ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 5

EO C424.02 – BOIL WATER USING HEATED ROCKS

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-704/PG-001, *Gold Star 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.

Prepare and light a fire(s) to use in TP 3 a minimum of one hour prior to instructing this lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A group discussion was chosen for TP 1 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions and feelings on uses of rocks in a survival situation. Sharing in the discussion encourages the cadets to examine their own thoughts and may prompt them to re-think their previously held ideas. Participating in a group discussion improves the cadets' listening skills and team development.

An interactive lecture was chosen for TP 2 as it introduces the cadets to types of rocks and their heating properties.

A practical activity was chosen for TP 3 as it is an interactive way for the cadets to develop skills and knowledge about boiling water using heated rocks in a safe and controlled environment. This activity contributes to the development of survival skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have boiled water using heated rocks.

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IMPORTANCE

It is important for cadets to know how natural resources can be used in a survival situation. Rocks can be used in a variety of ways. There are different types of rocks—some of which are more useful than others. Knowing how to boil water using rocks is an extremely beneficial skill, especially when in a survival situation.

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Teaching point 1 **Discuss the uses of rocks in a survival situation.**

Time: 5 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.

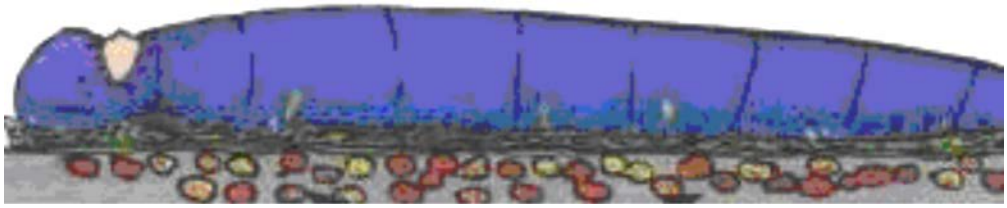
USES OF ROCKS IN A SURVIVAL SITUATION

When in a survival situation, there are many uses for rocks.

INSULATION

Rocks are able to hold heat very well and can keep a person warm for a long period of time. Placing a heated rock anywhere near the body will help keep it warm during cold days and nights.

One can keep warm while sleeping on the ground by making a rock bed. To make a rock bed, place large, dry, flat stones in a fire pit. Once the stones are hot, remove them and place them in the ground. Cover the area with soil and enjoy. To avoid getting wet, allow time for moisture to evaporate from the ground.



Note. From Camping and Wilderness Survival (p. 417), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

Figure 1 Rock Bed

Cooking

Rocks can be used to cook in a variety of ways. A flat rock can be used in much the same way as a grill and hot rocks can be used (along with grass) to steam food. Small game can be cooked by stuffing it with hot stones. It is also possible to bake food in the ground using rocks. They can also be used to cook or heat food.

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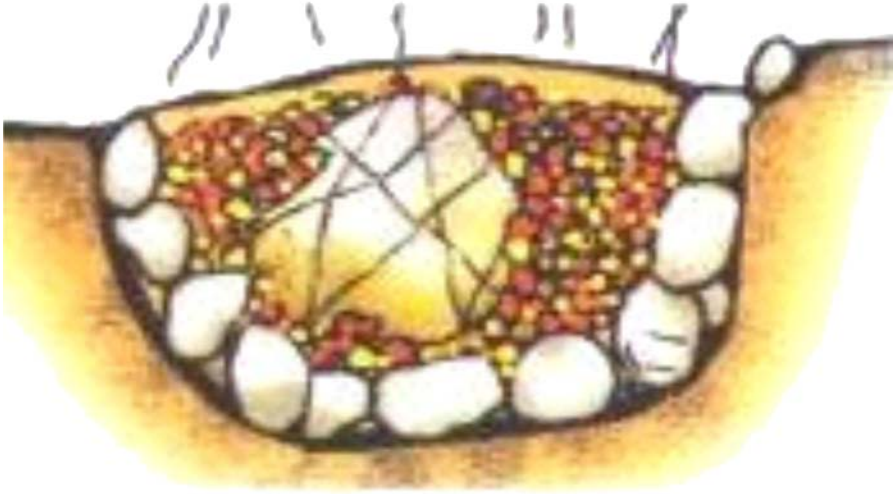
Figure 2 Stone Grill



Note. From Camping and Wilderness Survival (p. 451), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

