

**CHAPTER 16**

**PO 290 – PARTICIPATE IN A FIELD EXERCISE**





**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 1**

**EO M290.01 – CONSTRUCT, LIGHT, MAINTAIN, AND EXTINGUISH A SIGNAL FIRE**

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Total Time: 60 min

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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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 TP1 and TP2 to present basic material and give direction on emergency signal fires.

Demonstration and performance was chosen for TP3 and TP4 as it allows the instructor to explain and demonstrate preparing a signal fire while providing an opportunity for the cadets to practice this skill under supervision.

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**INTRODUCTION**

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**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall be expected to construct a luminous cone fire, apply fire safety principles and to light, maintain, and extinguish a signal fire.

**IMPORTANCE**

It is important for cadets to safely construct, light, maintain, and extinguish a signal fire. Signal fires will alert rescuers to your location if lost or injured.

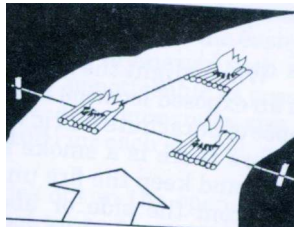
**Teaching Point 1****Determine Types of Emergency Signal Fires**

Time: 5 min

Method: Interactive Lecture

**EMERGENCY SIGNAL FIRES****Three Fire Triangle Pattern**

- Three fires is the internationally recognized distress signal. Ideally they should be placed in a triangle at equal distances apart, an arrangement which also makes them easier to feed with fuel. If that is not possible, any grouping will serve, provided that the fires are clearly separated. However, if fuel is scarce, or if you are too badly injured or too weak from hunger to maintain several fires, use only your campfire.



Wiseman, J., *The SAS Survival Handbook*, HarperCollins Publishers (p. 505)

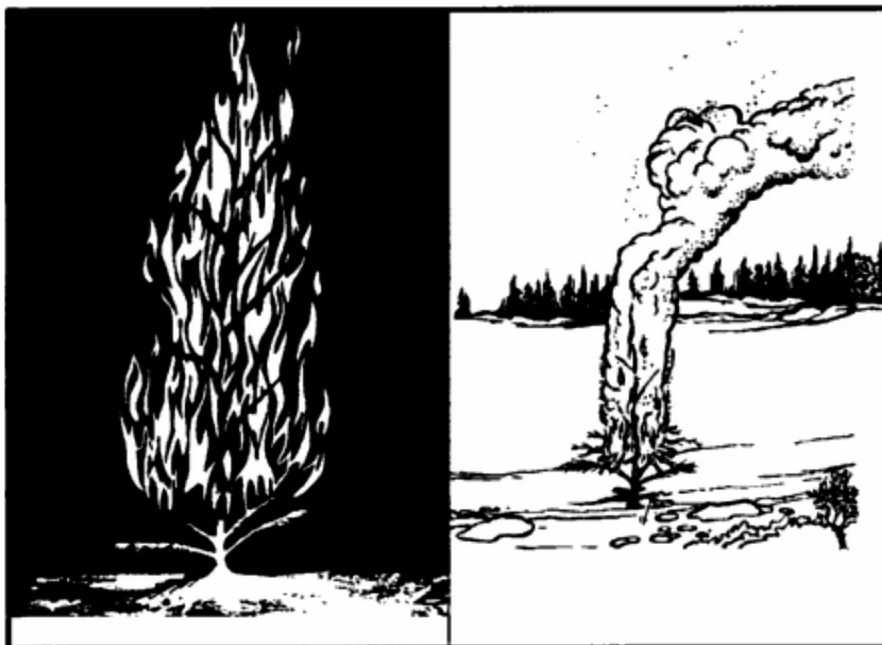
Figure 16-1-1 Three Fire Triangle Pattern

**A Torch Tree**

- Small isolated trees make excellent fire signals. Build a fire between the boughs. Place dry wood in the lower branches and ignite it so that the flames flare up and ignite the foliage. Before the primary tree is consumed, cut and add more small green trees to the fire to produce more smoke. If a tree is dead, start a fire at its base. It will burn for a long time, leaving you free to attend to other signals.



Always select an isolated tree so that you do not start a forest fire and endanger yourself or others.



*"Signalling Techniques", Wilderness Survival. Copyright 2007 by Jalic Inc.  
Retrieved 12 March 2007, from <http://www.wilderness-survival.net/chpt19.php>*

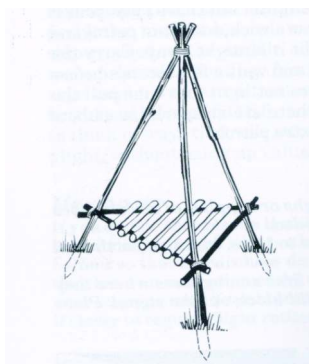
Figure 16-1-2 A Torch Tree

### A Luminous Cone Fire

- On a clear and open site, make a tripod with a platform to support a fire. The platform keeps the tinder off damp ground and you can store more firewood beneath it. Use a covering of evergreen boughs to keep the cone dry; they will burn brightly and give off good smoke. Cover the complete cone with brightly coloured material when the fire is not lit. This will not only keep the fire dry and ready to burn, but the material itself will be noticeable during the day, the material itself may attract attention. Take off the bright coloured material when you ignite the fire.



Keep these tripods well maintained, ensuring that wood is dry enough to light at a moment's notice and that the supply is not poached for other uses. Drive the pole ends into the ground to prevent tipping over in strong winds.



*Wiseman, J., The SAS Survival Handbook, HarperCollins Publishers (p. 506)*

Figure 16-1-3 A Luminous Cone Fire

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## CONFIRMATION OF TEACHING POINT 1

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### QUESTIONS

- Q1. Name three types of emergency signal fires.
- Q2. What is a consideration when building a torch tree signal fire?
- Q3. What is the internationally recognized distress signal?

### ANTICIPATED ANSWERS

- A1. A three fire triangle pattern, a torch tree, and a luminous cone fire.
- A2. Always select an isolated tree so that you do not start a forest fire and endanger yourself and others.
- A3. Three fires.

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### Teaching Point 2

### Identify a Location To Be Seen From the Air

Time: 5 min

Method: Interactive Lecture

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### LOCATIONS FOR A SIGNAL FIRE WHICH CAN BE SEEN FROM THE AIR

**Elevated Ground.** Choose the highest points of terrain for light signals.

**Highly Visible.** Find a natural clearing or edge of a stream where you can build fires that the foliage will not hide.

### Fuel Source

- Being in an area where there are readily available fuel sources for the signal fire would be highly beneficial.
- Some examples of fuel sources include:
  - dry, standing wood, and dry, dead branches;
  - dry inside (heart) of fallen tree trunks and branches;
  - green wood that is finely split;
  - dry grasses twisted into bunches;
  - peat dry enough to burn;
  - dried animal dung;
  - animal fats;
  - coal, oil shale, or oil laying on the surface; and
  - rubber, plastic or heavy oil to produce thick black smoke.

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## CONFIRMATION OF TEACHING POINT 2

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### QUESTIONS

- Q1. Is high terrain or low terrain best for choosing a location for a signal fire?

- Q2. What is a highly visible location?
- Q3. What are some examples of fuel sources?

### ANTICIPATED ANSWERS

- A1. The highest point of terrain is the best location.
- A2. A natural clearing or edge of a stream.
- A3. Dry, standing wood, and dry, dead branches; dry inside (heart) of fallen tree trunks and branches; green wood that is finely split; dry grasses twisted into bunches; peat dry enough to burn; dried animal dung; coal, oil shale, or oil laying on the surface; and rubber, plastic or heavy oil to produce thick black smoke.

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### Teaching Point 3

### Demonstrate and Have Cadets Collect Combustible Materials and Construct a Luminous Cone Signal Fire

Time: 20 min

Method: Demonstration and Performance

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### COMBUSTIBLE MATERIALS



Examples of combustible materials include birch bark, dry grass, fine wood shavings, bird down, waxed paper and cotton fluff from clothing.



The instructor shall construct a luminous cone fire previous to the cadets' arrival for demonstration purposes.

### PREPARING TO BUILD A FIRE

#### 1. Selecting and Preparing Tinder

- Tinder is any kind of material that a minimum amount of heat will ignite.
- Good tinder needs only a spark to set it ablaze.
- Birch bark, dry grass, fine wood shavings, bird down, waxed paper and cotton fluff from clothing all make good tinder.
- Tinder must be dry.
- It is a good idea to carry tinder in a waterproof container.

#### 2. Selecting and Preparing Kindling

- Kindling is the wood used to raise flames from the tinder so larger, less combustible materials can be burned.
- The best kindling consists of small, dry twigs and small pieces of soft wood.
- Kindling should not be collected straight from the earth because it is usually damp. It should be gathered from standing deadwood.

#### 3. Selecting and Preparing Fuel

- a. Fuel is anything that will burn in the fire.
- b. Dry wood from standing trees should be used to get fires going.
- c. Once the fire is established, greener and damp wood may be used.
- d. Hardwoods include hickory, beech, maple and oak. These hardwoods burn well, give off heat, and last a long time as coals.
- e. The fire can be maintained for a long period of time using hardwoods.
- f. Softwoods burn very quickly and give off sparks. They can be used when lighting the fire.
- g. Softwoods include cedar, alder, hemlock, spruce, pine, chestnut and willow.
- h. After the fire is burning steadily, fuel that is three to four times the size of the kindling can be added.

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## **ACTIVITY**

Time: 15 min

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### **OBJECTIVE**

The objective of this activity is to have cadets build a luminous cone fire in groups of no more than 15.

### **RESOURCES**

- String,
- Wood,
- Boughs,
- Tinder, and
- Kindling.

### **ACTIVITY LAYOUT**

The area must be previously selected and the appropriate authorities must be notified. The area should be in an open space where there is no chance of spreading the fire to other trees or flammable sources.

### **ACTIVITY INSTRUCTIONS**

Working as a member of a group of no more than 15, the cadets shall gather wood, green boughs (if available), tinder, and kindling to build the luminous cone fire. Each group shall construct a luminous cone fire according to the following steps:

1. Make a tripod to support a fire.
2. Using the string, lash the top of the tripod together and the side supports together.
3. Ensure pole ends are driven into the ground to prevent tipping.
4. Make a platform to hold the tinder, kindling and fuel.
5. Place tinder and kindling in the centre of the platform.
6. Ensure tinder and kindling are placed together in a fashion that will ignite the cone.



7. Ensure there is sufficient ventilation allowing oxygen to feed the fire when lit.
8. A fire will suffocate if there is too much fuel.
9. Cover with green boughs (if available) to keep the cone dry.
10. Ensure there is a heat and smoke outlet at the top of the cone.



The instructor will ensure that all the cadets in the group participate in the activity. The questions in the confirmation of TP3 should be asked as the instructor moves from one group to the next.

## SAFETY

Cadets will be supervised during the construction of the luminous cone fire.

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## CONFIRMATION OF TEACHING POINT 3

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### QUESTIONS

- Q1. What holds the tinder and kindling in the centre of the tripod?
- Q2. What do you use to keep the cone dry?
- Q3. What prevents the tripod from tipping?

### ANTICIPATED ANSWERS

- A1. A platform.
- A2. Green boughs.
- A3. Ensure pole ends are driven into the ground to prevent tipping.

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### Teaching Point 4

**Explain, Demonstrate, and Have the Cadets Practice Lighting, Maintaining, and Extinguishing One Signal Fire**

Time: 20 min

Method: Demonstration and Performance

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## ACTIVITY

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### OBJECTIVE

The objective of this activity is to have the cadets practice lighting, maintaining and extinguishing one signal fire.

### RESOURCES

- String,
- Matches,
- Wood/kindling/tinder,
- Water,

- Fire extinguishing equipment, and
- Shovel.

