ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 8

EO C240.05 – SIMULATE SURVIVAL IN SPACE

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.

Complete a recce of the area selected to conduct this lesson.

Obtain one map of the actual training area (where the activity will be conducted) for each group.

Photocopy the survival scenario located at Annex A for each group.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An in-class activity was chosen for TP1 as it is an interactive way to revisit survival in space, provoke thought and stimulate an interest among cadets.

A group discussion was chosen for TP2 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions, and feelings about survival in space.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson, and in groups of no more than four, the cadet shall be expected to simulate survival in space.

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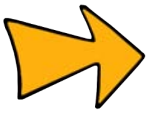
IMPORTANCE

It is important for cadets to simulate survival in space as it gives them the opportunity to understand the challenges astronauts face while living in space by using their knowledge about survival and applying it to a new situation.

Teaching point 1 **Conduct an In-class Activity Where Cadets Choose Five Items From a List to Survive in Space**

Time: 35 min Method: In-Class Activity



Water on the Moon

The lunar soil contains ice crystals in craters near the lunar poles (which cannot be seen from Earth). The ice is spread across thousands of square kilometres of lunar terrain, but only one percent of the soil is ice.

The Earth's Moon

The Moon is Earth's one natural satellite. It is more than one quarter the size of Earth itself (3474 km diameter). The Moon has no magnetic field and its gravity is one-sixth of the Earth's gravity because of its smaller size.

The footprints left by Apollo astronauts will last for centuries because there is no wind on the Moon. The Moon does not possess any atmosphere, so there is no weather as we are used to on Earth. The temperatures on the Moon are extreme, ranging from 100°C at noon to -173°C at night because there is no atmosphere to trap the heat.

ACTIVITY

OBJECTIVE

The objective of this activity is to further develop the cadets' interest and understanding of what surviving in a space environment might be like.

RESOURCES

- Handout the scenario located at Annex A,
- The following survival resources for each group:
  - a box of matches,
  - a magnetic compass,
  - a stellar map of the Moon,
  - 2 military water cans (to simulate oxygen tanks),
  - 4 two-litre bottles to simulate water,
  - 10 metres of nylon rope,
  - simulated food boxes,
  - a radio,

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- a fire blanket, and
- a map of the training area.

ACTIVITY LAYOUT

- Layout survival items for each group.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than four.
2. Provide each group with a copy of the scenario located at Annex A.
3. Each group will select the survival items for the survival scenario from the resources provided.
4. Inform the cadets that they have 35 minutes to complete the activity.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 1

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

Teaching point 2 **Conduct a Group Discussion and Have the Groups Explain Why They Chose Their Items for Survival**

Time: 20 min Method: Group Discussion

BACKGROUND KNOWLEDGE



The point of the group discussion is to discuss the groups' reasons for choosing their items to complete the survival simulation using the tips for answering/facilitating discussion and the suggested questions provided.

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GROUP DISCUSSION



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.

QUESTIONS

Q1. What were the items that your group selected to survive in space?

Q2. Why did your group select these survival items?

Q3. What was the most important item on your list and why?

Q4. What was the most challenging decision you had to make?

Q5. What item was not on this list that could be very useful to survival in space?

Q6. If you had a chance to do this exact simulation again, what would be one thing you would do differently and why?



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.

SAFETY

N/A.

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CONFIRMATION OF TEACHING POINT 2

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

END OF LESSON CONFIRMATION

The cadets' participation in the survival in space simulation will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Stimulating the cadets' interest in space by introducing elements of survival in space through active participation in this EO may lead to future aerospace opportunities in the Air Cadet Program.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-111 Lakeland Central School District. (2007). *Space Survival Challenge.* Retrieved 27 February 2007, from http://www.lakelandschools.org/EDTECH/leslie/space.htm.

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SPACE SURVIVAL SCENARIO

Situation

You are a member of a space shuttle crew scheduled to meet with the Earth colony on the lighted surface of the Moon. Due to mechanical failure, you and your three crewmates had to crash land about 10 km from the colony. During the landing on the Moon, much of the equipment aboard was damaged. Only ten items were left undamaged. Since survival depends on reaching the colony as soon as possible, the most critical items must be chosen to help you return.

Mission

You will be working in groups of four as a team of astronauts. Your survival depends on selecting no more than five items to bring with you as you try to get to the Earth colony on the Moon. Your challenge is to rank, in order (most important to least), those objects that have been left undamaged on your ship. Base your decisions on what you already know about conditions in space and on the Moon.

Items that Survived the Crash Landing

- a box of matches,
- a magnetic compass,
- a stellar map of the Moon,
- 2 military water cans (to simulate oxygen tanks),
- 4 two-litre bottles to simulate water,
- 10 metres of nylon rope,
- simulated food boxes,
- a radio,
- a fire blanket, and
- a map of the actual training area (to simulate a map of the moon).

Instructions

1. Select five items from the list that your team needs to survive and get back to the colony.
2. Rank your objects in order from most to least important.
3. Justify your choices within your group by explaining how the items will be used to return to the colony.
4. Prepare to present your findings to the class in a group discussion.

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INSTRUCTOR ANSWER KEY TO THE SPACE SURVIVAL SCENARIO



Cadets are encouraged to be creative with the application of their items. If they can justify the items used, then their decision to select the item is permissible with the exception of the following items.

The following items on the list will be of no use to the groups:

- The box of matches will be of no use because matches will not light because there is no oxygen on the moon.
- The magnetic compass will not work because there is no magnetic field on the moon.
- The handheld radios will not work because there is no air to carry sound waves and they are redundant because your spacesuit is equipped with built-in hands-free radio communication technology.

All other items from the list are useful for this simulation.

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