check provincial regulations on catching and killing small animals.

Parents shall be made aware of the training and when it will take place.

Instructors will have to use purchased or caught fish. Fish will have to be properly stored in a cool area (cooler with ice) to ensure they do not spoil.

#### PRE-LESSON ASSIGNMENT

N/A.

#### APPROACH

A demonstration was chosen for TP 1 as it allows the instructor to explain and demonstrate skinning a small animal.

A demonstration and performance was chosen for TP 2 as it allows the instructor to explain and demonstrate preparing and cooking a small animal or fish in the field while providing an opportunity for the cadet to practice under supervision.

A practical activity was chosen for TP 3 as it is an interactive way to allow the cadet to experience cooking a small animal or fish. This activity contributes to the development of survival skills in a fun and challenging setting under supervision.

---

## INTRODUCTION

---

### REVIEW

N/A.

### OBJECTIVES

By the end of this lesson the cadet shall have prepared a meal from field food sources.

### IMPORTANCE

It is important for cadets to prepare a meal from field food sources because in a survival situation, cadets may be required to prepare and cook fresh food that they have caught. Having the confidence and ability to cook food, will help a cadet maintain nutrition and energy when in a survival situation.

---

### Teaching Point 1

### Explain and Demonstrate Skinning a Small Animal

Time: 25 min

Method: Demonstration

---



For this TP, it is recommended that instructor explain and demonstrate each step required to complete the skill.

It is required that the instructor have experience skinning an animal prior to this lesson.

It is important to know how to prepare fish and game for cooking in a survival situation. Improper cleaning or storing can result in inedible fish or game, as well as creating a health hazard.

### SKINNING A SMALL ANIMAL

Once a small animal has been caught there are some important steps that have to be completed to prepare the animal prior to eating.



The process of skinning most small animals does not vary much. A rabbit will be used in this lesson for the demonstration.

**Step 1 – Bleeding the Animal.** Upon catching a rabbit, bleed the rabbit by cutting its throat. If possible, clean the carcass near a stream but downstream from your water source and at a minimum of 100 m from the campsite.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-1 Skinning a Small Animal – Step 2

**Step 2 – Preparing Materials.** Lay the rabbit on a flat surface and gather required materials (knife or small hatchet and water) (as per Figure 14-10-1).



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-2 Skinning a Small Animal – Step 3

**Step 3 – Removing Legs.** Remove each leg at the joint with a clean cut.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-3 Skinning a Small Animal – Step 4

**Step 4 – Removing the Skin.** Lay the rabbit on its back on a flat surface and pinch the skin at the loose part of the lower belly. Cut a hole in the skin with the knife and cut all the way to just below the front legs. Be careful not to puncture the stomach lining.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-4 Skinning a Small Animal – Step 5

**Step 5 – Separating the Skin.** Separate the muscle covering the gut from the skin starting at the opening, (it comes away quite easily) and continue around to the back.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-5 Skinning a Small Animal – Step 6

**Step 6 – Removing Skin From the Hind Legs.** Pull the skin over the back legs as if taking off a sock.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-6 Skinning a Small Animal – Step 7

**Step 7 – Removing Skin From the Front Legs.** Pull the skin forwards and ease out each front leg in turn.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-7 Skinning a Small Animal – Step 8

**Step 8 – Exposing the Neck.** Pull the skin forward exposing the neck.



*RiverCottage.net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-8 Skinning a Small Animal – Step 9

**Step 9 – Removing the Head and Remaining Skin.** Sever the head and remove any remaining skin.



*RiverCottage.Net, How to Skin a Rabbit. Retrieved April 15, 2008, from <http://forum.rivercottage.net/viewtopic.php?t=12605>*

Figure 14-10-9 Skinning a Small Animal – Step 10

**Step 10 – Removing Entrails and Glands.** Make a cut using a knife along the rabbit's belly through the rib cage and pelvis. Open the sides of the belly and grasp the windpipe below the severed neck and pull it out. Clean the rabbit's chest cavity thoroughly by rinsing it with water. Be sure to pay special attention to areas like the chest cavity and folds in the skin.



Dig a hole and bury all discarded animal parts to avoid attracting scavenging animals.

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What position should the animal be placed in when preparing to skin it?
- Q2. What area of the animal's body is first cut?
- Q3. What is the last step in skinning an animal?

### ANTICIPATED ANSWERS

- A1. The animal should be laid out flat.
- A2. The first part that should be cut is the neck to bleed the animal.
- A3. The last step in skinning the animal is cleaning the small animal and rinsing the chest cavity thoroughly by rinsing with water.

---

### Teaching Point 2

### Explain, Demonstrate and Have the Cadet Prepare a Fish

Time: 25 min

Method: Demonstration and Performance

---



For this TP, it is recommended that instruction take the following format:

1. Explain and demonstrate each step required to complete the skill one at a time.
2. Monitor cadets as they imitate each step.

Background information has been provided to support the demonstration and performance. Assistant instructors may be employed to monitor the cadets' performance.

---

## BACKGROUND INFORMATION

---

### PREPARING A FISH

All freshwater fish are edible. Those under 5 cm (2 inches) long need no preparation and can be eaten whole. Larger fish must be gutted. To prevent spoilage, prepare the fish as soon as possible. The innards can be used as bait or buried in the ground, as the odour will attract insects and scavengers.

It may be some time from when the fish is caught to when it is cooked. Keep the fish cool, out of the sunlight, and away from insects. Cover in forest moss or place in a pool of cool water.



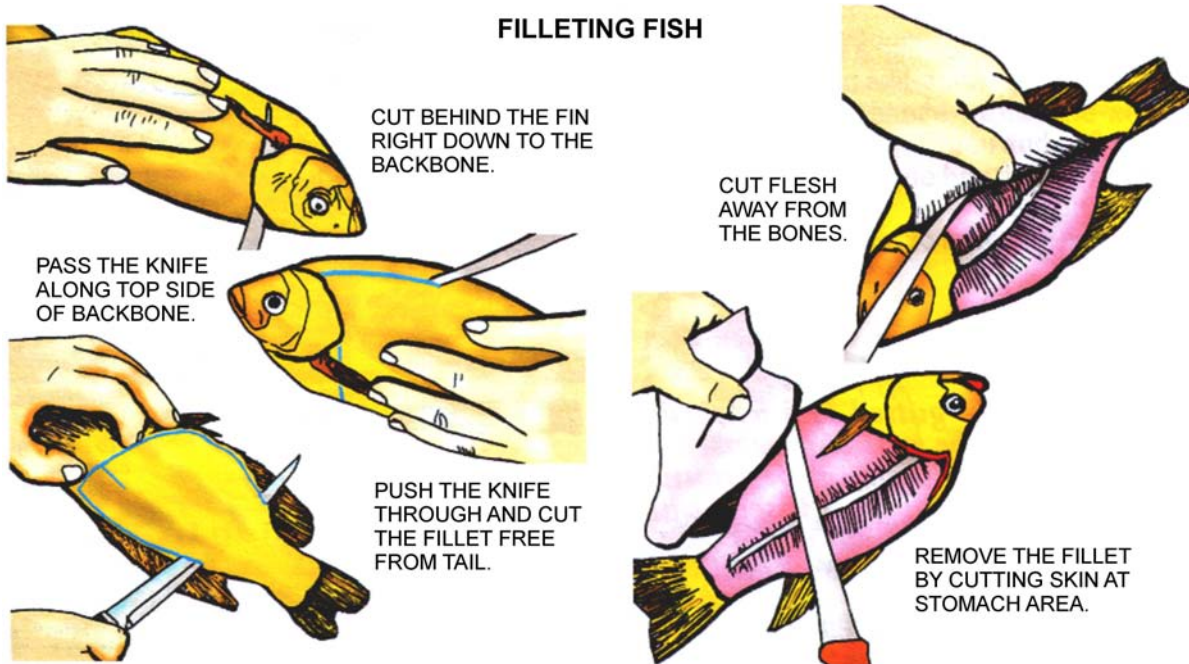
Different types of fish may require different methods of preparing. Determine the common local fish and describe the cleaning method for that type of fish.

**Bleeding.** As soon as a fish is caught, cut its throat and allow it to bleed. Wipe the slime off the fish to make it less slippery. Do not let any slime get in your eyes. Cut out the gills.

**Gutting.** Make an incision from the anal orifice to where the throat was cut. Remove the entrails – you can use them for hook bait. Keep the roe (fish eggs); it is very nutritious.

**Scaling.** Scaling is not necessary and fish can be cooked with scales on, but if there is time, scrape them off. Remove scales by holding the tail and pushing a dull knife across the skin at a 45-degree angle. Draw the knife from tail to head.