## ACTIVITY LAYOUT

Provide each group of cadets with a match to light the signal fire.

## ACTIVITY INSTRUCTIONS



The instructor will review lighting a fire, maintaining a fire and extinguishing a fire.

## LIGHTING A FIRE

### 1. Lighting Using a Match

- Matches are the easiest way to start a fire.
- They produce a flame instantly when struck against a striking pad.
- The biggest problem with matches is that in windy or wet conditions they may not be useful.
- They will not ignite if the striking pad becomes wet or worn.
- The matches should be packed in waterproof containers so that they cannot rub or rattle together and accidentally ignite.
- Waterproof matches are the most effective kind to include in a survival kit.

## MAINTAINING AND EXTINGUISHING A FIRE

### 1. Maintaining a Fire

- A fire should never be left unattended.
- It takes only seconds for a fire to begin burning out of control.
- Immediately after a fire has been started, it requires a modest amount of wood to build up heat.
- The fire requires very little wood to keep it burning once a good amount of wood is built up.
- Too much wood should not be put on the fire at once as it may smother the fire.
- Suitably sized wood should only be put on the fire (e.g. less than 45 cm).
- The fire must have proper ventilation so that oxygen may feed the fire.
- A fire is only to be built to a controllable size.

### 2. Extinguish a Fire

- Water is the easiest way to put out a fire.
- Water should be dumped on the fire until it results in no heat emanating from the centre.

- c. All of the sparks are to be out prior to decamping. The fire is to be smothered completely with wet earth or sand.

### **SAFETY**

Ensure all safety precautions are taken when the cadets are lighting, maintaining and extinguishing the fires.

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

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### **QUESTIONS**

- Q1. What is fuel?
- Q2. What is the purpose of kindling?
- Q3. Name two of the methods of extinguishing a fire.

### **ANTICIPATED ANSWERS**

- A1. Fuel is anything that burns (wood, oil, animal fats, etc.).
- A2. Kindling is the wood used to raise flames from the tinder so that larger, less combustible materials can be burned.
- A3. The ways to extinguish a fire are with water, wet earth, or wet sand.

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### **END OF LESSON CONFIRMATION**

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The cadets' participation in TPs 3 and 4 will serve as the confirmation of this lesson.

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### **CONCLUSION**

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

N/A.

### **METHOD OF EVALUATION**

N/A.

### **CLOSING STATEMENT**

Safety is a key concern when dealing with fire. Principles of fire safety must be applied before beginning the steps in lighting a fire. Knowing how to construct a signal fire in a survival situation is important as a signal fire will help attract help to the survival location.

### **INSTRUCTOR NOTES/REMARKS**

- The instructor shall demonstrate lighting the first of the prepared signal fires.
- Additional supervision is required during the lighting of the signal fires. Fire safety equipment shall also be present.
- Appropriate authorities (e.g. local police, forestry service, and/or airport authority) shall be notified of the lighting of the signal fires to include: squadron contact name, squadron contact number, location including grid reference, estimated time of lighting, and the duration the fire is expected to be lit.

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**REFERENCES**

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- C2-016 (ISBN 0-517-88783-5) Curtis, R. (1998). *The Backpacker's Field Manual: A Comprehensive Guide to Mastering Backcountry Skills*. New York, NY: Three Rivers Press.
- C2-042 (ISBN 0-7566-0946-1) Berger, K. (2005). *Backpacking and Hiking*. New York, NY: DK Publishing, Inc.
- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.
- C3-118 Wilderness Survival. (2007). *Signalling Techniques*. Retrieved 12 March 2007, from <http://www.wilderness-survival.net/chpt19.php>.



**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 2**

**EO M290.02 – CONSTRUCT A LEAN-TO-STYLE SHELTER**

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Total Time:	90 min
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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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 TP1 to present basic material and give direction on procedures for constructing a lean-to-style shelter.

Demonstration was chosen for TP2 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire.

Performance was chosen for TP3 as it provides an opportunity for the cadets to practice building a lean-to-style shelter under supervision.

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**INTRODUCTION**

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**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall be expected to have constructed a lean-to-style shelter.

**IMPORTANCE**

It is important for cadets to know how to construct a lean-to-style shelter as it can protect them from weather, animals and insects in a survival situation. Shelters can also provide warmth, shade and comfort.

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**Teaching Point 1****Explain the Importance of Site Selection**

Time: 20 min

Method: Interactive Lecture

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**SELECTING A SITE FOR CONSTRUCTION OF A LEAN-TO-STYLE SHELTER**

- The site selection should begin before darkness, if possible.
- The shelter should be built near materials to build the shelter (trees, boughs) and fuel for the fire.



Ensure cadets understand that although trees may offer protection, those with dead branches or on windswept fields may be dangerous. Check above and around the lean-to site for dead and standing trees or branches.

**Land Considerations**

- The area selected must be large enough to accommodate the planned shelter.
- The area selected should not be at the bottom of a hill.
- The area should be relatively flat with only a slight slope to allow for drainage.
- Dry river gullies, canyons and flood plains should be avoided.

**Water Considerations**

- The shelter should be built away from still water in order to avoid insects.
- The shelter should be built away from the source of drinking water.

**Animal and Insect Considerations**

- Avoid setting up a shelter where there are animal trails or water holes.
- Fast flowing streams will have fewer insects nearby than still water.
- Avoid areas infested with ants or bees.

**Other Considerations**

- There should be an area nearby to construct signals.
- The entrance of the shelter should face the sun to add warmth and increase morale.
- Very thick woods should be avoided as it will be hard to dry the shelter or fuel.
- Try to find a natural windbreak or a place that is away from strong wind currents.
- Avoid swampy terrain.
- A place for a fire should be located in front of the opening of the shelter.
- Be aware of the prevailing winds.

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**CONFIRMATION OF TEACHING POINT 1**


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**QUESTIONS**

- Q1. Name three land considerations when building a shelter.
- Q2. Name three animal considerations when building a shelter.
- Q3. Name three other considerations when building a shelter.

**ANTICIPATED ANSWERS**

- A1. The area must be large enough for the planned shelter; the area should not be at the bottom of a hill; and it should be relatively flat with only a slight slope to allow for drainage.
- A2. Avoid building shelters near animal trails or water holes; fast flowing streams will have fewer insects than still water; and areas infested with ants or bees should be avoided.
- A3. There should be an area nearby to construct signals; the entrance should face the sun for warmth and morale; thick woods should be avoided as it will make drying difficult; look for a natural windbreak or place away from strong wind currents; avoid swampy terrain; and choose a place where a fire can be located in front of the opening of the shelter.

**Teaching Point 2****Explain and Demonstrate the Procedure for Constructing a Lean-to-style Shelter**

Time: 20 min

Method: Demonstration



While in the field you must adhere to the policies in CATO 11-08, *Environmental Protection and Stewardship*.



The lean-to-style shelter that was previously constructed is for demonstration purposes and is to be shown to the cadets while providing an explanation of its construction.

The procedure for constructing the lean-to-style shelter are to include:

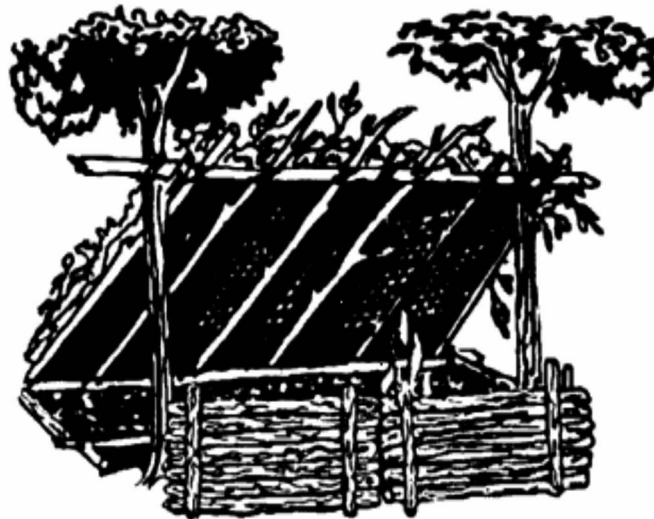
1. obtaining the appropriate supplies to include:
  - a. ground sheets,
  - b. knife,
  - c. shovel,
  - d. pegs,
  - e. rope/twine, and
  - f. natural materials.

2. tying and lashing cross-pieces and the vertical supports between the trees and ground;
3. checking each ground sheet for fatigue and holes;
4. tying each end of the ground sheet to the cross-pieces and supports, ensuring they are to waist height of the tallest person;
5. substituting the ground sheet for the boughs illustrated in [Figure 16-2-1](#);
6. ensuring the ground sheet is pulled tight between the cross-pieces and supports and along the sides;
7. pulling the bottom of the ground sheet out and pegging each grommet to the ground; and
8. digging small trenches around the shelter to allow for effective drainage.

### **SAFETY**

Review safe handling of a knife to include:

- always cut away from the body;
- do not let others stand too close to you;
- do not leave a knife unattended on the ground;
- sheath a knife when not in use; and
- never throw a knife for any reason.



*"Shelters", Wilderness Survival. Copyright 2007 Jalic Inc. Retrieved 9 March 2007, from <http://www.wilderness-survival.net/shelters-s.php>*

Figure 16-2-1 Lean-to-style Shelter



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**CONFIRMATION OF TEACHING POINT 2**

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**QUESTIONS**

- Q1. What three items are required to build a shelter?
- Q2. What is the purpose of digging small trenches around a shelter?
- Q3. What is the purpose of the ground sheet and why is it pegged down?

**ANTICIPATED ANSWERS**

- A1. Rope/twine, ground sheets, pegs, branches, sticks and leaves are required.
- A2. The small trenches provide drainage.
- A3. The ground sheet will keep the occupant dry and the pegs are to secure the ground sheet to the ground.

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**Teaching Point 3****Construct a Lean-to-style Shelter**

Time: 40 min

Method: Performance

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**ACTIVITY**

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**OBJECTIVE**

The objective of this activity is to have the cadets, in groups of no more than four, construct a lean-to-style shelter.

**RESOURCES**

- Ground sheets,
- Rope/twine,
- Shovel,
- Items found in a natural setting, and
- Pegs.

**ACTIVITY LAYOUT**

Select an area that is large enough to construct the lean-to-style shelters.

**ACTIVITY INSTRUCTIONS**

Working as a member of a group of no more than four, the cadets shall choose a location for the lean-to-style shelter and gather sticks and branches that will be required to build the shelter. Each group shall make sure they have the necessary resources to complete a shelter. Each group shall construct a lean-to-style shelter following these steps:

1. Tie a cross-piece between two trees so that it is to waist height of the tallest person.
2. Lash the support pieces to the cross-piece.
3. Pull the ground sheet tight and tie it to the crosspiece and supports.

4. Pull the bottom of the ground sheet out and peg each grommet to the ground.
5. Dig small trenches for drainage around the lean-to-style shelter.



The questions in the confirmation of TP3 should be asked of the groups as the instructor moves from one group to the next.

## **SAFETY**

Adequate supervision will ensure the cadets do not misuse the equipment.

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

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## **QUESTIONS**

- Q1. Why was that location chosen to build the shelter?
- Q2. How are the supports anchored?
- Q3. What challenges were encountered while building the shelter?

## **ANTICIPATED ANSWERS**

- A1. It was built on a flat area, with a little slope; away from animal trails or water holes; away from still water; away from areas infested with ants and bees; having a natural wind break and facing the sun.
- A2. They are lashed together between the cross-pieces and the ground.
- A3. Answers will vary. Encourage the cadets to elaborate their responses.

