ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL FOUR

INSTRUCTIONAL GUIDE

SECTION 7

EO C490.02 – IMPROVISE TOOLS FOR USE IN A SURVIVAL SITUATION

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-804/PG-001, *Proficiency Level Four Qualification Standard and Plan*, 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.

The following examples of improvised tools should be constructed before this lesson:

- a knife,
- a needle,
- a compass, and
- a hammer.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A group discussion was chosen for TP 1 to allow the cadets to interact with their peers and share knowledge and experiences about the potential of the materials at hand during a survival situation.

A demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate the skill of improvising tools while providing an opportunity for the cadets to practice the skill under supervision

A demonstration was chosen for TP 4 as it allows the cadets to observe how to construct a hammer.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall be expected to improvise tools for use in a survival situation.

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IMPORTANCE

It is important for cadets to improvise tools for use in a survival situation as this skill enables the cadet to adapt to most survival situations. These skills give the survivor purpose and help build morale and spirit.

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Teaching point 1 **Discuss the potential of the materials at hand for use in a survival situation.**

Time: 10 min Method: Group Discussion

BACKGROUND KNOWLEDGE



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

A survival situation demands improvisation depending on what tools are available. Even simple tools can have multiple uses. If tools are not available, the surrounding area should be surveyed for possibilities.

Safety is paramount when using any tool or item as a tool. Injuries incurred during a survival situation deplete precious resources and energy and can be demoralizing to the survivor or survivors.

Using what is available should be one of the first things considered for all survival situations.

Usable items may be procured from the environment, vehicles, and buildings.

Vehicles, including cars, bicycles, trucks, heavy machinery, boats, snowmobiles and motorcycles offer some of the same items found on aircraft. Vehicles and buildings may be used as shelter.

Some suggested items that can be used from vehicles are:

- wires,
- mirrors,
- hubcaps,
- control cables,
- leatherette seat covers, and
- antennae.

Some suggested items that can be used from buildings are:

- wires,
- wood,
- glass,
- plastic, and
- various metal and plastic pipes and tubing.

Primitive man has survived in almost all environments on the planet. He has made use of the materials available.

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Some suggested items that can be used from the surrounding environment are:

- trees,
- grasses and plants,
- stones,
- dirt,
- sand, and
- animal parts, to include:
  - fat,
  - skin,
  - organs,
  - bones, and
  - sinew.

GROUP DISCUSSION



TIPS FOR ANSWERING / FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, 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. Why is safety important when using tools in a survival situation?

Q2. What are some items that can be taken from vehicles?

Q3. What are some items that can be taken from buildings?

Q4. What are some items that can be taken from the surrounding environment?

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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.

CONFIRMATION OF TEACHING POINT 1

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

Teaching point 2 **Explain, demonstrate and have the cadets construct a cutting or piercing tool.**

Time: 15 min Method: Demonstration and Performance



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

(1) Explain and demonstrate the complete skill while cadets observe.

(2) Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.

(3) Monitor the cadets' performance as they practice the complete skill.

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

Cutting and piercing tools can make everyday life in a survival situation easier. They are used to prepare food, assemble shelter and create other tools.

Most purchased cutting and piercing tools are made of stainless or tool steel. Even if these materials are available, they are difficult to work without a forge, machine shop or special metal working tools. Therefore, softer materials like aluminum, bone or plastic should be considered.

A safety razor contains one or more thin blades. These are removed by disassembling the razor's head. Although small and thin, these blades are extremely sharp. The opposite edge should be covered with tape or mounted in wood.

Stone may shaped into cutting tools, but the technique, called flint knapping, is difficult to master. The sharp edge of broken stones may be used as a cutting tool. Smashing two stones together may leave sharp fragments that will serve as a cutting tool. Use caution when breaking stones as sharp fragments will fly off the broken stone, potentially causing injury.

Broken glass can be used but is brittle and difficult to use without inflicting wounds on the user. A piece of broken glass has cutting edges on all sides. Covering the opposite edge of the tool with thick tape or in a grooved stick may prevent injury. Glass is very fragile and will not endure hard use as a cutting tool.

