

PO 436

1. **Performance:** Explain Aspects of Meteorology
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet will explain aspects of meteorology, to include:
 - a. air masses and fronts, and
 - b. winds.
4. **Remarks:** Nil.
5. **Complementary Material:**
 - a. Complementary material associated with PO 436 is designed to enhance the cadet's knowledge of meteorology, specifically:
 - (1) EO C436.01 (Explain Fog),
 - (2) EO C436.02 (Describe Severe Weather Conditions), and
 - (3) EO C436.03 (Analyze Weather Information).
 - b. Complementary material from PO 336 that was not conducted in the previous year may be selected as complementary training in Proficiency Level Four.

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EO M436.01

1. **Performance:** Explain Winds
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall explain winds, to include:
 - a. surface winds, and
 - b. jet streams.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain surface winds, to include: <ol style="list-style-type: none"> a. katabatic and anabatic winds, b. mountain waves, and c. gusts and squalls. 	Interactive Lecture	15 min	C3-116 (pp. 130–132)
TP2	Describe jet streams.	Interactive Lecture	10 min	C3-116 (pp. 134–135) C3-334

5. **Time:**
 - a. Introduction / Conclusion: 5 min
 - b. Interactive Lecture: 25 min
 - c. Total: 30 min
6. **Substantiation:** An interactive lecture was chosen for this lesson to orient the cadets to winds and generate interest in the subject.
7. **References:**
 - a. C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Pepler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.
 - b. C3-334 Short N. (2005). Remote Sensing Tutorial. *Federation of American Scientists*. Retrieved February 26, 2009, from http://www.fas.org/irp/imint/docs/rst/Sect14/Sect14_1c.html
8. **Training Aids:** Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for classroom / training area.
9. **Learning Aids:** Nil.

10. **Test Details:** This EO is assessed IAW Chapter 3, Annex B, Aviation Subjects–Combined Assessment PC.
11. **Remarks:** Cadets who are qualified Advanced Aviation may assist with this instruction.

EO M436.02

1. **Performance:** Describe Air Masses and Fronts
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall describe air masses and fronts, to include:
 - a. weather in an air mass,
 - b. types of fronts, and
 - c. frontal weather.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain weather in an air mass.	Interactive Lecture	10 min	C3-116 (p. 140)
TP2	Define and explain types of fronts.	Interactive Lecture	15 min	C3-116 (p. 140) C3-334
TP3	Conduct an in-class activity to describe types of fronts and associated weather, to include: <ol style="list-style-type: none"> a. warm front, b. cold front, c. stationary front, d. occluded fronts, and e. upper fronts. 	In-Class Activity	55 min	A3-044 (pp. 7-12 to 7-15) C3-116 (pp. 142–145)

5. **Time:**
 - a. Introduction / Conclusion: 10 min
 - b. Interactive Lecture: 25 min
 - c. In-Class Activity: 55 min
 - d. Total: 90 min

6. **Substantiation:**

- a. An interactive lecture was chosen for TPs 1 and 2 to orient the cadets to air masses and fronts and generate interest.
- b. An in-class activity was chosen for TP 3 as it is an interactive way to present types of fronts and associated weather.

7. **References:**

- a. A3-044 CFACM 2-700 Air Command. (2001). *Air Command weather manual*. Ottawa, ON: Department of National Defence.
- b. C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Pepler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.
- c. C3-334 "Remote Sensing Tutorial", 2005, *Federation of American Scientists*, by N. Short, 2005. Retrieved February 26, 2009 from http://www.fas.org/irp/imint/docs/rst/Sect14/Sect14_1c.html

8. **Training Aids:**

- a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for classroom / training area,
- b. Two thermos / cooler / bottle,
- c. Two baby food jars,
- d. Red and blue food colouring,
- e. Index card / plastic coated paper, and
- f. Fronts information sheets.

9. **Learning Aids:**

- a. Pen / pencil,
- b. Coloured pencils / markers, and
- c. Fronts worksheets.