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### **END OF LESSON CONFIRMATION**

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The cadets' construction of a lean-to-style shelter will serve as the confirmation of this lesson.

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### **CONCLUSION**

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## **HOMEWORK/READING/PRACTICE**

N/A.

## **METHOD OF EVALUATION**

N/A.

## **CLOSING STATEMENT**

It is important for the cadets to know how to construct a lean-to-style shelter in a survival situation. A shelter will help protect a person from weather, animals and insects. Shelters can also provide warmth, shade and comfort. The lean-to-style shelter provides an effective shelter for squadron survival exercises.

**INSTRUCTOR NOTES/REMARKS**

If lean-to-style shelters cannot be constructed, another style shelter (e.g. a bivouac tent, or a tarpaulin between trees) may be substituted.

The directives found in CATO 11-08, *Environmental Protection and Stewardship*, are to be followed during this lesson.

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**REFERENCES**

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- A0-039 CATO 11-08 D Cdts 3. (1997). *Environmental Protection and Stewardship*. Vol. 1 General (pp. 1-11). Ottawa, ON: Department of National Defence.
- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.
- C3-118 Wilderness Survival. (2007). *Shelters*. Retrieved 9 March 2007, from <http://www.wilderness-survival.net/shelters-2.php>.

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**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 3**

**EO M290.03 – CONSTRUCT A SIMPLE SNARE**

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Total Time:	60 min
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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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.

Cut one 60 cm length of non-ferrous wire for each pair of cadets. Have spares on hand in case extras are needed.

**PRE-LESSON ASSIGNMENT**

N/A.

**APPROACH**

Demonstration was chosen for TP1 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire.

Performance was chosen for TP2 as it is an interactive way to introduce cadets to constructing a simple snare.

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**INTRODUCTION**

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**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall be expected to construct a simple snare.

**IMPORTANCE**

It is important for cadets to learn to construct a simple snare because in a survival situation the ability to catch food is essential. Consumption of protein will satisfy hunger and enable the cadet to ward off fatigue.

**Teaching Point 1****Explain and Demonstrate the Procedure for Constructing a Simple Snare**

Time: 15 min

Method: Demonstration

Site selection is important when constructing a simple snare. The simple snare should be placed in an area frequented by small animals or near where they store their food. In all seasons, small animal tracks and their feces can be seen. These give a good indication of where small animals frequent or are travelling.

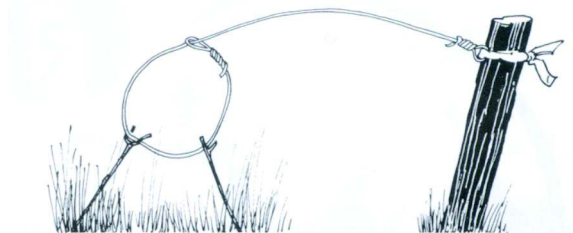
A simple snare may be made of brass wire, string, plant cordage, roots, horse hair, rawhide, dried animal guts, etc. The best material for constructing a simple snare is non-ferrous wire because it keeps its round shape and is easily twisted to make a loop through which the moving part of the wire will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



Ensure the instructor has practiced constructing a simple snare before demonstrating this procedure to cadets.

To construct a simple snare:

1. Using the non-ferrous wire, 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. (See [Figure 16-3-1](#)).
2. Set the loop vertically four fingers above the ground using twigs. Ensure the loop is a hand's width away from obstructions on either side of the path. (See [Figure 16-3-1](#)).
3. Anchor the remaining wire to a stake/tree/obstruction. (See [Figure 16-3-1](#)).



*Wiseman, J., The SAS Survival Handbook, HarperCollins Publishers (p. 187)*

Figure 16-3-1 A Simple Snare

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**CONFIRMATION OF TEACHING POINT 1**


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**QUESTIONS**

- Q1. Where should a simple snare be placed?
- Q2. Name three materials which can be used for constructing a simple snare?
- Q3. What is the best material for constructing a simple snare?

**ANTICIPATED ANSWERS**

- A1. The simple snare should be placed in an area frequented by small animals or near where they store their food.

- A2. A simple snare may be made of brass wire, string, plant cordage, roots, horse hair, rawhide, dried animal guts, etc.
- A3. The best material for 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.

---

**Teaching Point 2**
**Construct a Simple Snare**

Time: 35 min

Method: Performance

---

**ACTIVITY**


---

**OBJECTIVE**

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

**RESOURCES**

Non-ferrous wire 60 cm in length, one per group.

**ACTIVITY LAYOUT**

This activity must be conducted outdoors during daylight hours.

**ACTIVITY INSTRUCTIONS**

1. Divide cadets into groups of two.
2. Distribute one non-ferrous wire 60 cm in length to each group.
3. Instruct cadets to find an appropriate site to construct a simple snare.
4. Have cadets construct a simple snare.
5. Supervise and give feedback on the construction of simple snares.
6. After each group has finished constructing a simple snare, bring all groups back to one central location.
7. Have the entire group look at each simple snare if time permits.
8. Have cadets disassemble the simple snares and return materials to the instructor.

**SAFETY**

Adequate supervision will ensure cadets do not misuse the equipment.



Watch where you are walking and be careful not to step on a simple snare.

---

**END OF LESSON CONFIRMATION**


---

The cadets' participation in TP2 will serve as the confirmation of this lesson.

---

**CONCLUSION**

---

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

Constructing a simple snare is essential in a survival situation. The ability to feed yourself will ward off fatigue and eliminate one of the seven enemies of survival.

**INSTRUCTOR NOTES/REMARKS**

All snares will be disassembled immediately after completion of the practical exercise.

---

**REFERENCES**

---

- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.





**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 4**

**EO M290.04 – CONSTRUCT GROUND-TO-AIR SIGNALS**

---

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-802/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 the handout located at [Annex A](#) for each cadet.

**PRE-LESSON ASSIGNMENT**

N/A.

**APPROACH**

An interactive lecture was chosen for TP1 to introduce methods of signalling to the cadets.

A practical activity was chosen for TP2 as it is an interactive way to introduce cadets to methods of signalling and allows the cadets an opportunity to practice. This activity contributes to the development of survival skills in a fun and challenging setting.

---

**INTRODUCTION**

---

**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall have constructed a ground-to-air signal.

**IMPORTANCE**

It is important for cadets to know how to construct ground-to-air signals as they may help them get rescued in a survival situation. Many ground-to-air signals are internationally recognized and can be made with almost any substance; in the snow, with logs, with rocks, or by trampling grass. The purpose of ground-to-air signals is to be located, noticed, or to convey a message to rescuers.

---

**Teaching Point 1****Discuss Ground-to-air Signals Employed To Communicate  
With Aircraft**

Time: 15 min

Method: Interactive Lecture

---

**GROUND-TO-AIR SIGNALS****Signal Dimensions**

- Signals should be large with the letters or lines 3 metres (10 feet) wide and if possible 10 metres (40 feet) long, with 3 metres (10 feet) between signals.
- The markings should be deep or high and positioned so that the shadows cast by the sun are the longest.
- Experience teaches one to associate an object with its shape or outline. At a distance, the outline of an object can be clearly recognized long before the details that make up the object can be determined. Geometric shapes can tell the rescuer that the sign is man-made.

**Creating Contrasting Shades or Colours**

- Colour is an aid to an observer when there is contrast between the colour of an object and its background. The greater the colour contrast the more visible the object.
- While colour alone will not usually identify an object, it is often an aid in locating the object. Usually the darker shades of any given colour will be less likely to attract an observer's attention than the lighter, more brilliant shades.
- An object may cast a shadow beside it, which may be visible although the object itself is out of sight. Objects in shadow may be missed because the eye tends to accept conspicuously dark or light areas as uniform, and does not seek minor differences in darkness or lightness within them.
- To construct a signal on a lighter background dig a shallow ditch and build a low wall of dirt or logs, etc. to cast a shadow larger than your construction.
- Place the signal in an open area easily spotted from the air.

**Signals**

- Require assistance.
- Require medical assistance.
- Proceed in this direction.
- All is well.
- Require food and water.



Distribute copies of the handout located at [Annex A](#).

---

**CONFIRMATION OF TEACHING POINT 1**

---

**QUESTIONS**

- Q1. What should the signal dimensions be?
- Q2. Name two of the signals.
- Q3. How do you construct a signal on a lighter background?

**ANTICIPATED ANSWERS**

- A1. Signals should be large with the letters or lines 3 metres (10 feet) wide and if possible 10 metres (40 feet) long, with 3 metres (10 feet) between signals.
- A2. Require assistance, require medical assistance, proceeding in this direction, all is well, and require food and water.
- A3. To construct a signal on a lighter background dig a shallow ditch or build a low wall of dirt or logs, etc. to cast a shadow larger than your construction.

---

**Teaching Point 2****Construct a Ground-to-air Signals as a Member of a Group**

Time: 35 min

Method: Practical Activity

---

---

**ACTIVITY**

---

**OBJECTIVE**

The objective of this activity is to have the cadets construct a ground-to-air signal as a member of a group.

**RESOURCES**

- Shovel,
- Items found in nature,
- Rope, and
- Handout.

**ACTIVITY LAYOUT**

An area must be selected that is large enough to construct the ground-to-air signals.

**ACTIVITY INSTRUCTIONS**

1. Divide cadets into groups of four.
2. Distribute given materials to the groups.
3. Assign a ground-to-air signal to each group.
4. The cadets shall choose a location for the ground-to-air signals. If the cadets have access to beaches or fields they may use the area accordingly (e.g. drawing signals in the sand).
5. Have groups gather resources needed for signals.

6. Each group shall construct a ground-to-air signal.
7. Ensure that the final constructed signal looks the same as the picture.
8. Disassemble signals after completion of the activity.
9. Return natural resources back to the environment.



Give each group of cadets a different ground-to-air signal from the list to construct. If there are more than 5 groups restart the list from the top and work your way through it again.

### **SAFETY**

Ensure parameters are established so the cadets do not go outside the training area or get lost.

---

### **END OF LESSON CONFIRMATION**

---

The cadets' participation in TP2 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 construct ground-to-air signals in a survival situation to improve their chances of a quick rescue. Many ground-to-air signals are internationally recognized and can be made with almost any substance; in the snow, with logs, with rocks, or by trampling grass. The purpose of ground-to-air signals is to be located, noticed, or to convey a message to rescuers.

### **INSTRUCTOR NOTES/REMARKS**

All materials used in the construction of ground-to-air signals will be from the surrounding environment.

All ground-to-air signals should be removed and returned to the environment after the completion of the practical activity.

---

### **REFERENCES**

---

- C2-044 Transport Canada (2007). *Ground-to-Air Signals*. Retrieved 9 February 2007, from <http://www.tc.gc.ca/CivilAviation/publications/tp14371/SAS/4-0.htm>.
- C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.

C3-118 Wilderness Survival. (2007). *Signalling Techniques*. Retrieved 12 March 2007, from <http://www.wilderness-survival.net/chpt19.php>.

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**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 5**

**EO M290.05 – IDENTIFY HIKING TECHNIQUES**

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Total Time: 60 min

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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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**

Create slides or copy the handouts located at [Annex B](#) for each cadet.

The instructor may bring in examples of hiking footwear, if available, for demonstration purposes.

**APPROACH**

An interactive lecture was chosen for TP1 to TP3 to present background material to the cadets.

---

**INTRODUCTION**

---

**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall be expected to identify hiking techniques. The cadets will be able to recognize how to monitor their daily water requirements, identify characteristics of hiking footwear and identify a personal hiking rhythm.

**IMPORTANCE**

It is important for cadets to know how to use hiking techniques to allow for a more comfortable and satisfying experience. Hiking is low-impact and this makes it suitable for virtually everyone; providing good aerobic exercise, toning muscles and improving general physical condition.