**Filleting.** Filleting is one way of preparing a fish. Pass the knife along the top side of the backbone. Cut behind the fin down to the backbone. Push the knife through and cut the fillet free from the tail. Cut the flesh away from the bones. Remove the fillet by cutting the skin at the stomach area.



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 144)*

Figure 14-10-10 Filleting a Fish

---

## ACTIVITY

---

### OBJECTIVE

The objective of this activity is to have cadets prepare a fish.

### RESOURCES

- Fish, and
- Knife.

### ACTIVITY LAYOUT

Have cadets prepare an open area with a clean table or flat surface to prepare fish.

### ACTIVITY INSTRUCTIONS

Cadets will prepare a fish as each step is demonstrated by the instructor.

### SAFETY

Cadets shall be reminded to always cut away from their body.

---

## CONFIRMATION OF TEACHING POINT 2

---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

### Teaching Point 3

### Explain and Demonstrate Cooking a Small Animal and Have the Cadet Practice Cooking a Fish

Time: 30 min

Method: Practical Activity

---



This lesson incorporates material covered in EO C224.01 (Cook in the Field, A-CR-CCP-702/PF-001, Chapter 14, Section 7). Background information has been provided in this lesson as the possibility exists that some cadets may have not participated in the complementary training.

Distribute the handout located at Annex J to each cadet.

The instructor will give a demonstration of one cooking method. The method chosen should already be set up and lit. Demonstrate how to cook the fish.

Concurrently cook the rabbit, while the cadets cook their fish. Instructors may choose to use a different method than the cadets.

### COOKING

Cooking food can make it more palatable and kills parasites and bacteria. However, when food is heated it loses nutritional value – the more the heat, the greater the loss – so nothing should be cooked longer than necessary. The methods chosen for cooking a small animal or fish simulate the ways that can be used in a survival situation.



All of the methods listed require prior preparation of the food being cooked. This involves peeling/skinning, cleaning and wrapping. When cooking in the field, food must be properly prepared.

---

## BACKGROUND KNOWLEDGE

---

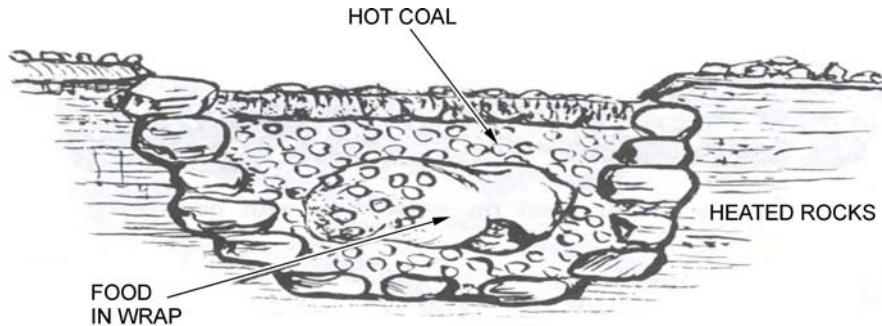
Cooking in the field is an important skill for people who find themselves in a survival situation. Since the human body needs nutrients and energy, cooking is essential to kill harmful bacteria. There are many different ways to cook in the field.

### BAKING

The best way to bake in the field is in the ground. When food is buried, it will cook faster. To do this:

1. Dig a shallow pit in the ground.
2. Line the pit with rocks.
3. Burn a small fire to get a bed of coals.
4. Place a layer of wet grass on the embers when there are no more open flames and only hot, red embers remaining (if the grass is dry, use water).
5. Place the food (already prepared to be cooked) on top of the wet grass.

6. Use a stick to move around the hot coals to get them as close to the food as possible. Try to put some coals on top of the food.
7. Cover the food with the earth that was dug from the pit.



*Department of National Defence, Down But Not Out, Department of National Defence (p.130)*

Figure 14-10-11 Baking in the Ground

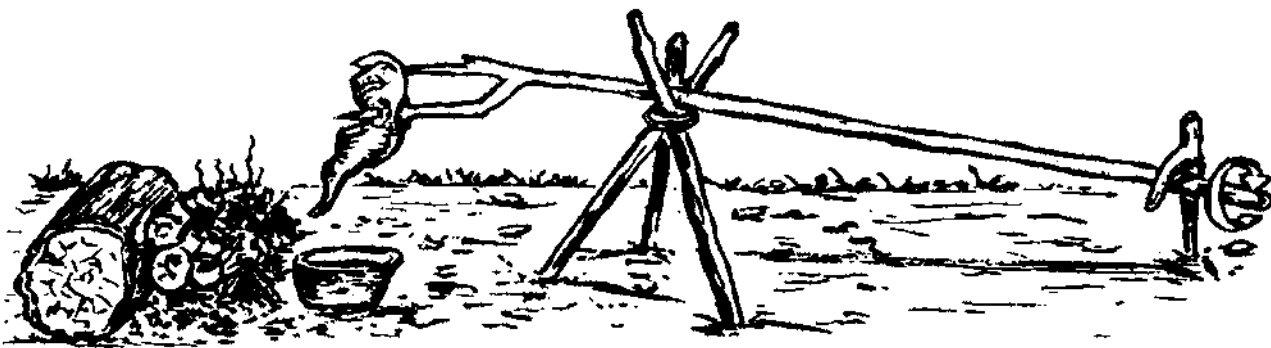


When using this method, it is very difficult to check and see if the food is cooked. Cooking time will vary, depending on what is being cooked. Ensure food is completely cooked before consuming. Place it back in the ground and allow more time if unsure.

## ROASTING

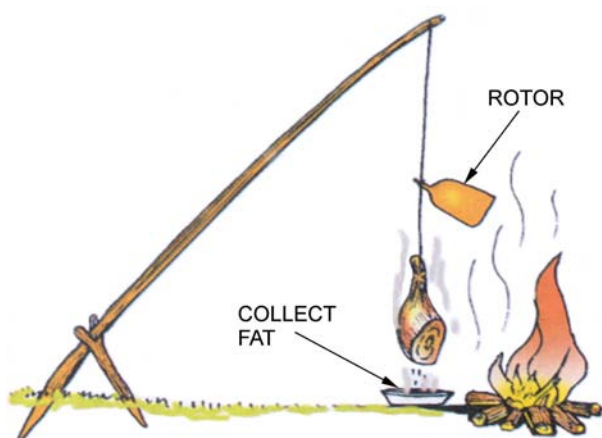
Roasting is an easy method that produces tasty results. Unfortunately, it also produces a lot of grease when cooking meat. To minimize waste, place a pot or container under the roasting food to catch grease. Place the object being cooked on the end of a stick, beside an open fire. The food should not be placed directly over the fire and direct contact with smoke and flame should be avoided as much as possible.

The food will need to be rotated or turned to ensure it is cooked throughout. If hanging the food from above the fire, a rotor, made with plastic or heavy paper, can be attached (as per Figure 14-10-13). The rotor will catch and turn in the wind, turning the food.



*Department of National Defence, Down But Not Out, Department of National Defence (p.129)*

Figure 14-10-12 Roasting



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14-10-13 Roasting With a Rotor