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Bone, metal or plastic can be used to fashion cutting or piercing tools but the edge or point will not remain sharp. Adding small teeth to the edge of a cutting tool will help during cutting. Aluminum and other soft metal cutting edges can be formed by pounding the edge between two stones. The edge of a cutting tool and size of the blade should not exceed 10 cm. Longer edges become unwieldy in use.

Bone can be fashioned into a sewing needle. Strike the bone with a stone to create splinters. These splinters can be smoothed and shaped by rubbing on a stone. To pierce a hole for the eye of the needle, a sharp chip of stone can be set and bound in a split stick and spun between the hands to create a drill.

Handle material can be wood, with wire, strong material (seat cover, or leather) or cord wrapping. The handle should be comfortable in the hand and securely fastened to the blade.

When not being used, a protective cover can be fashioned from strong material to protect the knife and user.

CONFIRMATION OF TEACHING POINT 2

The cadets' construction of a cutting / piercing tool will serve as the confirmation of this TP.

Teaching point 3 **Explain, demonstrate and have the cadets construct a compass.**

Time: 15 min Method: Demonstration and Performance



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

(1) Explain and demonstrate the complete skill while cadets observe.

(2) Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.

(3) Monitor the cadets' performance as they practice the complete skill.

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

A compass needle points north because the needle is magnetized and becomes aligned by the earth's magnetic field. An improvised compass can be created from a small strip of ferrous metal and a container of water.

To magnetize the ferrous metal several methods may be employed. A sewing needle is an excellent piece of ferrous metal to magnetize as it is light in weight and easily magnetized.

Method 1:

Stroke a piece of silk fabric repeatedly in one direction (from the eye end to the point).

Method 2:

Stroke a magnet in one direction along the length of the needle (from the eye end to the point) repeatedly.

Method 3:

Heat the needle red hot and allow it to cool in an approximate north-south direction will. Use caution, as moving the red hot needle around to align it may prove difficult and dangerous in a survival situation.

Constructing the Compass

Once magnetized, the needle needs to be able to pivot freely to locate north.

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There are several ways to allow the needle to pivot freely. One method is to float the needle on a liquid. If the needle floats on a liquid such as water it can rotate. A buoyant object (eg, cork, leaf, Styrofoam, plastic cling wrap, etc.) can be used to support the needle on the surface of the water. Surface tension supports a small needle, but any disturbance to the container and the needle will sink.

Another method of allowing the needle to rotate is to attach it to a fine string, cord, long strand of hair, fishing line or other fine cordage. The cordage is attached exactly in the middle of the needle to keep it horizontal. The needle points north when allowed to dangle at the bottom of the cordage. North is found by slowly turning the cordage left or right and observing when the needle is rotating the least. This method proves difficult in windy conditions.

To verify which end of the needle is pointing north, use basic navigational skills (eg, North Star, Sun's position during the day, etc.).

ACTIVITY

Time: 5 min

OBJECTIVE

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

RESOURCES

- sewing needle,
- silk cloth, and
- small magnet.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

Have the cadets:

1. select a method of magnetizing the needle;
2. magnetize the needle;
3. select a method for allowing the needle to pivot;
4. determine north with the constructed compass; and
5. discuss the process of making a compass.



Cadets using the liquid method should improvise the float and container of water. Cadets using the cordage method should improvise the cordage.

SAFETY

Nil.

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CONFIRMATION OF TEACHING POINT 3

The cadets' construction of an improvised compass will serve as the confirmation of this TP.