**Teaching Point 1****Explain Potable Water Requirements for Consumption  
During a Day Hike**

Time: 15 min

Method: Interactive Lecture

**DAILY WATER REQUIREMENTS****Performance-related Water Loss**

- Water is lost from sweating, urinating, breathing, and defecating.
- When working hard and sweating heavily, a person can lose up to a litre of water per hour.
- At high altitudes where the air is dry, a person can dehydrate merely by breathing at rest.
- Under “normal” conditions, a person’s thirst mechanism, dry mouth and hormones in the kidneys, stimulates them to drink enough water to stay hydrated.
- If a person is working very hard or sweating profusely, if they are in a very hot or dry climate, or if they have an aggravating condition such as diarrhea or nausea that causes vomiting, they will have to drink water deliberately and regularly regardless of how thirsty they feel.
- Dehydration impairs humans, both physically and mentally.
- As a person becomes dehydrated, their blood plasma volume drops and, consequently, their hearts must work harder to keep body tissues supplied with blood. The result is a decrease in cardiovascular performance.
- When dehydrated, one’s body is also less able to dissipate heat through sweat (thermoregulation).
- Finally, the body’s ability to digest and metabolize food is impaired when it is low on water.

**Daily Water Intake by Weight**

- When as little as 1 percent of body weight in water is lost, a person’s physical performance begins to decline.
- If a 68 kg (150-pound) person is short just 0.95 litres (a quart) of water, heat regulation and exercise performance starts to decline.
- When a person is down 2.84 litres (three quarts) of water, that same 68 kg (150-pound) person will lose 20–30 percent of their exercise performance.



Present a slide or distribute a photocopy of [Figure 16B-1](#).



Present a slide or distribute a photocopy of [Figure 16B-2](#).



## MAINTAINING SAFE HYDRATION LEVELS

### Pre-hydrating

- Drink extra water before a strenuous activity.
- The best thing to drink is plain, cool water.

### Drinking Small Amounts Often

- Drink small amounts of cool water when possible.
- Cool water is absorbed more easily by the intestines than warm water.

### Avoiding Sugar and Caffeine Drinks

- Sugar impedes the body's ability to absorb fluid.
- Alcohol and caffeine inhibit one of the kidney's hormones that regulates water loss, so drinking either alcohol or caffeine will accelerate dehydration.

### Routinely Drinking Water

- Incorporate drinking water into your routine by keeping a water bottle in a convenient place or using a dromedary bag (e.g. camel pack).
- Make drinking water a habit. If only a sense of thirst is relied on, chances are a hiker will get behind in hydration.
- Make a point of drinking at least 0.24 litres (8 ounces) of water for every half hour of strenuous activity.

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What is the best thing to drink when pre-hydrating?
- Q2. What impedes the body's ability to absorb fluid?
- Q3. How can you incorporate drinking water into your routine?

### ANTICIPATED ANSWERS

- A1. The best thing to drink when pre-hydrating is plain, cool water.
- A2. Sugar impedes the body's ability to absorb fluid?
- A3. Incorporate drinking water into your routine by keeping a water bottle in a convenient place or using a dromedary bag (e.g. camel pack).

---

### Teaching Point 2

### Explain the Optimum Characteristics of Hiking Footwear

Time: 15 min

Method: Interactive Lecture

---

## CHARACTERISTICS OF HIKING FOOTWEAR

The most important factor to consider when selecting hiking footwear is the fit. It should provide protection for the feet and a firm foundation for walking and scrambling. Today's boots are derived from athletic shoe technology.

They are light, comfortable and functionally suited. Common characteristics to look for when selecting a hiking boot are:

### **Sturdy and Lightweight**

- The boot should support the feet and ankles from twisting on uneven surfaces.
- Higher boots with stiff ankle support provide lateral rigidity.
- The boot should also support the foot from over bending when placing too much weight on the toe or heel.
- The lighter the boot the easier walking will be.
- Every extra kg of footwear weight can be compared to 2.27 kg (5 pounds) of added backpack weight.

**Comfortable (Snug Fit).** When worn, footwear shall fit snugly with the heel snug against the wall of the shoe and a small amount of space for the toes to move.

**Sized Correctly (Can Wiggle Toes).** Boots that fit will ensure comfort during the hike. A boot fits correctly when:

- it is wide enough so that the boot matches the width of the foot with a little extra room;
- the tongue rests comfortably along the top of the foot; and
- the toes have room to wiggle.

### **SOCKS**

The boot is only one part of the footwear system; socks are the first line of defence for the feet. A two sock system is common in many activities. Unless regularly hiking in hot, damp conditions, consider wearing one pair of heavy socks and one pair of light inner socks.

**Inner Socks.** This is a thin layer that helps wick, or pull moisture away from the foot. They are usually made of polypropylene material.

**Outer Sock.** This layer is most often made of thick wool, which can absorb moisture. This layer cushions the foot and provides insulation.

---

## **CONFIRMATION OF TEACHING POINT 2**

---

### **QUESTIONS**

- Q1. What is the most important factor when selecting hiking footwear?
- Q2. Every extra kg of footwear can be compared to what?
- Q3. What is the first line of defence for the feet?

### **ANTICIPATED ANSWERS**

- A1. The most important factor to consider when selecting hiking footwear is the fit.
- A2. Every extra kg of footwear weight can be compared to 2.27 kg (5 pounds) of added backpack weight.
- A3. Socks.

---

**Teaching Point 3****Explain Personal Hiking Rhythm**

Time: 20 min

Method: Interactive Lecture

---

**DETERMINING STRIDE RHYTHM AND SPEED**

A steady hiking rhythm is generally more enjoyable as hikers overexert themselves less and generally keep the physical strain at enjoyable levels. Having a steady rhythm will enable a hiker to stick to a fixed schedule and lessen the strain put on the feet, legs, lungs and overall body. This allows a hiker to travel while being less fatigued.

**Developing a Hiking Rhythm.** A hiking rhythm is very personal and is developed over the course of many hikes. To develop a rhythm there are some guidelines to follow:

- Choose a specific stride rhythm and speed and keep to it. A comfortable rhythm is one that allows a hiker to walk at the same intensity level for at least one hour without having to take a break.
- Adjust rhythm to terrain, weather and weight. The point where a person can no longer carry on a conversation indicates the hiker has gone beyond a comfortable tempo.
- Make the rhythm a full body movement where breathing and the swing of the arms happen in harmony with the body.
- Uneven surfaces like uphill and downhill slopes of varying incline can make it difficult to maintain a steady hiking rhythm.

**CONTROLLING FATIGUE**

The purpose of resting is to slow down the heart rate and breathing, thereby allowing the heart and lungs to rest. Resting gives the body time to get rid of the lactic acid built up in the muscles, and to recover from hot spots or sores.

**Resting Guidelines**

- Rest in regular intervals; try 10 minutes for every hour hiked (make the rest intervals part of the rhythm).
- Stick to 10 minute rest breaks. Use only lunch and supper breaks as extended rest periods.
- Ten minutes is the most effective rest duration for body recovery.
- Ensure to take off backpacks, rest in the shade, and sit down during rests.
- During the extended rest breaks, allow feet to rest and dry by removing shoes and airing out footwear.

**ADJUSTING RHYTHM**

Generally, hiking rhythm on a flat surface can be maintained easily; however, when weather and additional weight are included, hiking becomes more difficult. Speed depends on the fitness level of the entire group, the terrain, the altitude and pack weight. One of the best ways to measure and regulate pace is to pay close attention to the tempo of breathing.

If breathing determines pace then, for example, on level ground one takes three steps per inhalation, and three steps per exhalation. Climbing a hill, while maintaining the same breathing rate, the steps per inhalation fall to two steps. A good rule of thumb to follow is to walk at a pace that still allows one to carry on a conversation.

When travelling in different conditions, one's pace will change according to:

- **Weather.** Poor weather will reduce pace and force the hiker to reduce step size for safety.

- **Weight.** Weight will affect pace size as the more weight one carries, the more energy must be expelled.
- **Terrain.** Travelling uphill will reduce pace size and distance travelled.

### **EMPLOYING FULL BODY SYNCHRONIZATION**

Hiking rhythm is a full body affair. Just like marching, hiking requires coordinated movements where every action has a reaction. The swing of arms provides momentum, breathing controls pace, etc. To control rhythm, one must first learn what body parts work in unison with each other.

To employ full body synchronization during movement, the arms should be in motion at a natural swing opposite the forward foot. The swing of the arms provides momentum to help carry the body forward for the next step. Breathing will control pace (keeping in mind that a comfortable rhythm allows a person to carry on a conversation while hiking).

---

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

---

#### **QUESTIONS**

- Q1. What is involved with developing a hiking rhythm?
- Q2. How long should a rest break be?
- Q3. How does travelling in different conditions change one's pace?

#### **ANTICIPATED ANSWERS**

- A1. A hiking rhythm is very personal and is developed over the course of many hikes. Choose a specific stride rhythm and speed and keep to it. A comfortable rhythm is one that allows a hiker to hike at the same intensity level for at least one hour without having to take a break. Adjust rhythm to terrain, weather and weight. The point where a person can no longer carry on a conversation indicates the hiker has gone beyond a comfortable tempo. Make the rhythm a full body movement where breathing and the swing of the arms happen in harmony with the body.
- A2. Rest breaks should be 10 minutes.
- A3. Poor weather will reduce pace and force the hiker to reduce step size for safety, weight will affect pace size as the more weight one carries the more energy must be expelled and travelling uphill will reduce pace size and distance travelled.

---

### **END OF LESSON CONFIRMATION**

---

#### **QUESTIONS**

- Q1. Where can you dehydrate merely by breathing at rest?
- Q2. How much water can you lose when working hard and sweating heavily?
- Q3. What does comfortable footwear mean?

#### **ANTICIPATED ANSWERS**

- A1. You can dehydrate merely by breathing at rest at high altitudes.
- A2. You can lose up to a litre of water per hour when working hard and sweating heavily.

- A3. When worn, footwear shall fit snugly with the heel snug against the wall of the shoe and a small amount of space for the toes to move.

---

### CONCLUSION

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#### HOMework/READING/PRACTICE

N/A.

#### METHOD OF EVALUATION

N/A.

#### CLOSING STATEMENT

It is important for cadets to know how to use hiking techniques to allow for a more comfortable and satisfying experience. Hiking is an opportunity for cadets to enjoy the outdoors while engaging in physical activity.

#### INSTRUCTOR NOTES/REMARKS

Examples of hiking footwear should be brought into the class for demonstration purposes.

---

### REFERENCES

---

- C2-009 (ISBN 0-684-85909-2) Harvey, M. (1999). *The National Outdoor Leadership School's Wilderness Guide*. New York, NY: Fireside.
- C2-010 (ISBN 0-375-70323-3) Rawlins, C., and Fletcher, C. (2004). *The Complete Walker IV*. New York, NY: Alfred A. Knopf.
- C2-012 (ISBN 0-89886-643-X) Weiss, H. (1988). *Secrets of Warmth for Comfort or Survival*. Seattle, WA: The Mountaineers.
- C2-017 (ISBN 0-7627-0476-4) Roberts, H. (1999). *Basic Essentials, Backpacking*. Guilford, CT: The Globe Pequot Press.

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**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 6**

**EO M290.06 – OPERATE A HAND-HELD RADIO**

---

Total Time: 30 min

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**PREPARATION**

---

**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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 TP1 to introduce a new subject and describe parts of a radio.

Demonstration and performance was chosen for TP2, TP4 and TP5 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire, while providing an opportunity for the cadets to practice operating a hand-held radio under the supervision of an instructor.

Demonstration was chosen for TP3 as it allows the instructor to explain and demonstrate the skills the cadet is expected to acquire.