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 448)*

Figure 14-10-14 Roasting Fish

## BOILING

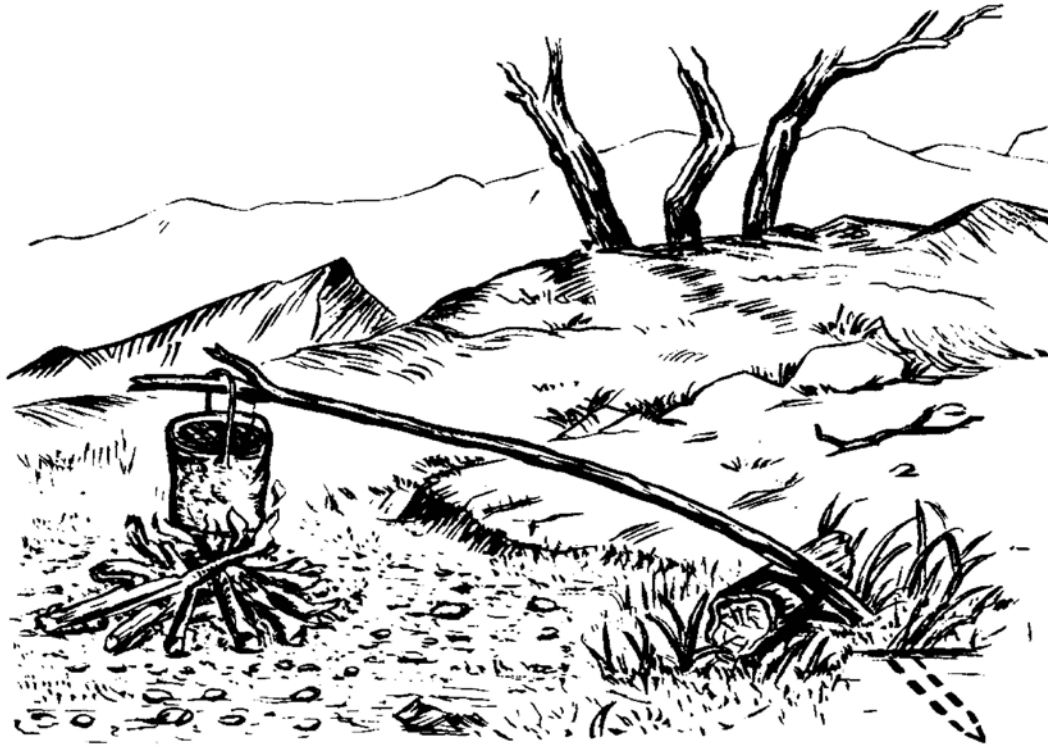
Boiling in a pot can be done over an open fire, the same as on a stove. When boiling in a pot, ensure the pot is sitting straight up on the fire. This can be done by using a grill, wedging it between two pieces of thick wood or placing rocks around to stabilize it. There are many ways to place a pot over a fire using wood (as per Figures 14-10-15 and 14-10-16). It is important to ensure the pot is stable and does not have a risk of falling into the fire.



Seeing bubbles is an easy way to tell that water is boiling.

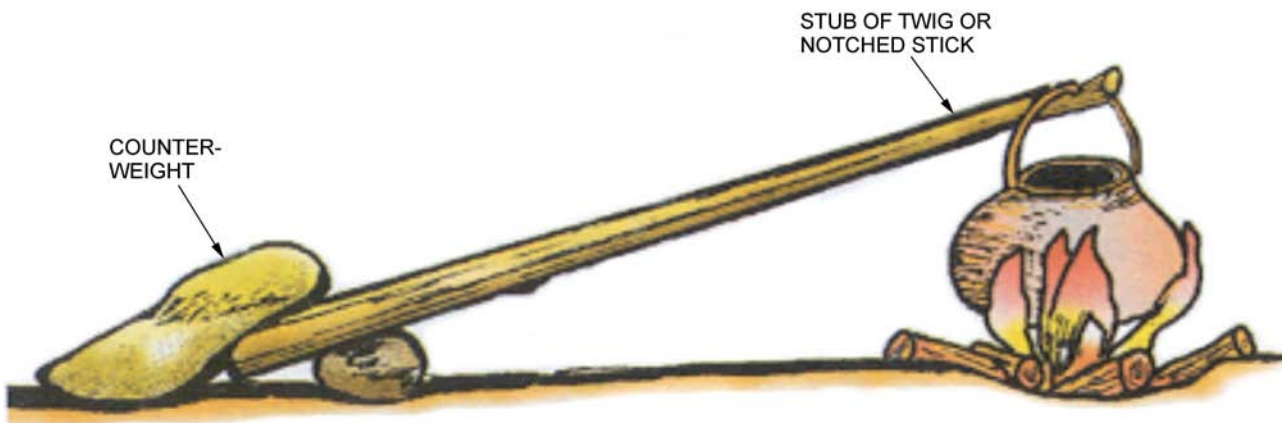


Boiling over an open fire will normally cause soot to form on the outside of the pot. A coating of soapy water on the outside of the pot will make cleaning much easier.



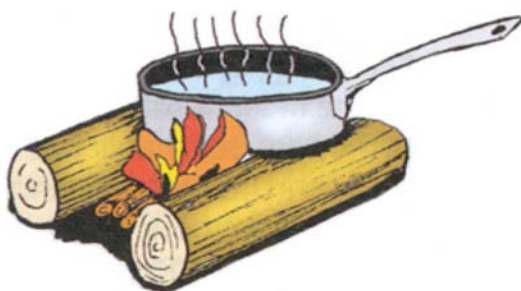
*Department of National Defence, Down But Not Out, Department of National Defence (p.128)*

Figure 14-10-15 Boiling



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14-10-16 Boiling Using a Counterweight



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 444)*

Figure 14-10-17 Boiling on an Open Flame With Wood



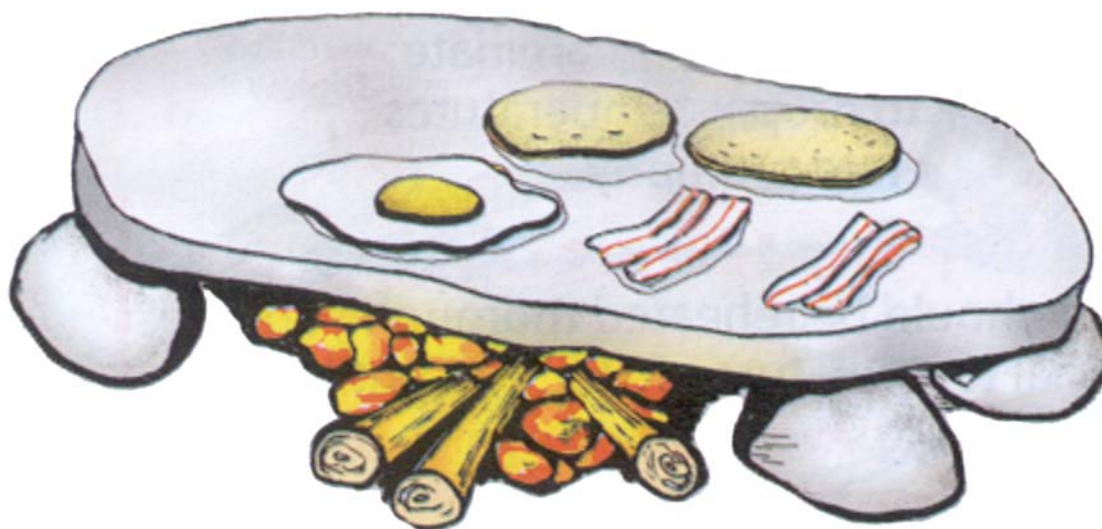
*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14-10-18 Boiling on an Open Flame With Rocks

### FRYING

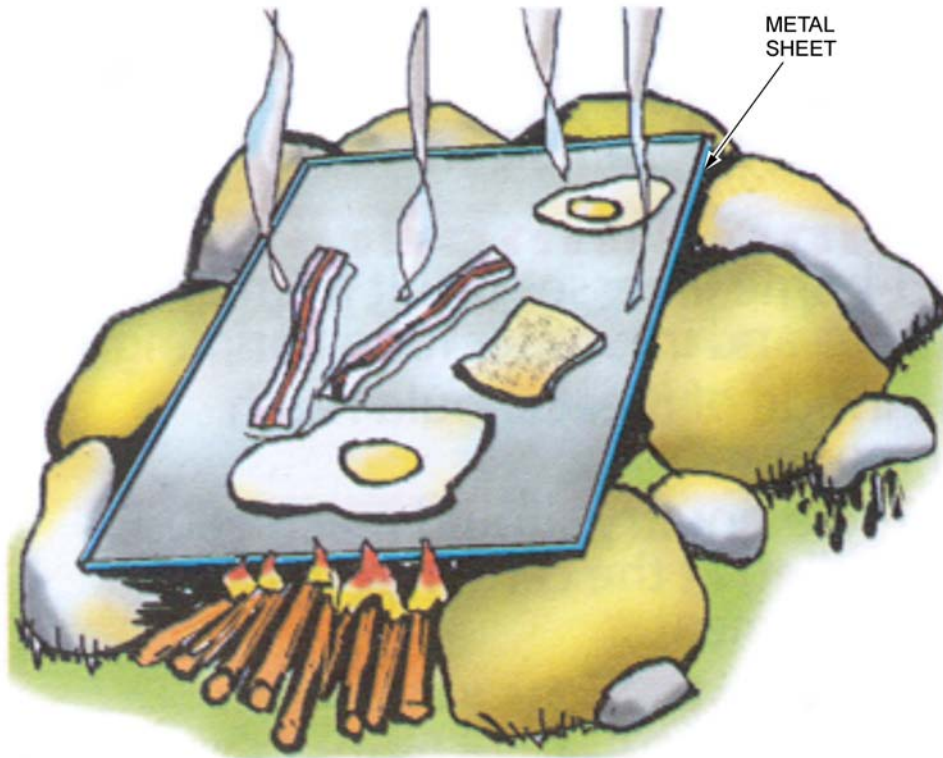
Food can be easily fried on a rock or sheet of metal. A rock will hold a lot of heat for a very long time. When using this method to cook, food may easily stick if there is not a sufficient amount of grease.