Teaching point 4 **Explain and demonstrate how to construct a hammer.**

Time: 10 min Method: Demonstration



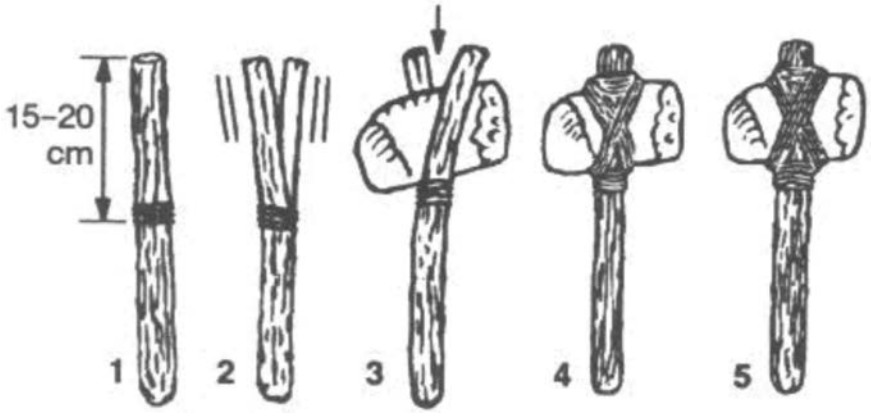
Using the hammer constructed prior to this lesson, explain and demonstrate how the hammer was made.

A hammer is one of the most basic and fundamental tools. It is perhaps the oldest human tool known. The earliest evidence of stone used as a hammer dates to about 2.4 million years ago. 30 000 years ago, humans adapted handles to stones to create hammers.

A stone can be used as a hammer for driving sticks into the ground, dispatching fish and small animals. If unhandled, the stone fits comfortably in the hand, with the finger tips extending just past the midpoint of the stone. Using smaller stones risks smashing fingers.

To make a split stick hammer, use the following steps:

1. Wrap the handle 15–20 cm from end with cordage.
2. Split the handle to the wrap.
3. Open tines and insert the stone hammer head.
4. Securely lash the stone to the handle.
5. Pull tines together at the top of the stone head and lash securely.



Note. From U.S. Army Survival Handbook (p. 134), by Department of the Army, 2002, Guilford, CT: The Lyons Press.

Figure 1 Split Stick Hammer

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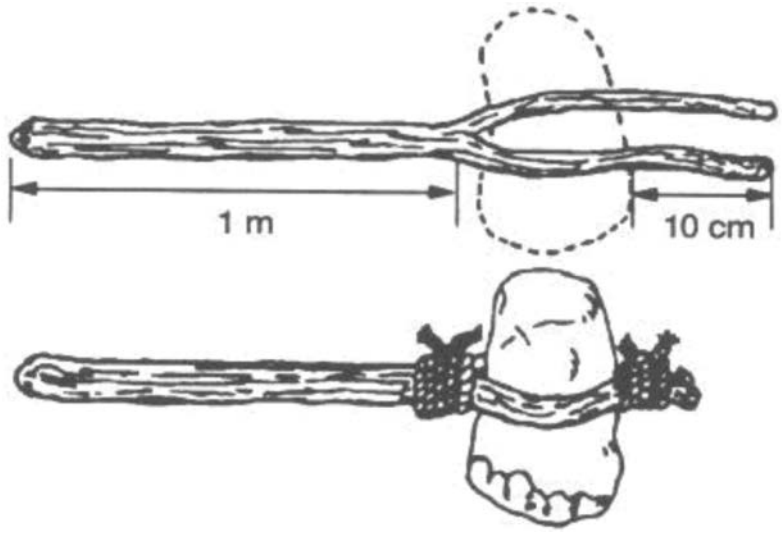
To make a forked stick hammer:

1. Find a suitable green wood forked branch and trim it to the correct length. Leave the tines long enough to be lashed above the stone.

2. Lash the base of the fork in the stick to prevent it from splitting when the tines are attached above the stone. A groove in the stone will help keep it from moving in use.

3. Set the stone in the crotch of the forked stick and start pulling the tines together with cordage. Secure the tines with cordage.



Note. From U.S. Army Survival Handbook (p. 134), by Department of the Army, 2002, Guilford, CT: The Lyons Press.