---

**INTRODUCTION**

---

**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall be expected to identify parts, change channels, operate the push-to-talk button and change batteries in a hand-held radio.

**IMPORTANCE**

It is important for cadets to know how to operate hand-held radios in order to communicate between groups in the field.

**Teaching Point 1****Identify the Parts of the Radio**

Time: 5 min

Method: Interactive Lecture



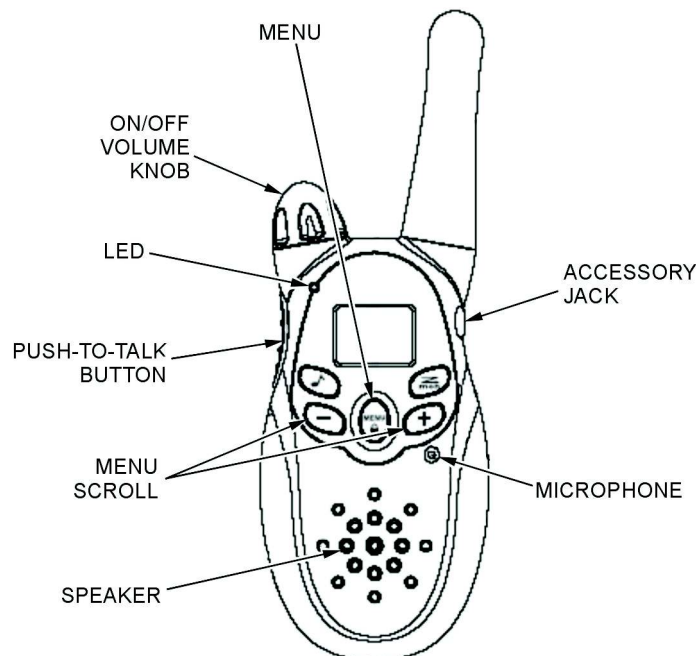
Radios presented in this lesson are the Talkabout FRS/GMRS Recreational Two-way Radios Models T5000, T5500, and T5550. Models may vary in each squadron. Refer to the user's guide as required.



Divide cadets into groups to a maximum of four and assign each group a radio.



Cadets will point to specific parts as they are explained.

**PARTS OF THE RADIO AND THEIR FUNCTIONS**

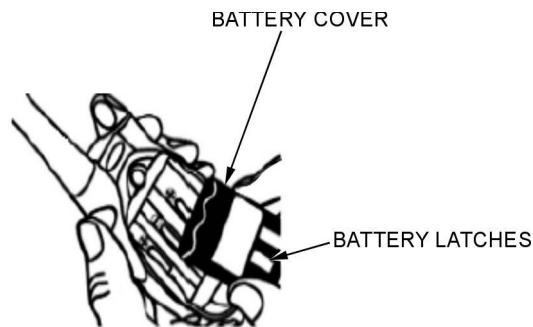
*Motorola Inc., Talkabout FRS/GMRS Recreational Two-way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 11)*

Figure 16-6-1 Hand-held Radio

- **On/Off Volume Knob.** Controls volume and power to the unit.
- **Light Emitting Diode (LED).** This light will be illuminated when the radio is on.



- **Push-To-Talk (PTT) Button.** A depressible button that allows transmissions.
- **Speaker.** Converts electric current into audible sound.
- **Antenna.** An electrical device designed to transmit or receive radio waves.
- **Accessory Jack.** This is used to insert accessory items such as a headset.
- **Microphone.** Converts sound into an electrical signal.
- **Menu Scroll.** Push to scroll through the menu options and channels. Use the “+” and “-” symbol in order to scroll through the menu options.



*Motorola Inc., Talkabout FRS/GMRS Recreational Two-way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 13)*

Figure 16-6-2 Battery Compartment

- **Battery Cover.** Covers the storage compartment of the battery (located on the reverse side of the radio).
- **Battery Cover Latches.** Secures the cover to the radio (located on the reverse side of the radio).

---

### CONFIRMATION OF TEACHING POINT 1

---

#### QUESTIONS

- Q1. Name the parts of the radio.
- Q2. What function does the antenna perform?
- Q3. What function does the microphone perform?

#### ANTICIPATED ANSWERS

- A1. The 10 parts of the Talkabout radio are: on-off/volume knob, LED, PTT, speaker, antenna, accessory jack, menu scroll, microphone, battery cover, and battery cover latches.
- A2. It transmits and receives radio waves.
- A3. It converts sound into an electrical signal.

---

**Teaching Point 2**

**Demonstrate Turning the Radio On and Off**

Time: 5 min

Method: Demonstration and Performance

---



Radio operations differ from model to model. Refer to the user's guide for operating instructions.



Explain and demonstrate turning a hand-held radio on and off and have cadets practice.

**TURNING THE RADIO ON/OFF**

- To turn the radio **ON**, turn the on-off/volume knob clockwise. The radio will beep and the radio display will briefly show all feature icons of the radio.
- To turn the radio **OFF**, turn the on-off/volume knob counterclockwise. A clicking sound will indicate the radio is turned off.

---

**CONFIRMATION OF TEACHING POINT 2**

---

The cadets' participation in TP2 will serve as the confirmation of this lesson.

---

**Teaching Point 3**

**Demonstrate Adjusting Frequencies**

Time: 5 min

Method: Demonstration

---



Explain and demonstrate selecting and changing radio stations.

**ADJUSTING FREQUENCIES**

**Selecting a Channel (Frequency)**

The radio operates on a group of frequencies that are accessed through radio channels. To set the channel of the radio, push the Menu button, this will cause the current channel to flash. Using the Menu scroll button, scroll through the channels and push the PTT button to select the desired channel.

---

**CONFIRMATION OF TEACHING POINT 3**

---

**QUESTIONS**

- Q1. How are the frequencies accessed on a hand-held radio?
- Q2. If channel eight was desired, how would one change the channels?

**ANTICIPATED ANSWERS**

- A1. The radio operates on a group of frequencies that are accessed through radio channels.
- A2. To set the channel of the radio, push the Menu button, this will cause the current channel to flash. Using the Menu scroll button, scroll through the channels and push the PTT button to select the desired channel.

**Teaching Point 4****Demonstrate Operating the Push-To-Talk (PTT) Button**

Time: 5 min

Method: Demonstration and Performance

**OPERATING THE PTT BUTTON**

To send and receive messages, check the channel activity by pressing the push-to-talk (PTT) button. Static will be heard if the channel is clear to use. Do not transmit if someone is talking on the channel.

- To send messages, press the PTT button, pause, speak into the microphone, pause, and then release (to maximize clarity, hold the radio three to five centimetres from the mouth).
- The LED will glow continuously when sending messages.
- To listen to messages, release the PTT button.

**ACTIVITY**

Time: 3 min

**OBJECTIVE**

The objective of this activity is to allow cadets to become familiar with sending and receiving transmissions.

**RESOURCES**

One hand-held radio per group of four cadets.

**ACTIVITY LAYOUT**

Divide cadets into groups (maximum of four per group). Separate groups from each other giving enough room to avoid radio feedback.

**ACTIVITY INSTRUCTIONS**

- Provide each group of cadets with a radio.
- Assign each cadet in each group a number (one through four).
- Pair the groups and assign each pair of groups a frequency.
- Cadet one from the sending group will transmit any message to cadet one in their receiving group.
- Cadets will go in turn until all have had a turn.
- The message should be enunciated clearly and spoken at a moderate pace and at a volume that is readable.



The intent of this activity is for the cadets to operate the radio while transmitting and receiving radio message. Be cognizant of the process the cadets use when speaking into the radio. Ensure the cadets press the PTT button, wait two to three seconds before speaking, and release the PTT button after the message is fully transmitted.

Considering the cadets have yet to be trained on voice procedures, this activity will not focus on the rules of radio procedures. A few sample messages have been provided here for the cadets to transmit to their peers:

Message 1 – The sun shines very brightly at noon.

Message 2 – During the night you can see the Big Dipper.

Message 3 – The best method to start a fire is a box fire.

Message 4 – CF-18s are very loud when they take off.

## SAFETY

Make sure the cadets do not hold the hand-held radio too close to their ears while receiving messages.

---

### CONFIRMATION OF TEACHING POINT 4

---

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

---

## Teaching Point 5

## Demonstrate Changing Batteries

Time: 5 min

Method: Demonstration and Performance

---

## BATTERIES

A battery is a device that stores chemical energy and makes it available in an electrical form. Radios require batteries to operate. Batteries are everywhere – in cars, remote controls, laptops, and cell phones to name a few places.

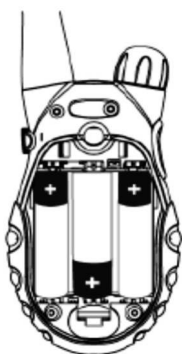


Explain to the cadets what type of battery is required to operate the hand-held radio. Consult the user's guide to ensure the proper size and type of battery is being used. The Talkabout radios discussed in this lesson use three AA batteries.

## CHANGING THE BATTERY

Many hand-held radios will use three AA batteries for power. To insert or replace these batteries, follow these steps:

1. Turn the radio so the back is facing up. Lift the battery latch to release the battery cover.
2. Remove the battery cover.
3. Insert three AA batteries as shown on the inside of the battery compartment.
4. Replace the battery cover and clip the battery latch to secure.



Motorola Inc., *Talkabout FRS/GMRS Recreational Two-way Radios Models T5000, T5500, T5550 User's Guide*, Motorola, Inc. (p. 13)

Figure 16-6-3 Batteries



Motorola Inc., *Talkabout FRS/GMRS Recreational Two-way Radios Models T5000, T5500, T5550 User's Guide*, Motorola, Inc. (p. 13)

Figure 16-6-4 Changing the Batteries



Batteries may corrode over time if left in radios and can cause permanent damage; therefore, they should be removed before storing radios for extended periods of time.

## BATTERY METER

The battery icon shows the battery charge level, from full to empty. When the battery is empty, the radio chirps periodically after releasing the PTT button. The radio powers off when the voltage drops below a predetermined level.

## SAFELY DISCARDING SPENT BATTERIES

Batteries are made of various materials comprised of heavy metals including nickel cadmium, alkaline, mercury, nickel metal hydride, and lead acid. These elements can harm the environment if not properly discarded. As such, batteries are one of the most complex items to dispose of or recycle.

Batteries, if not properly disposed of, may cause:

- the pollution of lakes and streams as the metals vaporize into the air when burned;
- the leaching of heavy metals from solid waste landfills;
- exposure of the environment and water to lead and acid;
- corrosion from the strong acid; and
- burns or other injury to eyes and skin.

Batteries are not all the same and each have specific instructions for their proper disposal and/or recycling. The batteries most people use are household types; however, due to the variety of different rules and regulations, check with the local community recycling facility to determine the household battery recycling options or supporting unit/base POL/HAZMAT section.



This is a good opportunity to encourage cadets to care for their environment. By developing a unit battery-recycling program, the unit can collect spent batteries from cadets' households and deliver the batteries to the local community recycling depot or supporting unit/base HAZMAT section.

---

**ACTIVITY**

Time: 3 min

---

**OBJECTIVE**

The objective of this activity is to allow the cadets to change the batteries of a hand-held radio.

**RESOURCES**

- One hand-held radio per group of four cadets, and
- Batteries.

**ACTIVITY LAYOUT**

Divide cadets into groups (maximum of four per group).

**ACTIVITY INSTRUCTIONS**

One or two cadets in the group (depending on time) will change the batteries of a hand-held radio IAW the user's guide.

**SAFETY**

N/A.

---

**CONFIRMATION OF TEACHING POINT 5**

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The cadets' observation and/or participation in the activity will serve as the confirmation of this TP.