STONE  
GRIDDLE



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14-10-19 Frying on a Flat Rock



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14-10-20 Frying With a Metal Sheet

---

### ACTIVITY

Time: 20 min

---

#### OBJECTIVE

The objective of this activity is to have the cadet cook fish using one of the following methods chosen by the instructor:

- baking,
- roasting,
- boiling, or
- frying.

#### RESOURCES

- Water,
- Fish prepared in TP 2,
- Matches, and
- Shovels.

**ACTIVITY LAYOUT**

An open area that is suitable for lighting small fires should be used for the cadets to cook food.

**ACTIVITY INSTRUCTIONS**

1. Divide the cadets into pairs.
2. Distribute a fish (use the prepared fish from TP2) to each cadet.
3. Have the cadets prepare the assigned method to cook their fish.
4. Have the cadets carry out preparing a heat source and cooking food.
5. Have the cadets sample cooked food, with approval from supervising staff.
6. Have the cadets ensure the fire is out when finished and no hot embers remain.

**SAFETY**

- Cadets will be lighting fires. Review fire orders and procedures.
- Fire safety equipment must be on hand.
- Additional supervision will have to be present during this lesson.
- In the event of an out of control fire contact emergency fire services.

---

**CONFIRMATION OF TEACHING POINT 3**


---

The cadets' participation in the activity will serve as the confirmation of this TP.

---

**END OF LESSON CONFIRMATION**


---

The cadets' participation in cooking a fish will serve as the confirmation of this lesson.

---

**CONCLUSION**


---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

Knowing how to cook in the field is a great skill to have when lost. Knowing the many different ways to cook in the field could mean in a person making it through a survival situation. Being able to use different methods of cooking in the field is also a fun way to cook food when on a weekend bivouac FTX.

**INSTRUCTOR NOTES/REMARKS**

Cadets who feel uncomfortable observing the skinning of a small animal do not have to attend that portion of the class but should be present for the TP on preparing a fish.

Only one rabbit should be caught or purchased and skinned for demonstration purposes. Check provincial regulations on catching and killing small animals.

Parents shall be made aware of the training and when it will take place.

---

### REFERENCES

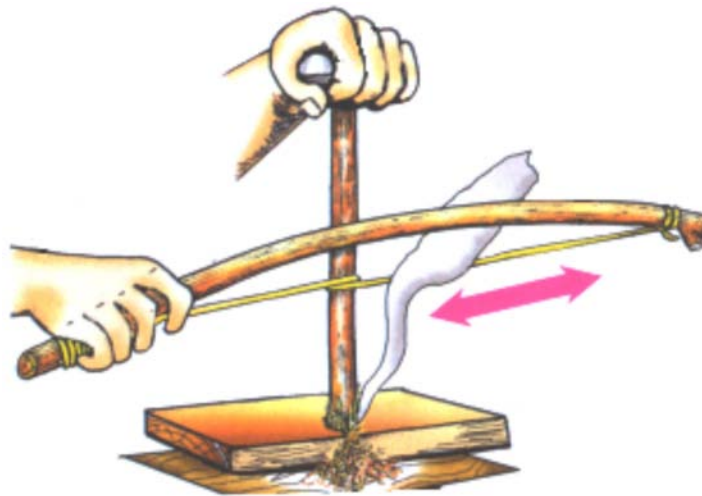
---

- C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2006). *Camping and Wilderness Survival: The Ultimate Outdoors Book* (2<sup>nd</sup> ed.). Lebanon, NH: Paul Tawrell.
- C2-004 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.
- C2-008 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

## BOW AND DRILL

Construct and use a bow and drill using the following steps:

1. Cut a groove into the bearing block or socket 3–5 cm deep for the hardwood shaft to fit.
2. Cut a groove into the softwood base in which the hardwood shaft will spin.
3. Carve one end of the hardwood shaft into a small point.
4. Collect kindling, tinder and fuel as required.
5. Place tinder into the opening of the softwood base for the embers to fall onto.
6. Wrap the bow around the hardwood shaft and place into the groove on the softwood base.
7. Gather kindling and fuel as required.
8. Place the bearing block on the top of the shaft.
9. Saw the bow back and forth so the hardwood shaft spins.
10. Maintain a constant motion back and forth.
11. Increase speed and look for embers, once smoke appears.
12. Stop and lightly blow on the tinder to start combustion, once the tinder begins to smoke.
13. Apply gathered kindling and fuel as required, when the tinder ignites.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

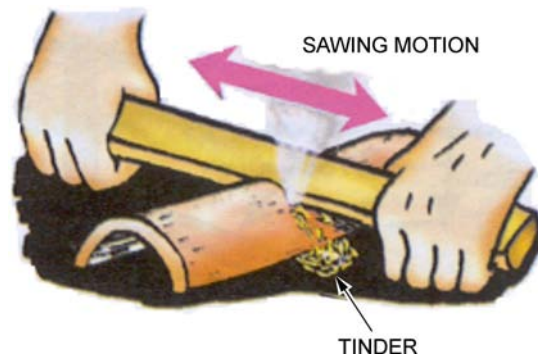
Figure 14A-1 Fire Bow and Drill

THIS PAGE INTENTIONALLY LEFT BLANK

## FIRE SAW

Construct and use a fire saw using the following steps:

1. On the inside of the fireboard, pick and splinter stringy fibres in order for them to catch a spark.
2. On the outside opposite to the direction of the fibres, cut a narrow groove in which the sawing will be done.
3. Rub the rub stick in a sawing motion in the groove of the fireboard until sparks appear.
4. Collect kindling, tinder and fuel as required.
5. Stop and lightly blow on the tinder to start combustion, once the tinder begins to smoke.
6. Apply gathered kindling and fuel as required, when the tinder ignites.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 434)*

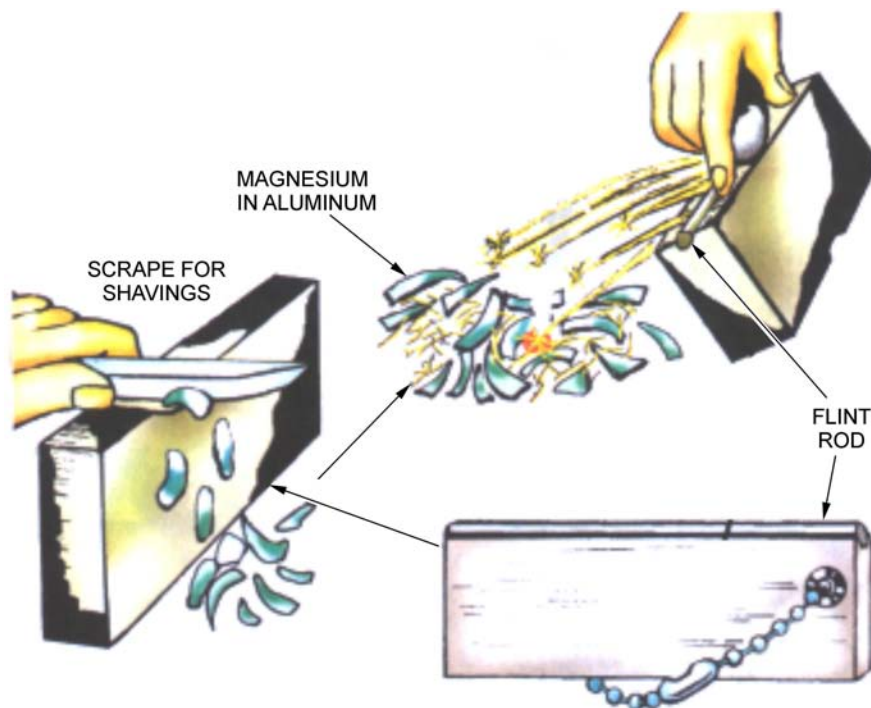
Figure 14B-1 Fire Saw in Motion

THIS PAGE INTENTIONALLY LEFT BLANK

## FLINT AND STEEL

Construct and use flint and steel using the following steps:

1. Hold the flint as close to the tinder as possible.
2. Strike it with the back of a knife blade or a small piece of carbon steel.
3. Collect kindling, tinder and fuel as required.
4. Strike downward so that the sparks fall into the tinder.
5. When the tinder begins to smoulder, fan or blow it gently into a flame.
6. Stop and lightly blow on the tinder to start combustion, once the tinder begins to smoke.
7. Apply gathered kindling and fuel as required, when the tinder ignites.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 436)*