Figure 2 Forked Stick Hammer

To make a thinned stick hammer use the following steps:

1. Using a small stone, chip the hammer stone to create a shallow groove around its circumference for the wood to wrap.

2. Shave the end to half the diameter, long enough to wrap around the stone and meet the handle.

3. Wrap the wood around the stone head and lash securely.

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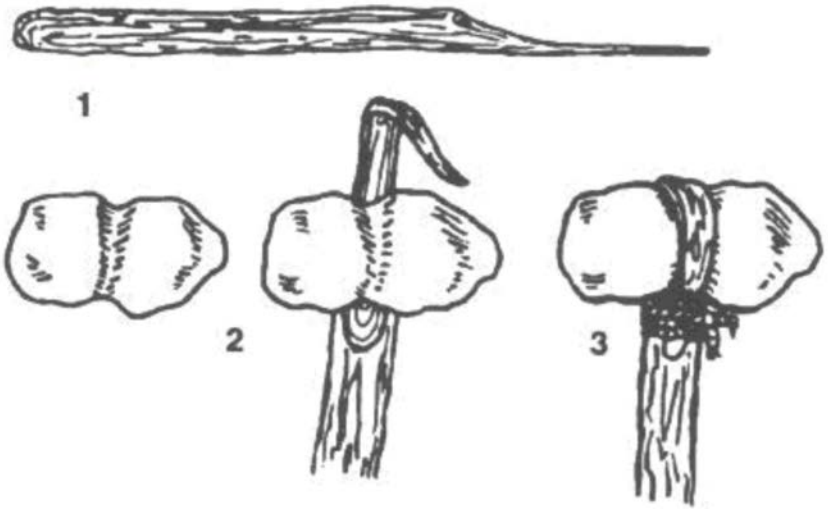

Note. From U.S. Army Survival Handbook (p. 134), by Department of the Army, 2002, Guilford, CT: The Lyons Press.

Figure 3 Thinned Stick Hammer

Wooden sticks can be attached to a stone to act as a handle. The handle increases the length of the swing radius, increasing the speed of the hammer head and the force delivered to the object being struck. It also keeps the user's hand away from the point of impact and reduces the shock of the blow to the user's hands. It is important to size the handle to the stone and the task. A handle that is too long results in an unwieldy tool and too short is inefficient.

The handle should be carefully constructed from green wood and attached securely to the stone. The diameter of the handle should be the same size as the user's index and middle finger combined. A split stick, Y-shape stick with the tines wrapped around or a stick thinned where it wraps around the stone will be more secure (as illustrated in Figures 1–3). The joint is strengthened by grooving the stone by chipping around its circumference, and lashing using a wet leather thong, wire, strong cordage or sinew for the binding.

Be conscious of the arc of the striking tool. If the stone separates from the handle, it has the potential to strike anything in that arc.

A piece of wood can also be used as a striking implement. The handle sizing remains the same as for a stone hammer. Larger diameter sections of log are reduced in the handle area to the proper handle size. This hammer or club is used either split or cut a piece of wood by hitting the back of the knife held in the opposite hand. This type of hammer or club does not last long in use as the objects being struck are usually wood, stone, or metal, which are harder than the club, causing it to splinter.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS:

Q1. What are some uses for a stone hammer?

Q2. How should the stone be attached to the handle?

Q3. Why will a wooden club not last long?

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ANTICIPATED ANSWERS:

A1. A stone can be used as a hammer for driving sticks into the ground, dispatching fish and small animals.

A2. The stone should be attached to the handle by lashing using a wet leather thong, wire, strong cordage or sinew for the binding

A3. A hammer or club will not last long in use as the objects being struck are usually wood, stone or metal which is harder than the club, causing it to splinter.

END OF LESSON CONFIRMATION

The cadets' improvisation of tools will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

The ability to improvise tools using found material can make the task of surviving easier. There will always be material in the area around the survivor. Identifying what they can be used for to assist in a survival situation is an asset.

INSTRUCTOR NOTES / REMARKS

Cadets who are qualified Survival Instructor may assist with this instruction.

REFERENCES

A3-016 B-GA-217-001/PT-001 Director Air Operations and Training. (1978). *Down but not out*. Ottawa, ON: Department of National Defence.

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