Figure 3 Baking in the Ground

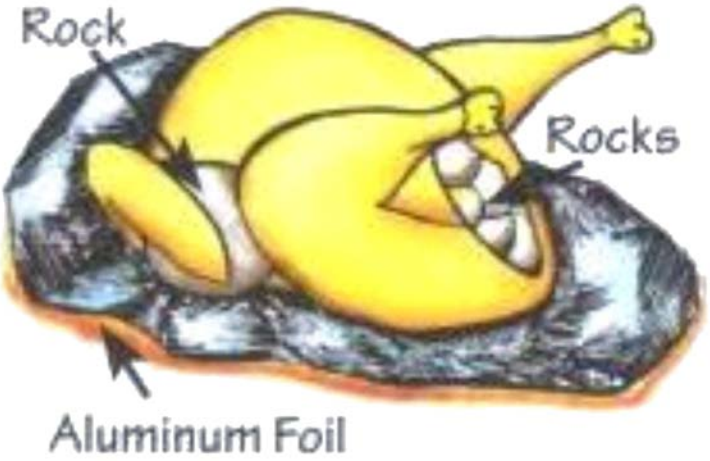


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Figure 4 Hot Stone Cooking

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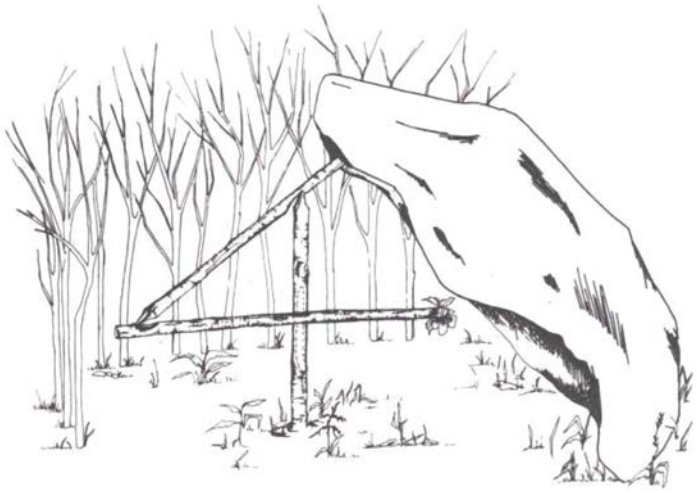
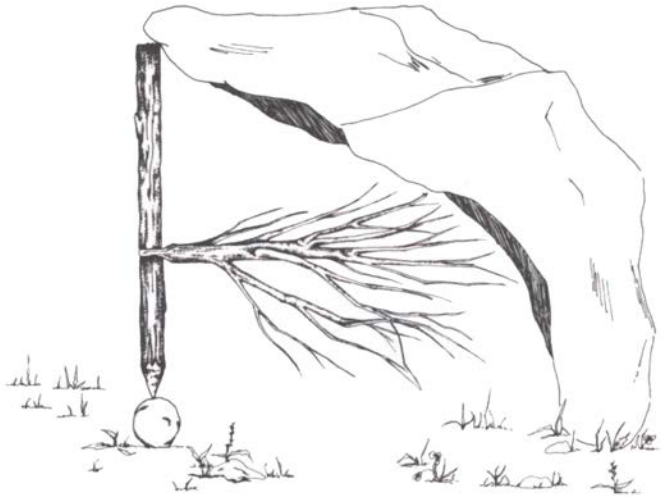
Trapping Wildlife for Food

Traps are a way to catch food in the field. They should only be used in a survival situation. There are many different types of traps requiring the use of rocks.



Note. From Tom Brown's Field Guide: Wilderness Survival (p. 179) by T. Brown, Jr. & B. Morgan, 1983, New York, NY: The Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

Figure 5 Trap Using Rock—Example 1



Note. From Tom Brown's Field Guide: Wilderness Survival (p. 183) by T. Brown, Jr. & B. Morgan, 1983, New York, NY: The Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

Figure 6 Trap Using Rock—Example 2

Building Shelter

A big rock (eg, a cave) will provide a permanent shelter. To increase the height and size of a shelter, as well as keep out rain and wind, build a stone barrier. Rocks can also be used to add weight to a shelter made with a groundsheet or tarp as a way to ensure wind, rain and animals do not enter.