---

**END OF LESSON CONFIRMATION**

---

The cadets' participation in TPs 2, 4 and 5 will serve as the confirmation of this lesson.

---

**CONCLUSION**

---

**HOMEWORK/READING/PRACTICE**

Cadets should be encouraged to recycle discarded batteries and contact recycling centres for appropriate methods for discarding/recycling household batteries.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

Radios are used during field exercises and other cadet activities. Proper use of this equipment is essential to ensure effective communication.

**INSTRUCTOR NOTES/REMARKS**

Hand-held radio models may vary from region to region. The instructor will be responsible for consulting the user's guide for detailed instructions on radio operation.

Dispose/recycle the batteries in accordance with local regulations.

---

**REFERENCES**

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- C0-069 Motorola Inc. (2004). *Talkabout FRS/GMRS Recreational Two-way Radios Models T5000, T5500, T5550 User's Guide*. Motorola Inc.

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**ROYAL CANADIAN AIR CADETS**  
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**SECTION 7**

**EO C290.02 – PARTICIPATE IN A DISCUSSION ON SKINNING AND COOKING A SMALL ANIMAL**

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-802/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 this lesson to present basic material.

**INTRODUCTION**

**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall be expected to participate in a discussion on skinning and cooking a small animal.

**IMPORTANCE**

It is important for cadets to understand how to skin and cook a small animal in a survival situation. Along with feeding the body, cooking also relieves boredom.

**Teaching Point 1**

**Discuss Skinning a Small Animal**

Time: 10 min

Method: Interactive Lecture

**SKINNING A SMALL ANIMAL**

For best results, the steps for skinning a small animal should be done in the sequence outlined below.

**Removing Urine.** Remove the urine by holding the animal's forelegs and gradually squeezing down on the body from the chest to the bowels.

**Cutting.** Cut a hole into the belly area.

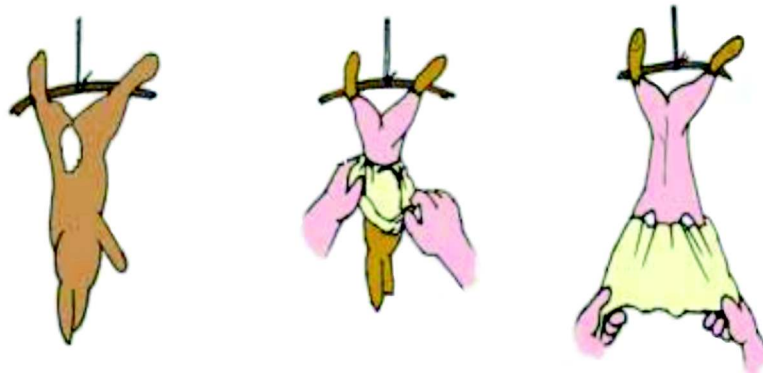
**Pulling the Skin and Removing the Guts.** Pull the skin apart at the hole and insert the first fingers of each hand. Pull the skin apart exposing the guts. Remove the guts.

**Cutting the Skin.** Cut the skin around the front and hind paws and between the hind legs.

**Hanging.** Hang the rabbit and pull off the skin. (See [Figure 16-7-1](#)).

### Removing Skin and Dismembering

- The last step in removing the skin is by pulling it over the head and cutting off the head.
- Dismember in the same way as a chicken.



*"Dressing", Simple Survival. Retrieved 15 March 2007, from <http://www.simplesurvival.net/dressing.htm>*

Figure 16-7-1 Skinning a Small Animal

---

## CONFIRMATION OF TEACHING POINT 1

---

### QUESTIONS

- Q1. What is the first step in skinning a small animal?
- Q2. What is the step after cutting a hole in the belly?
- Q3. What is the last step in skinning?

### ANTICIPATED ANSWERS

- A1. Remove the urine by holding the animal's forelegs and gradually squeezing down on the body from the chest to the bowels.
- A2. Pull the skin apart at the hole and insert the first fingers of each hand. Pull the skin apart exposing the guts. Remove the guts.
- A3. The last step in removing the skin is by pulling it over the head and cutting off the head.

---

**Teaching Point 2****Discuss Cooking a Small Animal**

Time: 15 min

Method: Interactive Lecture

---

**BOILING**

The following are some considerations of boiling food:

- Although boiling does destroy some food elements it conserves the natural juices and retains all the fat – provided that you drink all the liquid as well as eat the remaining food.
- Each time you throw away cooking water you lose valuable nutrients, though you will have to discard it if boiling out toxic substances.
- Boiling will make tough and stringy roots and older game softer and more edible.
- Cooking in boiling water requires a container.
- Tin cans and metal boxes are ideal.
- Make a handle, hang the tin cans or metal boxes from a pot support or use pot tongs to take them on and off the fire.
- Puncture holes in pots can be repaired by hammering in small plugs of wood – when wet they will expand and stop leaks.
- Containers can also be made of birch bark – but be careful that they do not boil dry.
- Boiling will kill worms and flukes (parasites) and can even make spoiled meat fit to eat.

**ALUMINUM FOIL COOKING**

The following are some considerations of aluminum foil cooking:

- Wrap food in foil.
- Place wrapped food on coals or place food in a hole in the coals and cover the food. By burying the food it is cooked more rapidly and space is left on the surface of the coals for other items.
- A downside to burying the food in hot coals is that it will be difficult to check if the food has finished cooking.

**CLAY BAKING**

The following are some considerations of clay baking both fish and birds:

**Fish**

- Find some large leaves and wrap them around the fish. It is not necessary to remove the scales.
- Mould a thin layer of clay or mud around the wrapped fish and let it dry slightly.
- Wrap a thick layer of clay or mud around the package and place it before the fire to dry.
- When sufficiently dry, bury it in the hot coals and bake for 7 minutes per 0.5 kg (pound).
- When cooked, break open the clay, pull apart the leaves and peel back the skin.

**Birds**

- Find some large leaves and wrap them around the bird. It is not necessary to remove the feathers.

- In the case of fowl, do not pluck the feathers but place the clay directly on the bird. For other birds mould a layer of clay around the wrapped bird.
- When cooked, the feathers of the fowl will come off as they will be stuck in the hard clay.

## **GRILLING**

The following are some considerations of grilling food:

- Grilling is the quick way of cooking large amounts of food but it requires a support—such as a mesh wire – rested on rocks over the embers of the fire.
- It should only be used when food is plentiful since it wastes most of the fat from the meat.
- Hot rocks beside the fire can be used as grilling surfaces.

## **ROASTING**

The following are some considerations of roasting food:

- Roasted meat cooks in its own fat.
- Continually turning the meat keeps the fat moving over the surface.
- The easiest method is to skewer the meat on a spit and turn it over the hot embers of a fire or beside a blazing fire where it is hot enough to cook.
- Roasting makes a very tasty dish but has two disadvantages:
  - Valuable fat is lost unless a drip tray is placed beneath the spit. Regularly baste the meat with fat from the tray.
  - Roasting by a fierce fire can cook and seal the outside, the inner flesh remaining uncooked, leaving harmful bacteria alive. A slow roast is preferable, and if cooking continues after the outer meat has been cut off the inner flesh can go on cooking.

## **STEAMING**

The following are some considerations of steaming food:

- Make a simple steamer by punching holes in a can and suspending it in a larger can, or putting something in the bottom of the larger can to keep the inner one above the water.
- Cover the outer can so that steam is not dissipated, but not so tightly that it is sealed or pressure could build up and cause it to explode.
- Steaming does not overcook the food and it preserves nutritional values.
- It is an excellent way of cooking fish and green vegetables.
- Fresh young leaves take very little cooking.
- The food stuff needs to be suspended in the steam above the boiling water.

## **FRYING**

The following are some considerations of frying:

- Frying is an excellent way of varying a diet, if fat and a container are available to fry in.

- Any sheet of metal that can be fashioned into a curve or give a slight lip will serve as a pan.
- In some areas, a large leaf can be found which contains enough oil not to dry out before the cooking is done.
- Try leaves out before risking valuable food on them and, if one is used, fry only over embers, not over flames.

---

### CONFIRMATION OF TEACHING POINT 2

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#### QUESTIONS

- Q1. What different methods of cooking were discussed?
- Q2. How can puncture holes be fixed in a pot?
- Q3. What type of cooking cooks meat in its own fat?

#### ANTICIPATED ANSWERS

- A1. Boiling, baking, aluminum foil cooking, clay baking, grilling, roasting, steaming, and frying.
- A2. Puncture holes in pots can be repaired by hammering in small plugs of wood—when wet they will expand and stop leaks.
- A3. Roasting cooks meat in its own fat.

---

### END OF LESSON CONFIRMATION

---

#### QUESTIONS

- Q1. What is the first step in skinning a small animal?
- Q2. What will kill worms and flukes and can even make spoiled meat fit to eat?
- Q3. What are two disadvantages of roasting?

#### ANTICIPATED ANSWERS

- A1. Remove the urine by holding the animal's forelegs and gradually squeezing down on the body from the chest to the bowels.
- A2. Boiling.
- A3. Valuable fat is lost unless a drip tray is placed beneath the spit. Roasting by a fierce fire can cook and seal the outside, the inner flesh remaining uncooked, leaving harmful bacteria alive.

---

### CONCLUSION

---

#### HOMework/READING/PRACTICE

N/A.

#### METHOD OF EVALUATION

N/A.

## **CLOSING STATEMENT**

It is important for cadets to know how to clean and cook an animal when they are in a survival situation. As well as helping cadets fend for themselves, cooking provides nourishment and relieves boredom.

## **INSTRUCTOR NOTES/REMARKS**

N/A.

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## **REFERENCES**

---

- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.



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**SECTION 8**

**EO C290.03 – CONSTRUCT A SNOW CAVE**

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Total Time:	90 min
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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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.

Recce the area to locate sites for snow cave construction prior to the lesson.

**PRE-LESSON ASSIGNMENT**

N/A.

**APPROACH**

An interactive lecture was chosen for TP1 to present basic material and give direction on procedures.

Demonstration was chosen for TP2 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire.

Performance was chosen for TP3 and TP4 as it provides an opportunity for the cadets to practice building a snow cave under supervision.

---

**INTRODUCTION**

---

**REVIEW**

N/A.

**OBJECTIVES**

By the end of this lesson the cadet shall have constructed a snow cave.

**IMPORTANCE**

It is important for cadets to know how to construct a snow cave as it can protect them from the elements and animals in a survival situation.

---

**Teaching Point 1**

**Identify Factors To Consider in Selecting a Site for a Snow Cave**

Time: 5 min

Method: Interactive Lecture

---

**SNOW CAVE SITE FACTORS**

When choosing a snow cave site, ensure the following are present:

- a hard snow drift;
  - a slope with a firm crust. This is usually found on the lee side (the opposite side from which the wind is blowing) of a steep ridge or river bank; and
  - ensure that the drift is not below a cornice or in an avalanche area.
- 

**CONFIRMATION OF TEACHING POINT 1**

---

**QUESTIONS**

- Q1. What type of snow drift should be used for building a snow cave?
- Q2. Where is a slope with a firm crust found?
- Q3. What areas should be avoided when building a snow shelter?

**ANTICIPATED ANSWERS**

- A1. A hard snow drift should be used.
- A2. A slope with a firm crust is usually found on the lee side (the opposite side from which the wind is blowing) of a steep ridge or river bank.
- A3. Avoid drifts below cornices or in avalanche areas.
- 

**Teaching Point 2**


**Demonstrate Appropriate Site Selection and Construct a Snow Cave**

Time: 35 min

Method: Demonstration

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**SELECTING A SITE**



Construction of the snow caves must be started at least 90 minutes before sundown to ensure the snow cave is completed before dark.

