ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL ONE

INSTRUCTIONAL GUIDE

SECTION 6

EO M190.06 – LIGHT, MAINTAIN AND EXTINGUISH A FIRE

Total Time: 90 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-801/PG-001, *Proficiency Level One 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 a fire ready to be lit.

Prepare examples of types of fires.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1, 3 and 4 to illustrate the application of rules, principles and concepts of fire safety, elements of fire and types of fires.

A demonstration and performance was chosen for TPs 2 and 5 as it allows the instructor to explain and demonstrate site location and layout, lighting, maintaining and extinguishing a fire.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

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

IMPORTANCE

Safety is a key concern when dealing with fire. Cadets must understand and apply principles of fire safety before they begin the steps in lighting. Fire is also the second step in the survival pattern and may be the difference between living and expiring while in a survival situation.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

Teaching point 1 **Explain principles of fire safety.**

Time: 5 min Method: Interactive Lecture

OBEY FOREST FIRE DANGER RATING SYSTEM

In cooperation with various fire management agencies, the Canadian Forest Service manages the Forest Fire Danger Rating System. The system uses weather, fuel and topographic data to rate the potential for forest fire ignition and to predict forest fire behaviour. The Forest Fire Danger Rating System must be at a suitable level prior to starting a fire. Never light a fire when the rating is high, very high or extreme. The slightest spark could cause a forest fire.

Note. From "Natural Resources Canada" by Canadian Forest Service, 2009, The Atlas of Canada. Retrieved October 26, 2011, from http://atlas.nrcan.gc.ca/auth/english/maps/environment/naturalhazards/forest_fires/firedangerrating/1

Figure 1 Forest Fire Danger Rating System

STRONG WINDS

If wind speed is high, the fire will be at risk of spreading if not properly managed. Strong winds can carry sparks away from the fire pit and start an unwanted fire. The fire should be placed in a location where it is effectively sheltered from strong winds.

SIZE OF FIRE

The fire shall be a suitable size so control can be maintained at all times. Never allow a fire to get larger than four feet wide and three feet high. Fires that are too large can burn out of control, and cause forest fires or personal injury. If a fire becomes too large, stop adding fuel and let the fire cool down.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What is the Forest Fire Danger Rating System?

Q2. What might happen if a fire is placed in an area with strong winds?

Q3. Why maintain a suitable size fire?

ANTICIPATED ANSWERS:

A1. The Forest Fire Danger Rating System uses weather, fuel and topographic data to rate the potential for forest fire ignition and to predict forest fire behaviour.

A2. It is at the risk of spreading.

A3. Fires that are too large can burn out of control, and cause forest fires or personal injury.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

Teaching point 2 **Explain, demonstrate and have the cadets determine an appropriate site location and layout for a fire.**

Time: 15 min Method: Demonstration and Performance

SITE LOCATION

Avoid windy areas because the fire can flare up and burn out of control. A reflector or a windbreak can be built out of green wood or rocks. The advantage of a reflector is that it concentrates the heat in the desired direction. Areas near water tend to have higher winds.

Clear the ground of all inflammable material before starting the fire. The material should be raked towards the centre of the site where the dead leaves, pine needles and other debris can be burned.

Do not build the fire against an old log or tree trunk. The log may smoulder and catch fire in a breeze.

Do not build the fire below the boughs of a tree. The boughs will dry from the heat and may catch fire.

The fire should be a suitable distance from any shelter in case the wind changes direction.

SITE LAYOUT

Surround the fire with dry rocks. They will help contain the fire so it may be properly maintained. Do not use rocks that have been submerged in water. Water expands as it is heated and may cause the rocks to explode. If rocks are unavailable, dig a pit approximately one half foot deep and four feet wide. This pit helps prevent of the fire from spreading.

Appropriate fire fighting equipment shall be placed in close proximity to the fire.



Deliver this teaching point around a properly constructed fire site.

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of the activity is to allow the cadet to practically apply the principles learned by constructing an effective fire site.