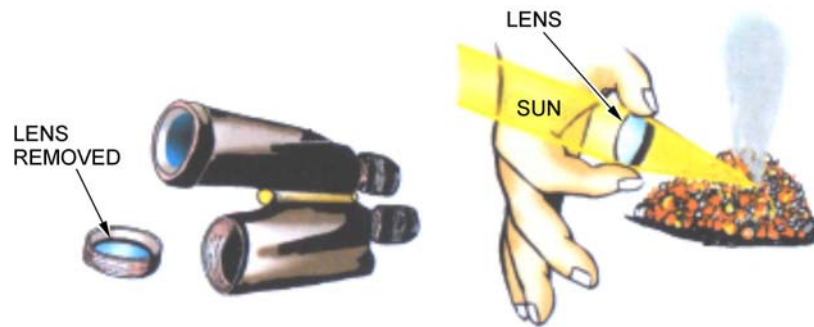
Figure 14C-1 Flint and Steel

THIS PAGE INTENTIONALLY LEFT BLANK

## SUN AND GLASS

Construct and use sun and glass using the following steps:

1. Locate a sunny spot in an open area.
2. Gather tinder and kindling in a small pile.
3. Point a piece of glass or convex lens to concentrate the rays of sun on the tinder.
4. When the tinder begins to smolder, fan or blow it gently into a flame.
5. Stop and lightly blow on the tinder to start combustion, once the tinder begins to smoke.
6. Apply gathered kindling and fuel as required, when the tinder ignites.

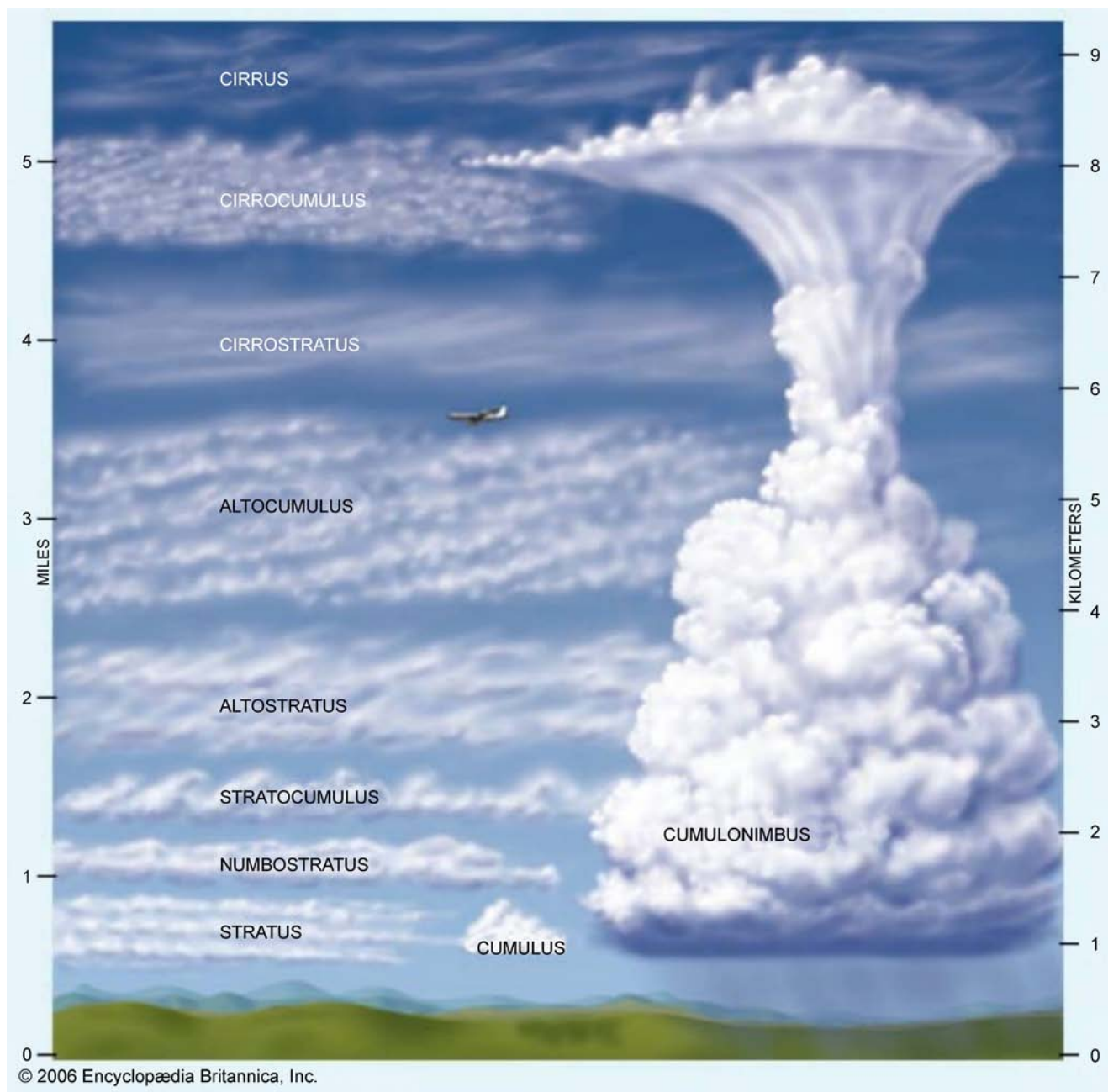


*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 437)*

Figure 14D-1 Sun and Glass

THIS PAGE INTENTIONALLY LEFT BLANK

### COMMON TYPES OF CLOUDS



*"Cumulus Cloud", by Encyclopædia Britannica, Inc, 2006, Encyclopædia Britannica Online, Copyright 2006 by Encyclopædia Britannica, Inc. Retrieved November 21, 2007, from <http://cache.eb.com/eb/image?id=93302&rendTypeId=34>*

Figure 14E-1 Common Types of Clouds

THIS PAGE INTENTIONALLY LEFT BLANK

### COMMON HABITAT

Rotting logs, stones, boards or any other materials lying on the ground provide good nesting sites and are excellent places to find a variety of insects including ants, termites, beetles and grubs. Grassy areas are good areas to search because insects are easily seen. The following insects can commonly be found in most locations.

**Grasshoppers.** Most commonly found in open fields. Watch for them jumping out of the way when walking. Eaten raw or cooked, remove the legs.



*Discover Entomology, by Carl D. Patrick, Grasshoppers and Their Control, Copyright 2008 by Texas A&M University Department of Entomology. Retrieved March 5, 2008, from <http://insects.tamu.edu/extension/bulletins/l-5201.html>*

Figure 14F-1 Grasshopper

**Beetles.** Often found under rotting logs, stones, boards or any other material lying on the ground. Insects with hard outer shells will have parasites so cook them before eating.



*Canadian Biodiversity Information Facility, Ground Beetles of Canada. Retrieved March 5, 2008, from [http://www.cbif.gc.ca/spp\\_pages/carabids/phps/image1\\_e.php#Bembidiini](http://www.cbif.gc.ca/spp_pages/carabids/phps/image1_e.php#Bembidiini)*

Figure 14F-2 Beetles

**Worms.** Worms are an excellent source of protein. Dig for them in damp soil or watch for them on the ground after rain. After collecting them, drop them into clean, potable water for a few minutes. The worms will naturally purge or wash themselves out, after which they can be eaten raw.



*Cheshire Wildlife Trust, Find Out About Earth Worms, Copyright 2004 by Cheshire Wildlife Trust. Retrieved March 5, 2008, from [http://www.wildlifetrust.org.uk/cheshire/watch\\_earthworms.htm](http://www.wildlifetrust.org.uk/cheshire/watch_earthworms.htm)*

Figure 14F-3 Earth Worm

**Grubs.** Known as insect larva, grubs are often found under rotting logs, stones, boards or any other materials lying on the ground.



*Green Smiths, Grub Worms. Retrieved March 5, 2008, from <http://www.greensmiths.com/grubs.htm>*

Figure 14F-4 Grubs

**Aquatic Insects.** Many species of edible insects exist around the edges of lakes, or ponds, or the ocean. Cook any hard shell insects.



*P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book (2<sup>nd</sup> ed.), Paul Tawrell (p. 912)*

Figure 14F-5 Water Insects

### IDENTIFYING TRACKS AND HABITAT

All animals can be a source of nourishment. The more one knows about animals, the better the chances of locating an animal. To find an animal in the wild, one must be observant for signs. If a person can recognize the signs an animal leaves, and identify the animal, one can devise a method to hunt and trap it.