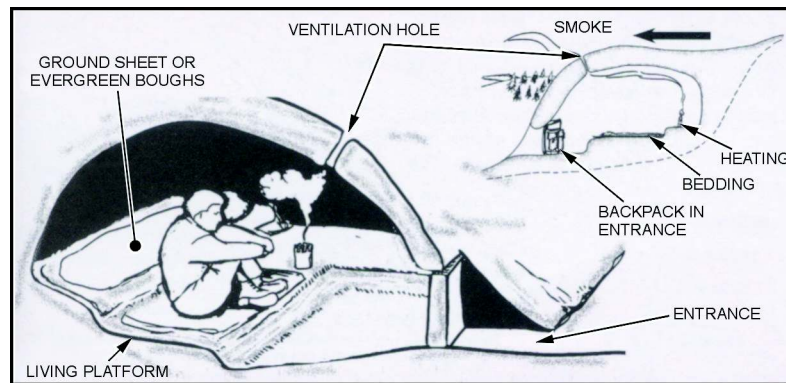
**CONSTRUCTING A SNOW CAVE**

The procedure for constructing a snow cave includes:

1. burrowing a small tunnel that is one metre into the lowest level of the chamber;
2. clearing the chamber of snow at right angles to the tunnel;



3. clearing the chamber of snow to a height that is comfortable for sitting;
4. constructing the outside of the roof to be well arched without sharp angles, to provide maximum support;
5. constructing a sleeping and sitting platform above the level of the entrance. This will be the warmest area of the cave;
6. constructing a ventilation hole in the roof of the snow cave. This will allow carbon monoxide gases and smoke to escape to avoid asphyxiation. There should also be a ventilation hole in the door to allow fresh air to enter; and
7. constructing a door using a block of snow or a ground sheet. Keep the door loose fitting and on the inside so that it will not freeze up and jam. If it does, a block on the inside will be much easier to free.



*Tawrell, P., Camping and Wilderness Survival, Falcon Distribution (p. 117)*

Figure 16-8-1 Snow Cave



Ensure the cadets enter and observe the finished snow cave.

## CONFIRMATION OF TEACHING POINT 2

### QUESTIONS

- Q1. Why is the outside of the roof well arched and constructed without sharp angles?
- Q2. What is the warmest area of the cave?
- Q3. What will allow carbon monoxide gases and smoke to escape and help to avoid asphyxiation?

### ANTICIPATED ANSWERS

- A1. To provide maximum support.
- A2. The sleeping and sitting platform above the level of the entrance of the cave.
- A3. A ventilation hole in the roof of the snow cave.

---

**Teaching Point 3****Ensure Cadets Choose an Appropriate Site for Construction of a Snow Cave and Have Cadets Construct a Snow Cave**

Time: 35 min

Method: Performance

---

---

**ACTIVITY**

---

**OBJECTIVE**

The objective of this activity is to have the cadets, in groups of no more than four, construct a snow cave.

**RESOURCES**

- Shovel, and
- Ground sheet.

**ACTIVITY LAYOUT**

Select an area that has the appropriate snow to construct the snow cave.

**ACTIVITY INSTRUCTIONS**

Working as a member of a group of no more than four, the cadets shall choose a location for the snow cave. Each group shall construct a snow cave following these steps:

1. Burrow a small tunnel that is one metre into the lowest level of the chamber.
2. Clear the chamber of snow at right angles to the tunnel.
3. Clear the chamber of snow to a height that is comfortable for sitting.
4. Ensure the outside of the roof is well arched and has no sharp angles.
5. Construct a sleeping and sitting platform above the level of the entrance.
6. Hollow out a ventilation hole in the roof of the snow cave.
7. Hollow out a ventilation hole in the door to allow fresh air to enter.
8. Construct a door using a block of snow or a ground sheet. If using a ground sheet, pull the sheet a small amount from the side of the wall to ensure ventilation.



The questions in the confirmation of TP3 should be asked of the groups as the instructor moves from one group to the next.

---

**CONFIRMATION OF TEACHING POINT 3**

---

**QUESTIONS**

- Q1. Why was this location chosen to build the snow cave?
- Q2. Where should the sitting and sleeping platform be constructed?

Q3. How do you construct a door in the snow cave?

**ANTICIPATED ANSWERS**

A1. This location was chosen because it is a hard snow drift with a slope and a firm crust.

A2. Above the level of the entrance.

A3. With a block of snow or a ground sheet.

**Teaching Point 4**

**Disassemble the Snow Caves When the Exercise Is Completed**

Time: 5 min

Method: Performance

**DISASSEMBLE THE SNOW CAVES**

Disassembling the snow caves includes the following steps:

1. cadets will remove ground sheets from the snow caves;
2. collapse or fill in the spaces with the removed snow; and
3. ensure the ground looks as natural as possible.

**CONFIRMATION OF TEACHING POINT 4**

The cadets' participation in the disassembly of the snow cave will serve as the confirmation of this TP.

**END OF LESSON CONFIRMATION**

The cadets' construction of the snow cave will serve as the confirmation of this lesson.

**CONCLUSION**

**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

Snow caves provide shelter from the elements and animals in a survival situation.

**INSTRUCTOR NOTES/REMARKS**

Cadets will not sleep in the snow cave.

Additional supervision is required during the construction of the snow cave.

---

**REFERENCES**

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- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-003 (1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.



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**SECTION 9**

**EO C290.04 – COLLECT DRINKING WATER USING A SOLAR STILL**

---

Total Time: 60 min

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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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.

Find a suitable water collection area for construction of the solar still. Ensure the area has enough ground coverage for all groups to have ample space to construct their solar stills.

**PRE-LESSON ASSIGNMENT**

This class should not be taught during the winter months.

**APPROACH**

An interactive lecture was chosen for TP1 and TP3 to present basic material and give direction on procedures.

Demonstration was chosen for TP2 as it allows the instructor to explain and demonstrate building a solar still.

Performance was chosen for TP4 and TP5 as it provides 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 construct a solar still and collect water from it.

**IMPORTANCE**

It is important for cadets to know how to construct a solar still and be able to collect water from it because in a survival situation water may not be readily available. Cadets will have to use other resources to find water. Thirst is one of the enemies of survival.

---

**Teaching Point 1****Explain How to Find an Appropriate Water Collection Site by Digging a Hole in the Ground**

Time: 5 min

Method: Interactive Lecture

---

**FINDING AN APPROPRIATE COLLECTION SITE**

A hole can be dug in almost any type of ground to find water. The hole has to be deep enough to let water seep in.

Dig a shallow well when you see damp sand or find plant growth.

Dry meandering stream beds might have water deposited just below the surface at outside bends. Dig in these bends for water.

Along sandy beaches or salt lakes, dig a hole in a sand depression 30.5 m (100 feet) from the shore or in the first depression behind the first sand dune. Rain water from local showers will collect between the dunes.

---

**CONFIRMATION OF TEACHING POINT 1**

---

**QUESTIONS**

- Q1. Where will rain water collect along sandy beaches?
- Q2. What would you dig if you saw damp sand or plant growth?
- Q3. A hole can be dug in what type of ground to find water?

**ANTICIPATED ANSWERS**

- A1. Rain water from local showers will collect between the dunes.
- A2. Dig a shallow well when you see damp sand or find plant growth.
- A3. A hole can be dug in almost any type of ground to find water. The hole has to be deep enough to let water seep in.

---

**Teaching Point 2****Demonstrate the Construction of a Solar Still**

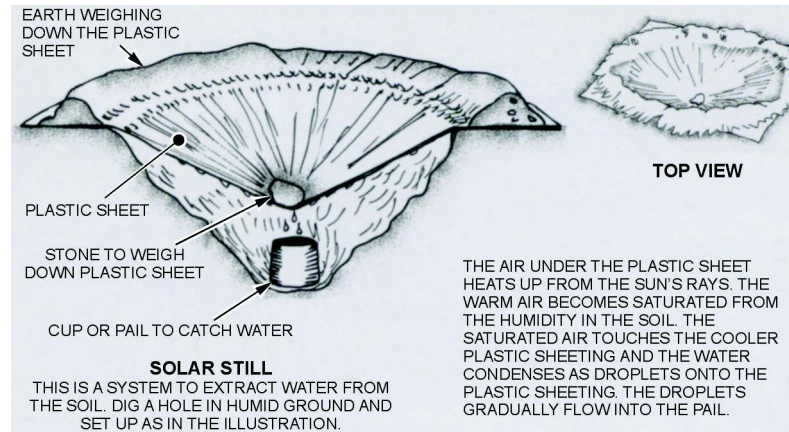
Time: 15 min

Method: Demonstration

---

**CONSTRUCTION OF A SOLAR STILL**

- Dig a hole in the ground approximately 90 cm (36 inches) across and 45 cm (18 inches) deep.
- Place a collecting can in the centre of the hole and cover the hole with a sheet of plastic formed into a cone.
- Weigh down the edges of the plastic sheet with heavy stones or use the dirt dug from the hole.
- Place a fist-sized stone in the centre of the bottom of the plastic sheet, above the collecting can.



Tawrell, P., *Camping and Wilderness Survival, Falcon Distribution* (p. 151)

Figure 16-9-1 A Solar Still

---

## CONFIRMATION OF TEACHING POINT 2

---

### QUESTIONS

- Q1. What are the dimensions of the hole that is to be dug?
- Q2. After placing the collecting can in the centre of the hole, what is the next step?
- Q3. What weighs down the edges of the plastic sheet?

### ANTICIPATED ANSWERS

- A1. The dimensions of the hole in the ground are approximately 90 cm (36 inches) across and 45 cm (18 inches) deep.
- A2. Cover the hole with a sheet of plastic formed into a cone.
- A3. Heavy stones.

---

### Teaching Point 3

### Explain How the Solar Still Collects Water

Time: 5 min

Method: Interactive Lecture

---

### WATER CONDENSATION

The sun's heat raises the temperature of the air and soil below the surface and vapour is produced. As the air becomes saturated, water condenses on the underside of the plastic, running down into the container. This is especially effective in desert regions and elsewhere when it is hot during the day and cold at night. The plastic cools more quickly than the air, causing heavy condensation. This kind of still should collect at least 450 ml (1 pint) over a 24-hour period.

---

## CONFIRMATION OF TEACHING POINT 3

---

### QUESTIONS

- Q1. How is vapour produced?

Q2. What happens when the air becomes saturated?

Q3. How much water should this type of still collect?

**ANTICIPATED ANSWERS**

A1. The sun's heat raises the temperature of the air and soil below the surface and vapour is produced.

A2. As the air becomes saturated, water condenses on the underside of the plastic, running down into the container.

A3. This type of still should collect at least 450 ml (1 pint) over a 24-hour period.

---

**Teaching Point 4**

**Construct a Solar Still**

Time: 25 min

Method: Performance

---

**ACTIVITY**

---

**OBJECTIVE**

The objective of this activity is to have cadets, in groups of no more than five, construct a solar still.

**RESOURCES**

- Clear plastic bags,
- Cup or pail, and
- Shovel.

**ACTIVITY LAYOUT**

N/A.

**ACTIVITY INSTRUCTIONS**

Working as a member of a group of no more than five, the cadets shall choose a location for the solar still and find heavy stones to hold down the plastic sheet. Each group shall construct a solar still following these steps:

1. Dig a hole in the ground approximately 90 cm (36 inches) across and 45 cm (18 inches) deep.
2. Place a collecting can in the centre of the hole and cover the hole with a sheet of plastic formed into a cone.
3. Weigh down the edges of the plastic sheet with heavy stones or the dirt dug from the hole.
4. Place a fist-sized stone in the centre of the bottom of the plastic sheet, above the collecting can.



The questions in the confirmation of TP4 should be asked of the groups as the instructor moves from one group to the next.