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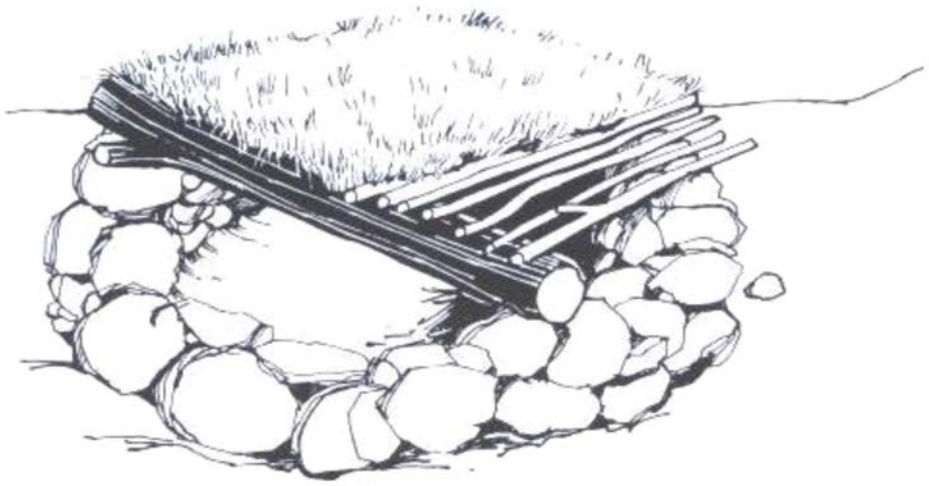
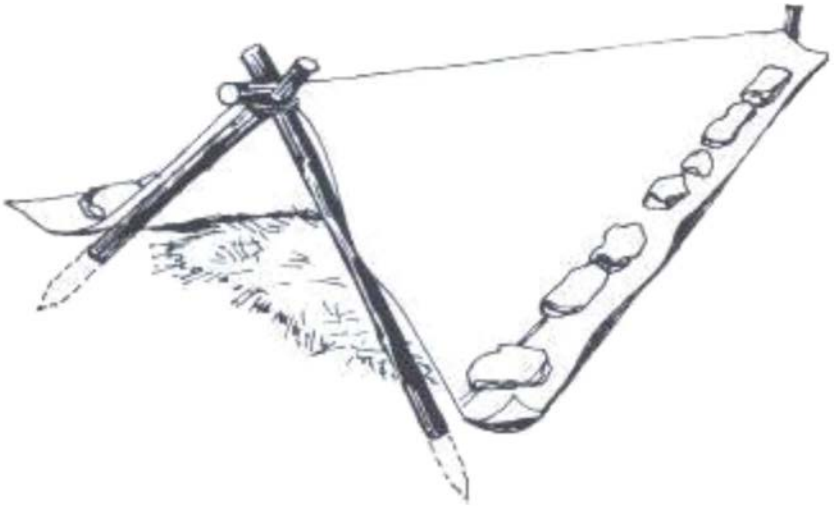


Note. From The SAS Survival Handbook (p. 246), by J. Wiseman, 1999, Hammersmith, London: HarperCollins Publishers. Copyright 1986 by John Wiseman.

Figure 7 Stone Barrier



Note. From The SAS Survival Handbook (p. 247), by J. Wiseman, 1999, Hammersmith, London: HarperCollins Publishers. Copyright 1986 by John Wiseman.

Figure 8 Adding Weight to a Groundsheet

Tools

Rocks can be used as tools in a variety of ways, such as hammers, knives, carvers, scrapers and sanders. Certain types of rocks can even be used to shape other rocks.

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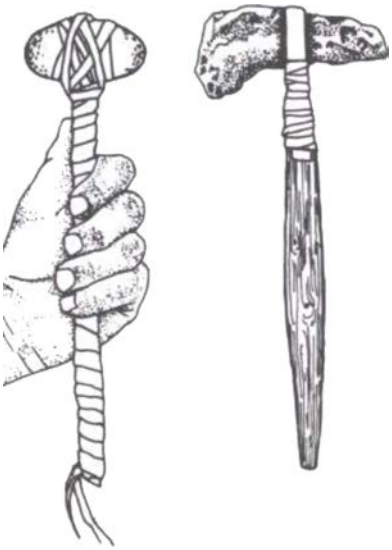

Note. From Tom Brown's Field Guide: Living With the Earth (p. 102) by T. Brown, Jr. & B. Morgan, 1984, New York, NY: The Berkley Publishing Group. Copyright 1984 by Tom Brown, Jr.

Figure 9 Rock Tools

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. What can rocks be used for in a survival situation?

Q2. How can a rock be used as a tool?

Q3. How can rocks be used to cook?

Q4. If you were in a survival situation, how could rocks be used to make your shelter more comfortable?

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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 **Identify types of rocks.**

Time: 5 min Method: Interactive Lecture

Boiling water with heated rocks requires that the rocks be heated to extreme temperatures—which can cause some types of rocks to explode. Some rocks hold heat better than others and are therefore a better choice.