RESOURCES

- Suitable location for a fire site,
- Rake,
- Shovel,
- Rocks,
- Fire extinguisher,
- Gerry can,

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

- Water pack,
- Water,
- Bucket of sand,
- Wire broom,
- Axe, and
- Fire bell.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

- Divide cadets into small groups.
- Direct cadets to find an appropriate location for a fire by applying the site location principles.
- Provide cadets with a rake and shovel, and have them clear the ground and dig a pit that will accommodate their fire.
- Have the cadets gather dry rocks and surround their fire pit.

SAFETY

Ensure cadets safely use the equipment.



After the cadets have completed the activity they should return to the original fire site for the next portion of the lesson.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. Why is it unwise to build a fire near an old log or a tree trunk?

Q2. Why must the rocks that surround the fire not be submerged in water?

Q3. What equipment should be in close proximity to the fire site?

ANTICIPATED ANSWERS:

A1. They may smoulder and catch fire.

A2. Water expands when heated and the rock may explode.

A3. Fire fighting equipment.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

Teaching point 3 **Identify the required elements of a fire.**

Time: 5 min Method: Interactive Lecture

ELEMENTS OF A FIRE

The three required elements for a fire include oxygen, spark / heat and fuel.

Note. From "Covidien Energy-based Professional Education", 2006, The Fire Triangle, 2010, by Covidien AG, October 26, 2011, from http://www.valleylabeducation.org/fire/pages/fire-12.html

Figure 2 Fire Triangle

Oxygen is required for a fire to stay lit. A spark is required to initially start the fire. The heat produced by the embers keeps the fire going. Fuel is anything that burns, such as wood.

If any one of the elements is removed, the fire will extinguish. When lighting a fire, always ensure adequate ventilation, enough fuel and a hot enough source to ignite the fuel.



Demonstrate how oxygen, heat / spark and fuel are all needed to start a fire and keep it lit.

Using a candle, a match and a large water glass, explain that without the match (spark) the candle (fuel) cannot be lit. Light the candle and place the empty water glass over the candle to prevent air (oxygen) from reaching it. The flame will extinguish.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. What are the three required elements of a fire?

Q2. If one element is removed, what happens to the fire?

ANTICIPATED ANSWERS:

A1. Oxygen, spark / heat and fuel.

A2. The fire will go out.

Teaching point 4 **Describe types of fires.**

Time: 15 min Method: Interactive Lecture

WARMTH AND COMFORT FIRES

Warmth and comfort fires can help to conserve body heat and save needed calories. These fires can be helpful in keeping away wild animals and insects. Warmth and comfort fires are the most practical fires, as they consume little fuel and burn slowly.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

SIGNAL FIRES

Signal fires should produce heavy black smoke to attract potential rescuers. This black smoke can be generated by the addition of green branches, rubber, plastic or heavy oil to an already well-established fire.

COOKING FIRES

Cooking fires should be set flat on the ground. They can also be constructed in a pit if there is heavy wind or the surrounding ground contains a fire hazard. Cooking fires shall be a moderate size or the food burns. The hot coals can be used to start a warmth and comfort fire to heat the camping area when cooking is finished.



Examples of these fires should be built to use as training aids.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS:

Q1. What are two advantages of a warmth and comfort fire?

Q2. What are some items that can be added to a fire to produce thick black smoke?

Q3. What type of ground surface should a cooking fire be on?

ANTICIPATED ANSWERS:

A1. They can help conserve body heat, help save needed calories, keep wild animals and insects away, and they are the most economical.

A2. Green branches, rubber, plastic or heavy oil.

A3. They should be on flat ground.

Teaching point 5 — **Explain, demonstrate and have the cadets practise lighting, maintaining and extinguishing fires.**

Time: 45 min — Method: Demonstration and Performance

LIGHTING A FIRE

TINDER

Tinder is any kind of material that a minimum amount of heat ignites. 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.