Most mammals are on the move at dawn and dusk (first light, last light), using regular routes between their watering spots, feeding places and homes. Animal tracks and trails can be identified by looking for specific signs.

The following are tips to locate and identify animals:

- Tracks are more obvious on wet ground snow and damp sand.
- The size of the impression is left from their tracks.
- The age of the track can be identified by its sharpness and moisture content.
- The clearer the track the more recent it is. If water or rain has seeped into it, it may be older.
- Heavy vegetation reveals regularly used routes or paths.
- Some animals never travel very far; any tracks likely mean they are in the area.
- Smaller animals make tunnels through dense underbrush.
- Broken twigs along a route, will identify direction of travel and the height of the animal.

### Rabbits and Hares

Rabbits and hares are easy to catch. They live either in burrows or above ground and most often use a specific run that they routinely retrace. Rabbits and hares have long hind legs with small front paws. When looking for rabbits or hares keep the following in mind:

- They leave little detail on soft ground.
- They have a narrow hind foot with four toes.
- They leave tracks with their hind feet in front of the forefoot instead of side by side.

- They eat tree bark and may nibble the base of a tree.
- They warn other rabbits and hares by using their paws to create sounds. The sound emitted sounds like a thump or someone hitting a cushion.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 35)*

Figure 14F-6 Rabbit and Tracks

### Squirrels

Squirrels are alert and very nimble. Most are active day and night – feeding on nuts, fruits, shoots and for some bird's eggs. Their nests are usually the size of a small day pack, made of sticks and leaves, high in trees. However, squirrels seek out tree hollows for winter dens. Squirrels are small and their tracks are barely noticeable. Signs of squirrel presence include:

- chewed cones,
- cone scales piled about, and
- loud and almost continuous high-pitched squeals and chirps.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 49)*

Figure 14F-7 Squirrel and Tracks

### Marmots (Groundhog)

The groundhog is most commonly found on pastures, roadsides, and overgrown fields. Groundhogs live alone in burrows up to 9 m long (30 feet), excavated under stumps, rocks or edges of buildings. Normally there are three entrances to the burrows. They are visible, measuring 20–30 cm (8–12 inches) across, with big mounds of dirt nearby.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 91)*

Figure 14F-8 Marmot (Groundhog) and Tracks

### Porcupines

The porcupine is the second largest rodent. It has sharp quills that are solid at the base and barbed at the tip. This animal feeds mainly on grasses, acorns and twigs and is fond of salt. Their tracks and signs include:

- footprints, where the front paws have four toes and hind paws have five toes,
- trees with bark stripped in irregular patches, and
- nipped twigs littering the ground.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 109)*

Figure 14F-9 Porcupine and Tracks

## Beavers

Beavers are known as dam builders. They are aquatic animals with scaly, padded-like tails. They can be found using regular runs along streams, lakes, or bogs/marshes and reside in a den known as a beaver house, where they can be trapped. Their tracks and signs include:

- fore footprints that have five toes with claw marks but, often only four show,
- rear footprints that are webbed, roundish and larger,
- water levels that are higher than normal lakes, bogs or marshes,
- the presence of a beaver dam, lodges, fallen and chewed saplings, and
- the presence of bark shavings near water.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 110)*

Figure 14F-10 Beaver and Tracks

## Raccoons

The “masked bandit” lives in a variety of habitats, from forests to prairies to city parks. They prefer to be in the vicinity of water and trees and are most abundant in wooded swamps. They reside in dens often in a hollow tree or log, rock crevice, cave or abandoned building. A raccoon’s diet from land sources includes nuts, fruit, insects, small rodents, and birds. Near water they will eat frogs, fish, molluscs and insects. Their tracks and signs include:

- a hind track that is about 7.62 cm (3 inches) long with 5 toes, and
- a front paw that is like a small hand with five fingers.



*N. Bowers, R. Bowers, and K. Kaufman, Kaufman Focus Guides: Mammals of North America, Houghton Mifflin Company (p. 99)*

Figure 14F-11 Raccoon and Tracks

### DETECTING SIGNS OF FEEDING

A skilled eye can often identify the species of animal by the pattern left by teeth or beak marks on a nut, or the way in which a pine cone has been stripped to get at its seeds. Some signs of feeding that may be found in the wilderness include:

- bark stripped from trees,
- the gnawed shells of nuts,
- partially eaten fruits,
- bitten off shoots,
- the remains of prey, and
- remains of carnivores or the destruction of nests.

Discarded fruits or nuts are often found when food is plentiful – an animal finds one piece not to its liking and drops it to try another. They not only disclose an animal's presence but suggest bait for traps.

### FINDING DROPPINGS

Droppings (sometimes called scat) are one of the best indications of whether an animal is a herbivore or a carnivore. The size of the animal can be judged from the mass and quantity of droppings. The dropping's dryness is an indication of how long it has been since they were passed. Old droppings will be hard and odourless. Fresh droppings will be wet, still smell and may be covered by flies.

The composition of droppings can be used to figure out what kind of animal deposited it. Bits of plant material (stems, seeds, husks, and stalks) indicate an herbivore (plant eater). There is almost no scent to the droppings of a plant eater, although those that have gorged on berries leave sweet smelling scat.

Droppings filled with animal material (scales, bones, and fur) left by a carnivore, usually has a rank smell. A mass of flies indicate a pile of fresh droppings.

### **IDENTIFYING ROOTINGS**

Some animals root up the ground in search of insects and tubers. If the earth is still crumbly and fresh an animal is likely to have been active on the spot. Small scratches may be where a squirrel or other rodents have been digging for shoots.

### **DETECTING SCENTS AND SMELLS**

Be alert and if you smell anything out of the ordinary. Try and register the smells. They may be indications of wildlife present. Where one kind of animal exists, there will also be others.

### INSECT NUTRITIONAL VALUE CHART

<b>Insect (per 100 g)</b>	<b>Protein (g)</b>	<b>Fats (g)</b>	<b>Carbohydrates (g)</b>	<b>Calcium (mg)</b>	<b>Iron (mg)</b>
<b>Crickets</b>	<b>12.9</b>	<b>5.5</b>	<b>5.1</b>	<b>75.8</b>	<b>9.5</b>
<b>Small Grasshoppers</b>	<b>20.6</b>	<b>6.1</b>	<b>3.9</b>	<b>35.2</b>	<b>5.0</b>
<b>Giant Water Beetles</b>	<b>19.8</b>	<b>8.3</b>	<b>2.1</b>	<b>43.5</b>	<b>13.6</b>
<b>Red Ants</b>	<b>13.9</b>	<b>3.5</b>	<b>2.9</b>	<b>47.8</b>	<b>5.7</b>
<b>Silkworm Pupae</b>	<b>9.6</b>	<b>5.6</b>	<b>2.3</b>	<b>41.7</b>	<b>1.8</b>
<b>Termites</b>	<b>14.2</b>	<b>n/a</b>	<b>n/a</b>	<b>0.050</b>	<b>35.5</b>
<b>Weevils</b>	<b>6.7</b>	<b>n/a</b>	<b>n/a</b>	<b>0.186</b>	<b>13.1</b>

*G. Davenport, Wilderness Survival, Stackpole Books (p. 161)*

Figure 14G-1 Nutritional Value

THIS PAGE INTENTIONALLY LEFT BLANK

### COMMON POISONOUS PLANTS



Government of Canada Poisonous Plants. Retrieved November 15, 2007, from [http://cbif.gc.ca/pls/pp/ppack.jump?p\\_null=illust&p\\_type=list&p\\_sci=comm&p\\_x=px](http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px)

Figure 14H-1 Poison Ivy



Government of Canada Poisonous Plants. Retrieved November 15, 2007, from [http://cbif.gc.ca/pls/pp/ppack.jump?p\\_null=illust&p\\_type=list&p\\_sci=comm&p\\_x=px](http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px)

Figure 14H-2 Poison Oak

THIS PAGE INTENTIONALLY LEFT BLANK

**COMMON POISONOUS PLANTS**



*Government of Canada Poisonous Plants. Retrieved November 15, 2007, from [http://cbif.gc.ca/pls/pp/ppack.jump?p\\_null=illust&p\\_type=list&p\\_sci=comm&p\\_x=px](http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px)*

Figure 14I-1 Castor Bean



*Government of Canada Poisonous Plants. Retrieved November 15, 2007, from [http://cbif.gc.ca/pls/pp/ppack.jump?p\\_null=illust&p\\_type=list&p\\_sci=comm&p\\_x=px](http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px)*