When selecting rocks to heat, **NEVER** pick rocks that are next to a water source (eg, river, swamp, moss, bottom of a hill). Rocks that have moisture inside are likely to explode. Go to higher land to find dry rocks.

TYPES OF ROCKS

Geologists classify rocks into three groups according to the major Earth processes that formed them. The classification system will assist in finding types, but many rocks overlap between categories. The types of rocks are igneous, sedimentary and metamorphic.

Rocks are groups of different minerals pushed together and combined. They are a continuous spectrum of colour, content, form and composition.

Igneous rocks. Formed from magma (molten rock) that has cooled and then solidified. The majority of these rocks formed beneath the Earth's crust. Some examples of igneous rock are granite, pumice, rhyolite and basalt.

Basalt rocks hold heat very well.

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Note. From "Geology.com", 2009, Igneous Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 10 Granite



Note. From "Geology.com", 2009, Igneous Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 11 Pumice



Note. From "Geology.com", 2009, Igneous Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 12 Rhyolite



Note. From "Geology.com", 2009, Igneous Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 13 Basalt

Sedimentary rocks. Formed in layers near the Earth's surface. They are composed of grains that have been compacted loosely under low pressure. They are normally loose and not very strong. Some examples of sedimentary rocks are coal, iron ore, shale and limestone.

When selecting rocks to heat, sedimentary rocks are generally a poor choice.

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Note. From "Geology.com", 2009, Sedimentary Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 14 Coal



Note. From "Geology.com", 2009, Sedimentary Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 15 Iron Ore



Note. From "Geology.com", 2009, Sedimentary Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 16 Shale



Note. From "Geology.com", 2009, Sedimentary Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 17 Limestone

Metamorphic rocks. Created by heat / pressure, which changed the rock from one type to another. Since these rocks were created by heat / pressure, they are usually found deep beneath the Earth's surface. Some examples of metamorphic rock are phyllite, slate, hornfels and quartzite.



Slate rocks hold heat very well.

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Note. From "Geology.com", 2009, Metamorphic Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 18 Phyllite



Note. From "Geology.com", 2009, Metamorphic Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 19 Slate



Note. From "Geology.com", 2009, Metamorphic Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 20 Hornfels



Note. From "Geology.com", 2009, Metamorphic Rocks, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 21 Quartzite

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. What are the three types of rocks?

Q2. When selecting rocks to heat, which type of rock is a poor selection?

Q3. Which rocks hold heat well?

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ANTICIPATED ANSWERS:

A1. The three types of rocks are igneous, sedimentary and metamorphic.

A2. Sedimentary rocks are a poor selection.

A3. Basalt and slate.

Teaching point 3 **Have the cadets, in a group of no more than three, boil water using heated rocks.**

Time: 40 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of no more than three, boil water using heated rocks.

RESOURCES

- Water container (one per group),
- Controlled fire (one per group)
- Fire safety equipment, and
- 1 L of water (per group).

ACTIVITY LAYOUT

- Select an area with ample small rocks available for selection.
- Have a fire(s) prepared.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than three.
2. Distribute a water container to each group and place each group at a fire.
3. Have each cadet select a minimum of six rocks about the size of a golf ball.



Due to the time it will take the rocks to heat, encourage the cadets to pick small rocks.

4. Have the cadets place their rocks in the fire.
5. While the rocks are heating:
   a. have each cadet create a method to remove the rocks from the fire (eg, tongs); and
   b. have each group place 1 L of water in their container.

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6. After the rocks have been in the fire for a minimum of 25 minutes, have each group place two rocks in the water container.

7. Once the rocks have cooled (1–2 minutes), have each group add two more rocks.

8. Have the groups continue adding rocks until the water boils.

9. Have the groups extinguish their fire.

When in a survival situation where a container is not available, boiling can be done in a hollowed log, a rock depression, clay, rawhide, etc.

SAFETY

- Supervisory staff shall have fire safety equipment available in case of emergency.
- Rocks will be extremely hot; use extreme caution.



NEVER pick rocks that are next to a water source (eg, river, swamp, moss, bottom of a hill). Rocks that have moisture inside are likely to explode. Go to higher land when looking for rocks.

CONFIRMATION OF TEACHING POINT 3

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

END OF LESSON CONFIRMATION

The cadets' participation in boiling water using heated rocks will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Rocks are virtually everywhere and have a variety of uses in survival situations. There are different types of rocks—some of which are more useful than others. Understanding the applications of different types of rocks could help an individual when they find themselves in a survival situation. Boiling is not the only option when cooking with rocks. Experiment and have fun!

INSTRUCTOR NOTES / REMARKS

Select an area where the natural resources required may be found.

The instructor shall have prepared a fire(s) for the cadets to use.

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