10. **Test Details:** This EO is assessed IAW Chapter 3, Annex B, Aviation Subjects–Combined Assessment PC.

11. **Remarks:**

- a. It is recommended that the three periods required for this EO be scheduled consecutively.
- b. Cadets who are qualified Advanced Aviation may assist with this instruction.

EO C436.01

1. **Performance:** Explain Fog
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall explain:
 - a. formation of fog, and
 - b. types of fog.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Have the cadets perform an experiment to illustrate the formation of fog.	In-Class Activity	10 min	C3-116 (p. 147) C3-200
TP2	Conduct an in-class activity to explain types of fog.	In-Class Activity	15 min	C3-116 (p. 147)

5. **Time:**
 - a. Introduction / Conclusion: 5 min
 - b. In-Class Activity: 25 min
 - c. Total: 30 min
6. **Substantiation:** An in-class activity was chosen for this lesson as it is an interactive way to present the formation and types of fog.
7. **References:**
 - a. C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Peppler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.
 - b. C3-200 Weather Wiz Kids. (2008). *Make fog*. Retrieved September 26, 2008, from <http://www.weatherwizkids.com/fog.htm>
8. **Training Aids:**
 - a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for classroom / training area,
 - b. Glass jar,
 - c. Strainer,

- d. Kettle,
- e. Water, and
- f. Ice cubes.

9. **Learning Aids:**

- a. Glass jar,
- b. Strainer,
- c. Oven mitts,
- d. Water,
- e. Rubbing alcohol,
- f. Ice cubes,
- g. Flip chart paper,
- h. Flip chart markers, and
- i. From the Ground Up: *Millennium Edition*.

10. **Test Details:** Nil.

11. **Remarks:** Cadets who are qualified Advanced Aviation may assist with this instruction.

EO C436.02

1. **Performance:** Describe Severe Weather Conditions
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall describe severe weather conditions, to include:
 - a. thunderstorms,
 - b. icing, and
 - c. turbulence.

4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Describe thunderstorms, to include: <ol style="list-style-type: none"> a. formation, b. dangers, and c. avoidance. 	Interactive Lecture	10 min	C3-116 (pp. 148–151)
TP2	Describe icing, to include: <ol style="list-style-type: none"> a. types of icing, and b. protection from icing. 	Interactive Lecture	5 min	C3-116 (pp. 153–155)
TP3	Describe types of turbulence, to include: <ol style="list-style-type: none"> a. mechanical turbulence, b. thermal turbulence, c. frontal turbulence, and d. wind shear. 	Interactive Lecture	10 min	C3-116 (p. 156, pp. 288–289)

5. **Time:**

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|-------------------------------|--------|
| a. Introduction / Conclusion: | 5 min |
| b. Interactive Lecture: | 25 min |
| c. Total: | 30 min |

6. **Substantiation:** An interactive lecture was chosen for this lesson to introduce the cadets to severe weather conditions and to generate interest.

7. **References:** C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Pepler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.
8. **Training Aids:** Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for classroom / training area.
9. **Learning Aids:** Nil.
10. **Test Details:** Nil.
11. **Remarks:** Cadets who are qualified Advanced Aviation may assist with this instruction.

EO C436.03

1. **Performance:** Analyze Weather Information
2. **Conditions:**
 - a. Given:
 - (1) Aviation reports and forecasts,
 - (2) Supervision, and
 - (3) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall analyze weather information by reading:
 - a. aviation routine weather reports (METARs),
 - b. aerodrome forecasts (TAFs),
 - c. upper winds and temperature forecasts (FDs), and
 - d. graphic area forecasts (GFAs).
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Describe a METAR, to include: <ol style="list-style-type: none"> a. definition, b. frequency of reports, c. special weather reports (SPECI), and d. where METARs are available. 	Interactive Lecture	5 min	C2-044 (p. 144) C3-116 (p. 160)
TP2	Familiarize the cadets with METAR terminology, to include: <ol style="list-style-type: none"> a. report type, b. location indicator, c. date and time of observation, d. report modifier, e. wind, f. prevailing visibility, g. runway visual range, h. present weather, i. sky conditions, j. temperature and dewpoint, k. altimeter setting, 	Interactive Lecture	15 min	C2-044 (pp. 143–147) C3-116 (pp. 160–163)