Figure 14I-2 Death Camas



*Government of Canada Poisonous Plants. Retrieved November 15, 2007, from [http://cbif.gc.ca/pls/pp/ppack.jump?p\\_null=illustr&p\\_type=list&p\\_sci=comm&p\\_x=px](http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illustr&p_type=list&p_sci=comm&p_x=px)*

Figure 14I-3 Oleander



*Government of Canada Poisonous Plants. Retrieved November 15, 2007, from [http://cbif.gc.ca/pls/pp/ppack.jump?p\\_null=illustr&p\\_type=list&p\\_sci=comm&p\\_x=px](http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illustr&p_type=list&p_sci=comm&p_x=px)*

Figure 14I-4 Poison Hemlock

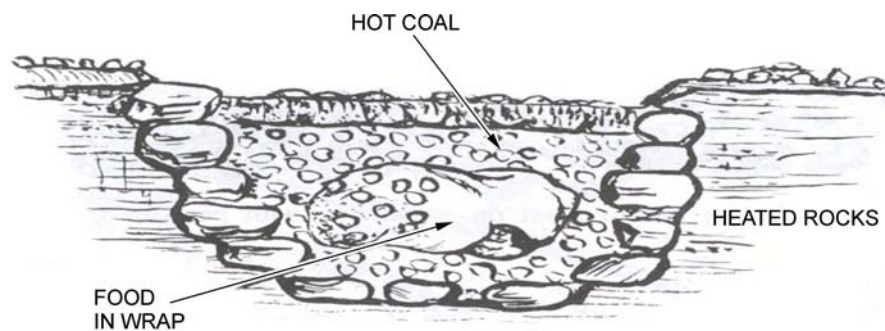
## METHODS OF FIELD COOKING HANDOUT

Cooking in the field is an important skill for people who find themselves in a survival situation. Since the human body needs nutrients and energy, cooking is essential to kill harmful bacteria. There are many different ways to cook in the field.

### BAKING IN A SHALLOW PIT LINED WITH ROCKS

The best way to bake in the field is in the ground. When food is buried, it will cook faster. To do this:

1. Dig a shallow pit in the ground.
2. Line the pit with rocks.
3. Burn a small fire to get a bed of coals.
4. Place a layer of wet grass on the embers when there are no more open flames and only hot, red embers remaining (if the grass is dry, use water).
5. Place the food (already prepared to be cooked) on top of the wet grass.
6. Use a stick to move around the hot coals to get them as close to the food as possible. Try to put some coals on top of the food.
7. Cover the food with the earth that was dug from the pit.



*Department of National Defence, Down But Not Out, Department of National Defence (p.130)*

Figure 14J-1 Baking in the Ground

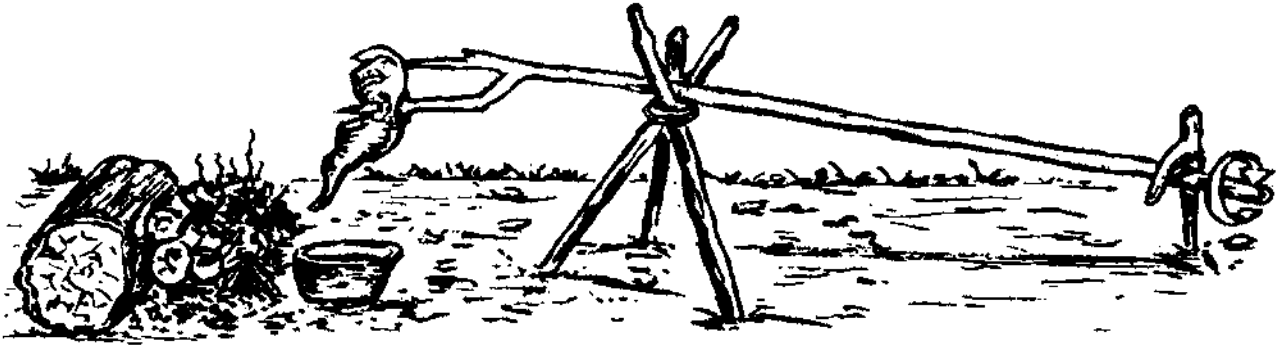


When using this method, it is very difficult to check and see if the food is cooked. Cooking time will vary, depending on what is being cooked. Ensure food is completely cooked before consuming. Place it back in the ground and allow more time if unsure.

### ROASTING WITH A STICK

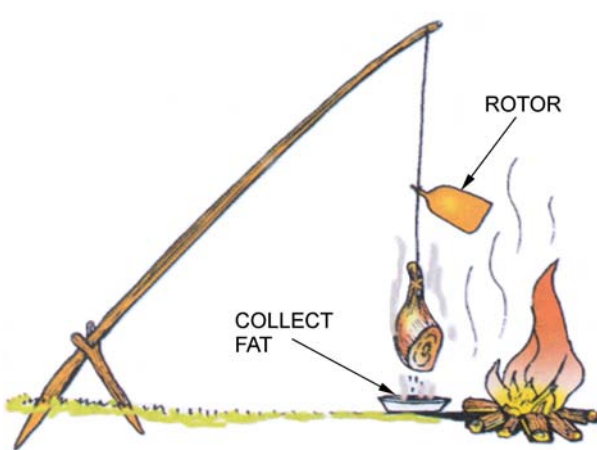
Roasting is an easy method that produces tasty results. Unfortunately, it also produces a lot of grease when cooking meat. To minimize waste, place a pot or container under the roasting food to catch grease. Place the object being cooked on the end of a stick, beside an open fire. The food should not be placed directly over the fire and direct contact with smoke and flame should be avoided as much as possible.

The food will need to be rotated or turned to ensure it is cooked throughout. If hanging the food above the fire, a rotor, made with plastic or heavy paper, can be attached (see Figure 14J-2). The rotor will catch and turn in the wind, turning the food.



Department of National Defence, *Down But Not Out*, Department of National Defence (p.129)

Figure 14J-2 Roasting on a Stick



P. Tawrell, *Camping and Wilderness Survival*, Paul Tawrell (p. 442)

Figure 14J-3 Roasting With a Rotor



P. Tawrell, *Camping and Wilderness Survival*, Paul Tawrell (p. 448)

Figure 14J-4 Roasting Fish

## BOILING IN A POT

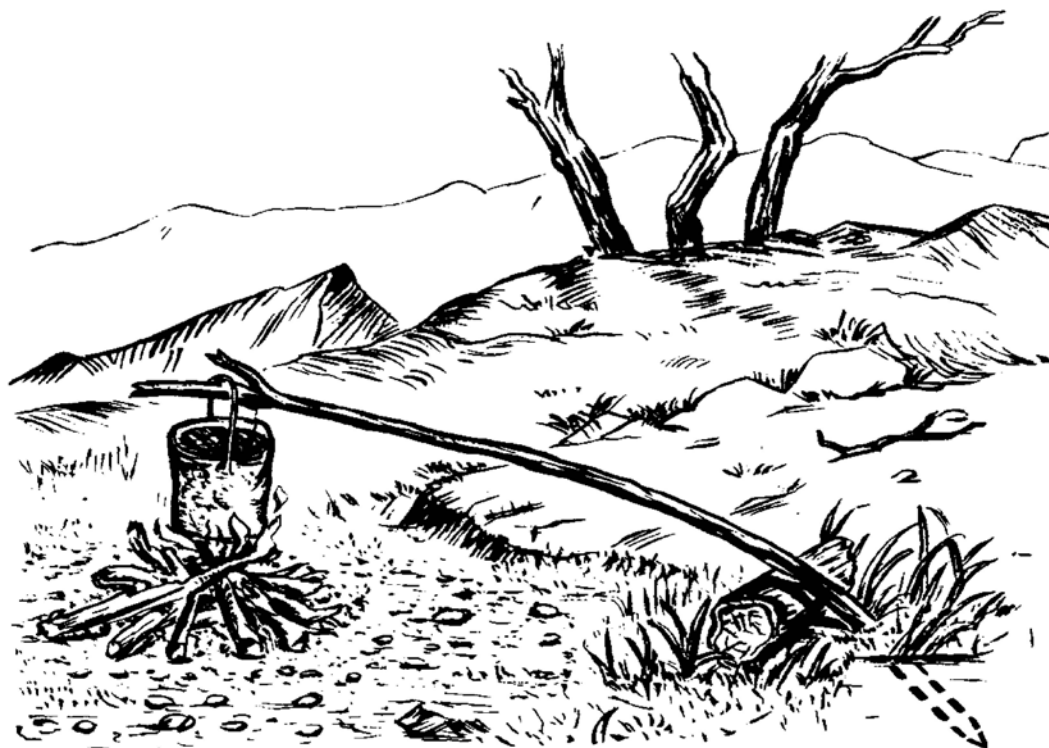
Boiling in a pot can be done over an open fire, the same as on a stove. When boiling in a pot, ensure the pot is sitting straight up on the fire. This can be done by using a grill, wedging it between two pieces of thick wood or placing rocks around to stabilize it. There are many ways to place a pot over a fire using wood (see Figures 14J-5 to 14J-8). It is important to ensure the pot is stable and does not have a risk of falling into the fire.