METHODS FOR OBTAINING A SPARK

Matches. 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 wind or wet conditions they may not be useful. They will not ignite if the striking pad becomes worn or wet. The matches should be packed in waterproof containers so that they cannot rub or rattle together and accidentally ignite. Non-safety, strike anywhere matches are the most effective in a survival situation.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

Flint and steel. Flint and steel is the best method of lighting a fire if matches are unavailable. If the flint is struck vigorously with a piece of steel it produces hot sparks that ignites the fire. The flint should be stuck downward so the sparks hits the centre of the tinder. Even if the flint is wet it still produces a spark.

Magnifying glass. Magnifying glasses focus strong direct sunlight to produce enough heat to ignite a fire. The light from the sun should be directed onto the tinder. The obvious disadvantage to the magnifying glass is that if the sun is not out, it will not produce a spark.

Battery and steel wool. Strands of steel wool can be attached to the terminals of a car battery to produce enough spark to start a fire. When the two strands of steel wool are brought close together, a spark jumps between them.



Using a nine-volt battery demonstrate this method for obtaining a spark.

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 woods. Do not collect kindling straight from the earth because it is usually damp. It should be gathered from standing deadwood.

FUEL

Fuel is anything that burns in the fire. Dry wood from standing trees should be used to get the fire going. Once the fire is established, greener and damp wood can be used. Hard woods include hickory, beech and oak. These hard woods burn well, give off heat, and last a long time as hot coals. The fire can be maintained for a long period of time using hard woods. Soft woods burn very quickly and give off sparks. They can be used when lighting the fire. These soft woods include cedar, alder, hemlock, spruce, pine, chestnut and willow. After the fire is steadily burning, add fuel that is three to four times the size of the kindling.

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 heat is built up.

VENTILATION

Ventilation allows the needed oxygen to be supplied to the fire. The more oxygen introduced, the brighter the fire. The ideal amount of ventilation results in a steady burn while only using a moderate amount of fuel. The fire suffocates if there is too much fuel.

EXTINGUISHING 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. Ensure that all of the sparks are out prior to decamping by smothering it completely with wet earth or sand and filling the fire pit.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

Teaching point 5 **ACTIVITY**

Time: 30 min Method: Activity

OBJECTIVE

The objective of this activity is to allow the cadet to practically apply the principles learned by constructing, lighting, maintaining and extinguishing a fire.

RESOURCES

- Matches,
- Flint and steel,
- Battery and steel wool,
- Magnifying class,
- Tinder,
- Kindling,
- Fuel,
- Fire site,
- Rake,
- Shovel,
- Fire fighting equipment, and
- Water.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into small groups.
2. Have the cadets in their groups, return to their fire pit.
3. Provide cadets with a rake and shovel, and firefighting equipment.
4. Have each group prepare the tinder and kindling.
5. Have each group light the fire using a match.
6. Have each group maintain the fire for three minutes.
7. Have each group extinguish their fire.
8. Ensure that the fire is completely extinguished.

SAFETY

Ensure fire-fighting equipment is near each fire site.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

CONFIRMATION OF TEACHING POINT 5

QUESTIONS:

Q1. What is fuel?

Q2. What does kindling do?

Q3. Name two of the four methods of obtaining a spark mentioned in this lesson.

ANTICIPATED ANSWERS:

A1. Fuel is anything that burns (wood, gasoline etc).

A2. Kindling is the wood used to raise the flames from the tinder so that larger less combustible materials can be burned.

A3. Matches, flint and steel, magnifying glass, battery and steel wool.

END OF LESSON CONFIRMATION

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

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Safety is a key concern when dealing with fire. Cadets must understand and apply principles of fire safety before they begin the steps in lighting. Fire is also the second step in the survival pattern and may be the difference between living and expiring while in a survival situation.

INSTRUCTOR NOTES / REMARKS

The directives outlined in CATO 11-08 *Environmental Protection and Stewardship* are to be adhered to during this training.

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: Author.

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.

THIS PAGE INTENTIONALLY LEFT BLANK

Unofficial convenience copy of A-CR-CCP-801/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-801-PF-001/A-CR-CCP-801-PF-001.pdf.
Verify against the official publication.