TP	Description	Method	Time	Refs
	<ul style="list-style-type: none"> l. recent weather, m. wind shear, and n. remarks. 			
TP3	Describe a TAF, to include: <ul style="list-style-type: none"> a. definition, b. issue and validity, and c. where TAFs are available. 	Interactive Lecture	5 min	C2-044 (p. 135) C3-116 (p. 167)
TP4	Familiarize the cadets with TAF terminology, to include: <ul style="list-style-type: none"> a. report type, b. location indicator, c. date and time of origin, d. period of validity, e. wind, f. low-level wind shear, g. prevailing visibility, h. significant weather, i. sky condition, j. change groups, and k. remarks. 	Interactive Lecture	15 min	C2-044 (pp. 136–139) C3-116 (pp. 167–169)
TP5	Describe an FD, to include: <ul style="list-style-type: none"> a. definition, b. decoding, and c. where FDs are available. 	Interactive Lecture	5 min	C2-044 (p. 140) C3-116 (p. 169)
TP6	Describe a GFA, to include: <ul style="list-style-type: none"> a. definition, b. issue and validity, c. coverage area, d. units of measure, e. abbreviations and symbols, and f. where GFAs are available. 	Interactive Lecture	10 min	C2-044 (p. 120) C3-116 (p. 166)
TP7	Familiarize the cadets with GFA Clouds and Weather Chart layout, to include: <ul style="list-style-type: none"> a. title box, b. legend box, c. comments box, and 	Interactive Lecture	15 min	C2-044 (pp. 120–124) C3-116 (pp. 166–167)

TP	Description	Method	Time	Refs
	d. weather information section, to include: (1) synoptic features, (2) clouds, (3) surface-based layers, (4) visibility, (5) weather and obstructions to vision, (6) isobars, and (7) surface winds.			
TP8	Conduct an activity to have the cadets read METARs, TAFs, FDs and GFA Clouds and Weather Charts.	In-Class Activity	15 min	

5. **Time:**

a.	Introduction / Conclusion:	5 min
b.	Interactive Lecture:	70 min
c.	In-Class Activity	15 min
d.	Total:	90 min

6. **Substantiation:**

- a. An interactive lecture was chosen for TPs 1–7 to introduce weather reports and forecasts, to give the cadets the basic material they need to decode and analyze the information and to generate interest.
- b. An in-class activity was chosen for TP 8 as it is an interactive way for the cadets to practice analyzing weather information under supervision.

7. **References:**

- a. C2-044 Transport Canada. (2008). *Aeronautical information manual*. Retrieved September 29, 2008, from <http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF>
- b. C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Peppler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for the classroom / presentation area, and
- b. Recent local METARs, TAFs, FDs and GFAs.

9. **Learning Aids:**

- a. Handout of sample METARs and SPECIs,
- b. Handout of sample TAFs,
- c. Handout of sample FDs,

- d. Handout of sample GFAs,
- e. Handout of the World Meteorological Organization (WMO) code chart, and
- f. Handout of the aviation forecast abbreviations chart.

10. **Test Details:** Nil.

11. **Remarks:**

- a. Recent METARs, TAFs, FDs and GFAs can be found at <http://www.flightplanning.navcanada.ca>. Click on the METAR / TAF, UPR WNDS (FDs), or Graphical FA icon and choose the desired region.
- b. It is recommended that the three periods required for this EO be scheduled consecutively.
- c. Cadets who are qualified Advanced Aviation may assist with this instruction.