Seeing bubbles is an easy way to tell that water is boiling.

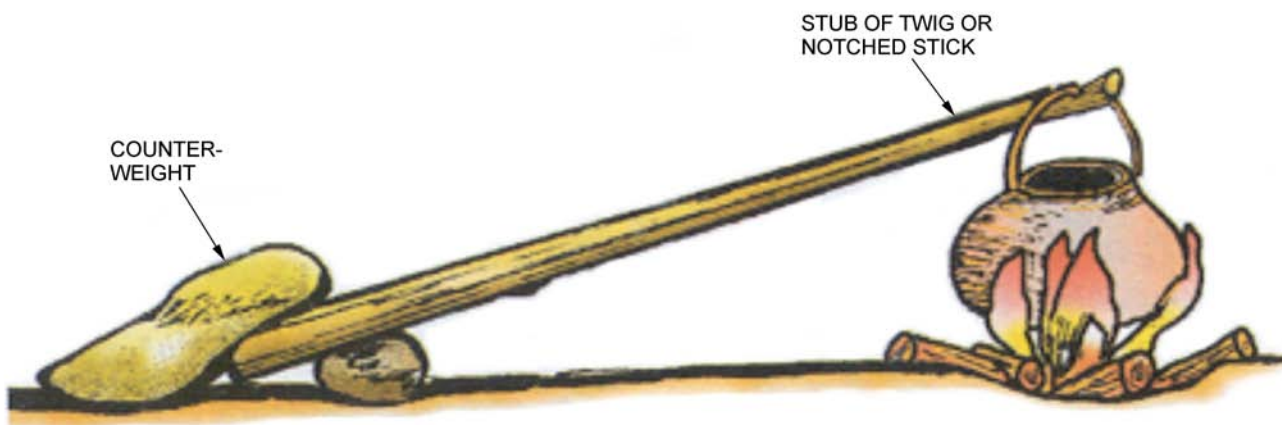


Boiling over an open fire will normally cause soot to form on the outside of the pot. A coating of soapy water on the outside of the pot will make cleaning much easier.



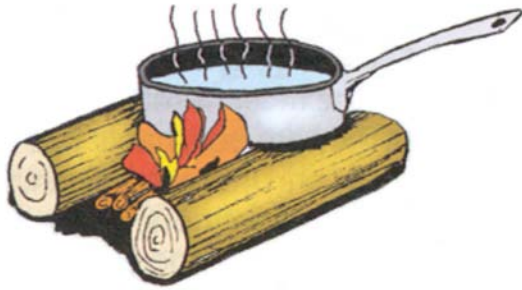
*Department of National Defence, Down But Not Out, Department of National Defence (p.128)*

Figure 14J-5 Boiling



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14J-6 Boiling Using a Counterweight



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 444)*

Figure 14J-7 Boiling on an Open Flame With Wood

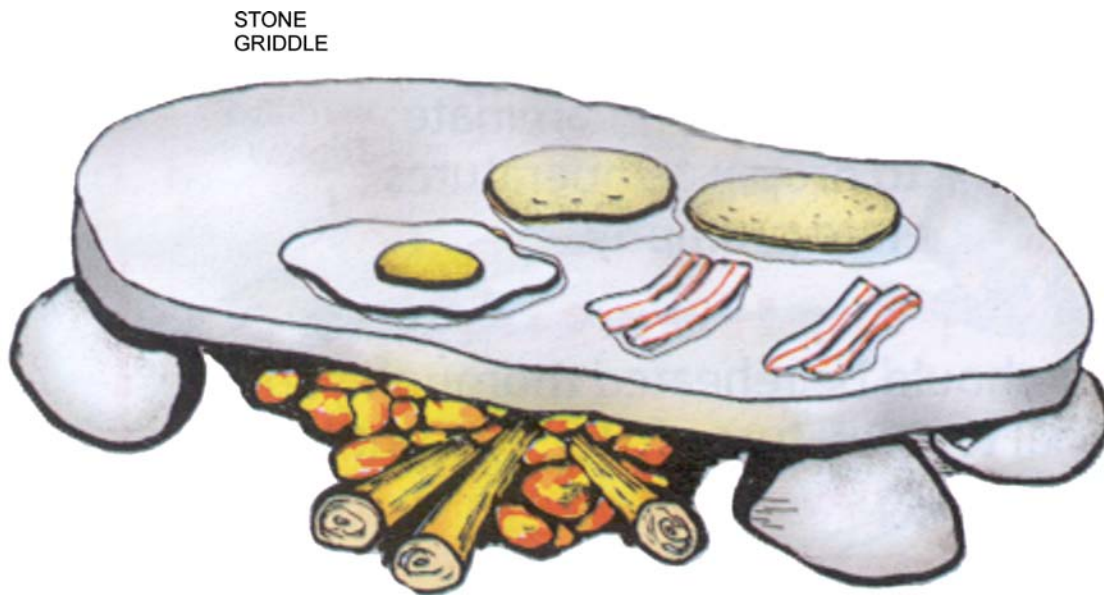


*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14J-8 Boiling on an Open Flame With Rocks

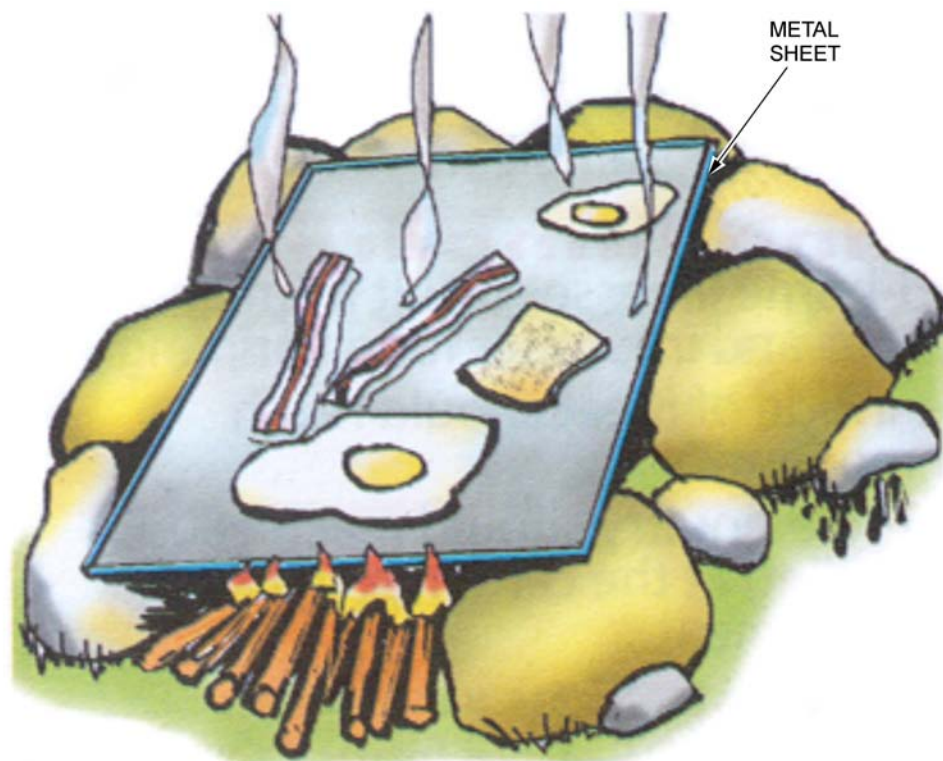
## FRYING

Food can be easily fried on a rock or sheet of metal. A rock will hold a lot of heat for a very long time. When using this method to cook, food may easily stick if there is not a sufficient amount of grease.



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14J-9 Frying on a Flat Rock



*P. Tawrell, Camping and Wilderness Survival, Paul Tawrell (p. 442)*

Figure 14J-10 Frying With a Metal Sheet

THIS PAGE INTENTIONALLY LEFT BLANK