The stills may remain overnight to collect water.

## SAFETY

Ensure cadets stay within the set boundaries of the solar still construction area.

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## CONFIRMATION OF TEACHING POINT 4

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### QUESTIONS

- Q1. What challenges were encountered while building the solar still?  
 Q2. Where is the collecting can placed?  
 Q3. What is the purpose of a solar still?

### ANTICIPATED ANSWERS

- A1. Answers will vary. Encourage the cadets to elaborate on their challenges.  
 A2. The collecting can is placed in the centre of the hole.  
 A3. The purpose of a solar still is to collect water when none is readily available.

---

## Teaching Point 5

## Disassemble the Solar Still

Time: 5 min

Method: Performance

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TP5 will be conducted on day two of the exercise.

## DISASSEMBLE THE SOLAR STILL

Disassemble the solar stills by:

- checking the solar stills for water collection;
- measuring the amount in the containers;
- removing all items from the hole and fill in the hole with the removed dirt; and
- ensuring the ground looks as natural as possible.

---

## CONFIRMATION OF TEACHING POINT 5

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The cadets' participation in the disassembly of the solar still will serve as the confirmation of this TP.

---

**END OF LESSON CONFIRMATION**

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The cadets' construction of a solar still will serve as the confirmation of this lesson.

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**CONCLUSION**

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**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

Having the skills to construct a solar still and collect water in a survival situation can be essential to your survival. If water is not readily available you must be able to use your own resources to find water.

**INSTRUCTOR NOTES/REMARKS**

The solar still must remain in place overnight as both the heat from the sun and the cool air at night are required for the water condensation process to occur. For scheduling purposes, TPs 1-4 will be done on day one of the schedule and TP5 will occur on day two.

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**REFERENCES**

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- C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
- C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Falcon Distribution.



**ROYAL CANADIAN AIR CADETS**  
**PROFICIENCY LEVEL TWO**  
**INSTRUCTIONAL GUIDE**



**SECTION 10**

**EO C290.05 – PARTICIPATE IN A HIKE**

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Total Time:	90 min
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**PREPARATION**

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**PRE-LESSON INSTRUCTIONS**

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/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.

Rece the hike route and have a map available prior to the start of the hike.

The hike will be on a predetermined route of 3 km on a Class 1 terrain.

Place flagging tape along the route prior to the commencement of the hike.

Cadets will be led by an officer and senior cadets may take charge of the syndicates while on the hike.

**PRE-LESSON ASSIGNMENT**

N/A.

**APPROACH**

An interactive lecture was chosen for TP1 to give directions on procedures for the hike.

Demonstration and performance was chosen for TP2 as it is an interactive way to allow cadets to experience hiking in a safe, controlled environment. This activity contributes to the development of the cadets' hiking skills and knowledge in a fun and challenging setting.

A group discussion was chosen for TP3 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions and feelings about the hike.

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**INTRODUCTION**

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**REVIEW**

The review for this lesson is from EO M290.05 (Discuss Hiking Techniques) and includes:

- Explain potable water requirements for consumption during a day hike;
- Explain the characteristics of proper footwear; and
- Explain, demonstrate and have cadets practice personal hiking rhythm.

## OBJECTIVES

By the end of this lesson the cadet shall have participated in a hike and used trailblazing techniques.

## IMPORTANCE

It is important for cadets to participate in outdoor activities like hiking; it promotes physical well-being and an interest in the outdoors. Trailblazing techniques are signals that can be left behind if you leave your camp so others can see the signals. They can also help you to find your way back to camp should you go in search of survival items.

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### Teaching Point 1

### Describe Trail Etiquette Methods That Accomplish the “Leave No Trace” Ideologies While Hiking

Time: 10 min

Method: Interactive Lecture

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## TRAIL ETIQUETTE

Proper planning before entering an outdoor environment serves as one of the key elements in having a safe and successful experience. No-trace camping involves avoiding or reducing the damage caused by humans in the environment.

**Staying on Established Trails.** Constant trampling and travel will cause erosion over environmental surfaces. Avoid taking shortcuts and, when travelling cross-country where no trails exist, try to remain on the most durable surfaces.

**Walking on Durable Surfaces.** Surfaces vary from soft marshes to solid rock and trekkers will continuously cross many different types of terrain. It is imperative to take the time to travel on surfaces that will not be significantly affected, rather than taking the straightest line to get to a destination, trampling whatever lies in the way.

**Travelling in Small Groups.** Increased group numbers can have a greater impact than smaller ones. Stick to appropriate group sizes of 10 or less. Take the necessary precautions when travelling in a group. Every action has the potential to impact the natural environment.

**Avoiding Making Loud Noises.** When travelling through the wilderness, allow nature’s sounds to prevail. Avoid using loud noises, secure all pots and pans on the backpack and only use the whistle in an emergency situation.

## WEARING PROPER SAFETY EQUIPMENT

- a whistle,
- a hat,
- sunscreen, and
- appropriate footwear.

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## CONFIRMATION OF TEACHING POINT 1

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## QUESTIONS

- Q1. What does no-trace camping involve?
- Q2. Why is it important to stay on established trails?

Q3. What is one piece of proper safety equipment?

### ANTICIPATED ANSWERS

- A1. No-trace camping involves avoiding or reducing the damage caused by humans in the environment.
- A2. Constant trampling and travel will cause erosion over environmental surfaces. Avoid taking shortcuts and, when travelling cross-country where no trails exist, try to remain on the most durable surfaces.
- A3. A whistle, a hat, sunscreen, or appropriate footwear.

### Teaching Point 2

### Demonstrate and Have Cadets Practice Trailblazing Techniques

Time: 60 min

Method: Demonstration and Performance



Have cadets pre-hydrate by consuming at least 500 ml of water prior to the start of the hike.



Prior to the hike explain and demonstrate the following trailblazing techniques.



Have the cadets look for previously marked signals on the route. Have the cadets trailblaze using flagging tape.

### TRAILBLAZING

These are signals to leave behind if you leave the scene of the crash or abandon camp.

- Make a large arrow shape to indicate the direction in which you have set off which will be visible from the air and other direction markers which can be interpreted at ground level.
- Signs on the ground will draw attention to your presence or past presence and the direction markers will help rescuers follow your trail.
- Continue to make them, not only for people to follow but to establish your own route if you wish to retrace it and as a guide if you lose your sense of direction and start going back on your trail.
- At camp, leave written messages in containers to detail your plans. Hang them from tripods or trees and draw attention to them with markers.
- 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 followed;
- arrowhead-shape notches cut out of tree trunks indicating a turn;
- small rocks set upon larger rocks, with small rocks beside; and
- a cross of sticks or stones meaning 'Not this way'.

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## ACTIVITY

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The cadets will not damage the environment while participating in trailblazing.

### OBJECTIVE

The objective of this activity is to have cadets practice trailblazing techniques in a natural environment.

### RESOURCES

Flagging tape.

### ACTIVITY LAYOUT

N/A.

### ACTIVITY INSTRUCTIONS

1. Cadets are to depart the training area, travelling a distance of no greater than 3 km along a predetermined route, on Class 1 terrain.
2. The cadets will be led by an officer and senior cadets may take charge of the syndicates.
3. Divide the cadets into three syndicates (e.g. 1:8–1:10 ratio). The cadets will travel as a syndicate while on the hike.
4. Have cadets identify markers along the hiking route and have them make their own markers with flagging tape, stones and sticks along the route.
5. On the return trip the cadets will retrieve the flagging tape they placed on the foliage.

### SAFETY

N/A.



The instructor shall provide advice to the cadets who experience difficulty. Ensure enough water is available for the cadets and accompanying staff members.

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**CONFIRMATION OF TEACHING POINT 2**

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**QUESTIONS**

- Q1. What is trailblazing?
- Q2. What will signs on the ground draw attention to?
- Q3. What forms the signal "Not this way"?

**ANTICIPATED ANSWERS**

- A1. Trailblazing is signals which are left behind if you leave the scene of the crash or abandon camp.
- A2. Signs on the ground will draw attention to your presence or past presence and the direction markers will help rescuers follow your trail.
- A3. A cross of sticks or stones.

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**Teaching Point 3**

**Conduct a Group Discussion and Debrief the Cadets on Their Experiences While on the Hike**

Time: 15 min

Method: Group Discussion

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**BACKGROUND KNOWLEDGE**

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The point of the group discussion is to draw trailblazing experiences from the group using the tips for answering/facilitating discussion and the suggested questions provided.

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## GROUP DISCUSSION

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### TIPS FOR ANSWERING/FACILITATING DISCUSSION

- Establish ground rules for discussion, e.g. everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

### SUGGESTED QUESTIONS

- Q1. What was the most significant aspect of the hike?
- Q2. What was the most practical part of trailblazing?
- Q3. Can anyone think of other ways to trailblaze?
- Q4. Why did the syndicate use flagging tape instead of foliage?
- Q5. What signal means "Not this way"?



Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.



Reinforce those answers given and comments made during the group discussion, ensuring the teaching point has been covered.

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### CONFIRMATION OF TEACHING POINT 3

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The cadets' participation in the group discussion will serve as the confirmation of TP3.



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**END OF LESSON CONFIRMATION**

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The cadets' participation in the hike and trailblazing activity will serve as the confirmation of this lesson.

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**CONCLUSION**

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**HOMEWORK/READING/PRACTICE**

N/A.

**METHOD OF EVALUATION**

N/A.

**CLOSING STATEMENT**

Hiking is an important outdoor activity which promotes physical fitness. In a survival situation trailblazing can help searchers find your camp and it can help you find your way back to your camp should you leave in search of survival items.

**INSTRUCTOR NOTES/REMARKS**

A whistle will be carried by every cadet as a safety precaution.

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**REFERENCES**

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A2-001 A-CR-CCP-951/PT-002 D Cds 3. (2006). *Royal Canadian Army Cadets Adventure Training Safety Standards*. Ottawa, ON: Department of National Defence.

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**GROUND-TO-AIR SIGNALS**

	<b>MESSAGE</b>	<b>SYMBOL</b>
1	REQUIRE ASSISTANCE	<b>V</b>
2	REQUIRE MEDICAL ASSISTANCE	<b>X</b>
3	PROCEEDING IN THIS DIRECTION	<b>↑</b>
4	ALL IS WELL	<b>LL</b>
5	REQUIRE FOOD AND WATER	<b>F</b>

*D Cds 3, 2007, Ottawa, ON: Department of National Defence*

Figure 16A-1 Ground-to-air Signals

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## WATER REQUIREMENTS

### Water Loss as a Percentage of Body Weight Related to Performance and Symptoms

0%	Normal heat regulation and performance.
1%	Thirst is stimulated, heat regulation during exercise is altered, performance begins to decline.
2%-3%	Further decrease in heat regulation, increased thirst, worsening performance.
4%	Exercise performance cut by 20-30%.
5%	Headache, irritability, "spaced-out" feeling, fatigue.
6%	Weakness, severe loss of thermoregulation.
7%	Collapse is likely unless exercise is stopped.

*M., Harvey, The National Outdoor Leadership School's Wilderness Guide, Fireside (p. 140)*

Figure 16B-1 Water Loss Table

### Recommended Daily Water Intake According to Weight

Body Weight in Kg	Litres H <sub>2</sub> O at Rest
36.29 (80 lb)	2.4
45.35 (100 lb)	3
54.43 (120 lb)	3.6
63.5 (140 lb)	4.2
72.58 (160 lb)	4.8
81.65 (180 lb)	5.4
90.72 (200 lb)	6

*M., Harvey, The National Outdoor Leadership School's Wilderness Guide, Fireside (p. 141)*

Figure 16B-2 Daily Water Intake Table

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