ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 9

EO C240.06 – DETERMINE DIRECTION USING CONSTELLATIONS ON A FIELD EXERCISE

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

Demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate determining direction while providing an opportunity for the cadet to practice this skill under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to determine direction using constellations on a field exercise.

IMPORTANCE

It is important for cadets to know how to identify Polaris, as a primary celestial reference, as it may be an important skill set to have when determining direction on a field exercise. This skill is also valuable when typical directional aids such as a map or a compass are not available.

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Teaching point 1 **Determine Direction at Night Using Polaris**

Time: 25 min Method: Demonstration and Performance



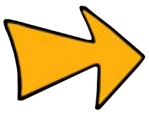
This teaching point is about stars; however, the knowledge portion can be instructed during daylight hours.

The Earth is in a constant state of motion spinning on its axis. It completes one full revolution every 24 hours. The points, where this axis intersects the Earth's surface, are known as the North and South Poles. If a person stood at the top of the North Pole, over the course of one day, that person would spin one complete rotation. On the surface of the Earth, this spin is undetectable. The spin actually makes it appear that the sky is revolving around the Earth.

THE RELATIONSHIP BETWEEN NORTH AND POLARIS

Polaris, more commonly known as the North Star, is most often used to determine north. It is a fixed point located over the North Pole, making it a consistent and reliable (stationary) reference point when determining which way is north.

Polaris is not a bright star, and is therefore difficult to identify in the night sky. It acts as a centre point while constellations move around it. Polaris is located at the tip of the Little Dipper (Ursa Minor). It can be found with the help of two constellations—the Big Dipper and Cassiopeia.



Constellations such as the Big Dipper and Cassiopeia revolve counterclockwise around Polaris.

THE BIG DIPPER

The Big Dipper is the central feature of a very large constellation (Ursa Major) that wheels around Polaris. It is a combination of seven stars that resembles a small bowl with a long handle (dipper).

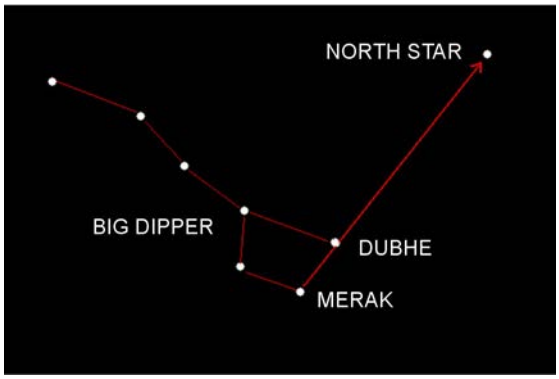
To find Polaris using the Big Dipper, follow its stars from the handle to the side of the bowl. The star Dubhe (DUB-ee), at the bowl's outer lip, is lined up with the star Merak (mer-AHK), inside the bowl. The stars Dubhe and Merak are commonly known as the pointer stars. They make a straight line that runs north and directly to Polaris. The distance from Dubhe to Polaris is five times the distance between the pointer stars.

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"Map Reading and Navigation", Second Brigade: The South Carolina State Guard (SCSG) Basic Training Manual. Retrieved 30 October 2006, from http://www.nettally.com/hgowan/north_star.gif

Figure 1 North Pole



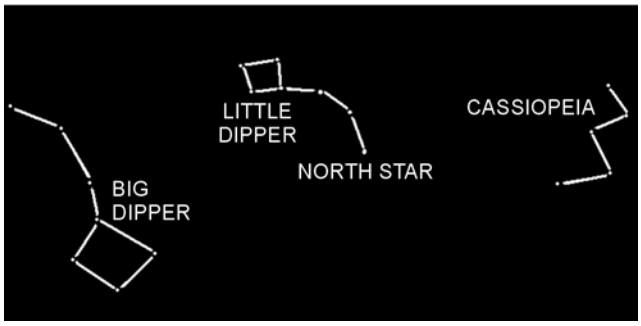
D Cdts 3, 2006, Ottawa, ON: Department of National Defence

Figure 2 Dubhe and Merak

CASSIOPEIA

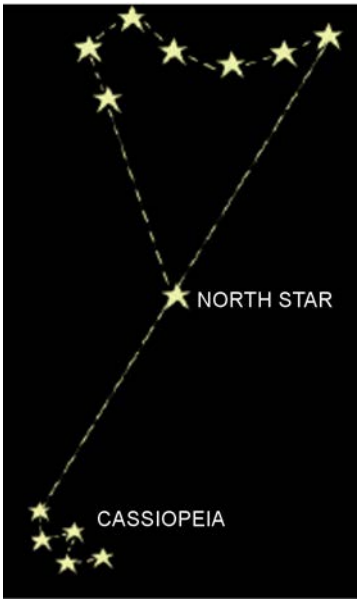
Cassiopeia is shaped like a W or an M, depending on the time of night, and wheels around the North Star.

Cassiopeia is perpendicular to Polaris (at a right angle) when the legs of the M are connected. The distance from Cassiopeia to Polaris is twice the width of the M.



D Cdts 3, 2006, Ottawa, ON: Department of National Defence

Figure 3 Little Dipper



"Navigation for Survival", The World Outdoor Web Navigation Guide. Retrieved 25 October 2006, from http://www.w-o-w.com/ARTICLES/navigation.figure12.gif

Figure 4 Cassiopeia

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Determining direction using Polaris must be conducted during the night. This night activity will consist of numerous stop points that are lesson specific; however, time has been allotted for the confirmation of the following points:

- locating and identifying Polaris using the Big Dipper;
- locating and identifying the pointer stars; and
- locating and identifying Polaris using Cassiopeia.

If this lesson is taught on an overcast night and the stars are not visible, the process must still be explained. The demonstration by the instructor and the cadet activity must be conducted at a later time, preferably while on the field exercise.

Note: Cadets should also be able to locate the Little Dipper after finding Polaris.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What is the common name for the star Polaris?

Q2. How far is the distance from Dubhe to Polaris?

Q3. What letter should Cassiopeia be viewed as when determining direction?

ANTICIPATED ANSWERS

A1. The North Star.

A2. The distance from Dubhe to Polaris is five times the distance between Dubhe and Merak.

A3. Cassiopeia must always be viewed as an M.

END OF LESSON CONFIRMATION

The cadets' participation in determining direction at night will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Alternate means of determining direction are important skills to have when determining direction using constellations on a field exercise, specifically when typical direction aids such as a compass or map are unavailable. Using Polaris, as a primary celestial reference, to navigate is a skill set that may be used frequently and will be helpful in future training on a field exercise.

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INSTRUCTOR NOTES/REMARKS

This lesson is to be conducted at night however the knowledge portion of this lesson can be conducted during daylight hours.

REFERENCES

C2-008 (ISBN 0-00-265314-7) Wiseman, J. (1999). *The SAS Survival Handbook.* Hammersmith, London: HarperCollins Publishers.

C2-041 (ISBN 0-07-136110-3) Seidman, D with Cleveland, P. (2001). *The Essential Wilderness Navigator.* Camden, ME: Ragged Mountain Press.

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