



## Course Name: Aviation Explorations 12

<b>School District/Independent School Authority Name:</b> School District #35 (Langley)	<b>School District/Independent School Authority Number (e.g. SD43, Authority #432):</b>
<b>Developed by:</b> David Thomas, George Wilander	<b>Date Developed:</b> May 2019
<b>School Name:</b> Langley Education Centre	<b>Principal's Name:</b> Ron Stare
<b>Superintendent Approval Date (for School Districts only):</b>	<b>Superintendent Signature (for School Districts only):</b>
<b>Board/Authority Approval Date:</b>	<b>Board/Authority Chair Signature:</b>
<b>Course Name:</b> Aviation Explorations 12	<b>Grade Level of Course:</b> Grade 12
<b>Number of Course Credits:</b> Four (4)	<b>Number of Hours of Instruction:</b> 100

### Board/Authority Prerequisite(s):

### Special Training, Facilities or Equipment Required:

A class set of aviation charts, chart rulers and E6B-style flight computers (or electronic equivalent) is required for the navigation portion of the course. For other portions of the course the students will be involved in place-based, on-site learning opportunities arranged by the instructor at local aviation related locations such as local airports, (Langley, Abbotsford, Vancouver), aviation related businesses and post-secondary aviation programs.

## **Course Synopsis:**

The aviation industry offers many opportunities for young people to select a challenging and rewarding career. Aviation Explorations 12 (BAA) supports students by allowing them to gain exposure to the variety of related opportunities available while also receiving course credit towards their graduation. Students are exposed to aviation related knowledge, skills and careers such as Air Traffic Controller, Pilot (fixed wing and rotary aircraft), aviation maintenance and manufacturing, airport management, aerospace engineering and other aviation specific services and businesses. Students cover some of the curriculum that is part of ground school training for a private pilot licence and also have hands-on and place-based learning opportunities to supplement the content and skills they learn.

The course is a mix of teacher-led instruction and practical, experiential and place-based aviation learning opportunities. This includes aviation related project work, guest speakers, site visits, in-class discussion, cooperative learning demonstrations, inspection and analysis of displays. As a knowledge base, all students are exposed to content similar to what pilots complete as part of their ground school training. Students interested in pursuing their private pilot licence would be able to continue that on their own, while students interested in other aspects of the aviation field (e.g. air traffic control, manufacturing/maintenance, airport management, aviation services) would have a common baseline knowledge on which to build.

## **Goals and Rationale:**

The forecast global shortage for pilots and aviation technicians over the next 20 years is unprecedented. Boeing and others in the aviation industry suggest that over 600,000 new pilots and a similar number of technicians will need to be recruited, trained and hired in this period. In Canada, the shortage by 2025 is an estimated 3,000 pilots and 55,000 workers overall. Despite the opportunities, aviation remains a relatively invisible career field.

Langley has a busy and growing regional airport with numerous businesses that provide students with an opportunity to learn about current and future aviation careers. As well, local post-secondary schools such as BCIT are potentially interested in partnerships with the school district. These are just two of the factors that make Aviation Explorations 12 (BAA) a good fit to benefit the students of the Langley School District.

Aviation Explorations 12 encourages students to:

- Develop technical skills required in the demanding aviation industry.
- Create an interest and awareness in aviation and aerospace careers as a viable option.
- Develop self-efficacy and networking skills necessary to access future opportunities.
- Expand pathways and provide educational needs for students entering aviation.

## **Aboriginal Worldviews and Perspectives:**

The First Peoples Principles of Learning provide a foundation not only for exploration and inquiry but also for moving forward in life with a respect for nature and others upon which safety is built.

- Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors. *This is seen, in part, through the requirement of a witness to each student's learning.*

- Learning is holistic, reflexive, reflective, experiential, and relational. (focused on connectedness, on reciprocal relationships, and a sense of place). *Proximity to an airport together with the focus on hands-on learning, group projects, and curricular competencies that relate to tangible aspects of the aviation industry support this principle.*
- Learning involves recognizing the consequences of one's actions. *Students see firsthand and through case studies that aviation abounds in cause and effect relationships, many of which are decidedly unforgiving.*
- Learning is embedded in memory, history, and story. *As students explore the history of aviation and consider the future possibilities, they learn to value both the story and the story-teller.*
- Learning involves patience and time. *One example of this principle is explored as students study the licensing process. Apprenticeship takes time, but the goal helps build resilience and patience.*
- Learning requires exploration of one's identity. *This principle is seen through the career exploration thread. Students explore their own identity in an environment that encourages reflection, with the aid of personal research and the thoughts and ideas of guest speakers who have travelled their own paths to an understanding of identity and fulfillment.*

### **Community Partnerships:**

Relationships with industry insiders at Langley Regional Airport, YVR, Nav Canada, BCIT and others are being built to both support student learning during the course as well as fostering an environment where students could potentially leverage their learning into mentorship or employment opportunities.

### BIG IDEAS

<p>Career-life decisions influence and are influenced by external and internal factors, including <b>global and local trends</b>.</p>	<p>Engaging in networks and reciprocal relationships can guide and broaden career-life awareness and options.</p>	<p><b>Technical knowledge</b> can be used to develop procedures, techniques and technologies that have implications for places of employment.</p>	<p>Developing an industry-specific vocabulary helps us share ideas and construct better questions.</p>
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### Learning Standards

Curricular Competencies	Content
<p>Students are expected to do the following:</p> <p><b>Examine</b></p> <ul style="list-style-type: none"> <li>• <b>Recognize personal priorities and consider their influence on values, actions and preferred futures</b></li> <li>• <b>Research career opportunities and develop an understanding of how to pursue that career</b></li> <li>• <b>Examine the concept of proactive and predictive safety management systems (SMS) and how they can inform our choices</b></li> </ul> <p><b>Interact</b></p> <ul style="list-style-type: none"> <li>• Meet with industry professionals to gain a deeper understanding of the industry and be able to articulate deeper questions</li> <li>• <b>Collaborate with a mentor</b> to inform a greater understanding of one aspect of the industry.</li> </ul>	<p>Students are expected to know the following:</p> <p><b>History of Flight</b></p> <ul style="list-style-type: none"> <li>• Key mileposts in the evolution of flight and the barriers aviation pioneers faced</li> <li>• Identify the forces that support innovation</li> <li>• Support an argument for near future advancements in aviation based on known needs and challenges and draw inferences to changing career opportunities.</li> </ul> <p><b>Airframes, Powerplants and Engines</b></p> <ul style="list-style-type: none"> <li>• Be able to confidently use a lexicon of aviation words necessary for further discourse in aviation</li> <li>• Understand and describe the differences between aircraft categories, classes, and types</li> <li>• Understand and be able to describe the differences between various powerplant types, e.g. horizontally opposed, radial, turbo-prop and turbo-jet</li> </ul>

**Experience**

- Engage in real-world activities such as **navigation planning, weight and balance**, maintenance procedures and aerodynamics experiments.
- Engage in place-based learning through field trips to the local airport, maintenance facilities, museums, and/or Nav Canada sites.

**Share**

- Design, assemble and create a **capstone project** and share it with the class and a **personal witness**.

- Explain the operation of select aircraft instruments and their respective limitations

**Theory of Flight**

- Understand and describe the mechanics of lift, drag, thrust and weight
- Analyze airfoil profiles for fitment with specific applications
- Analyze specific aircraft for specific roles

**Meteorology**

- Be able to confidently use a lexicon of aviation words necessary for further discourse in meteorology
- Understand how weather systems develop
- Understand and explain how weather affects flight planning

**Navigation**

- Be able to confidently use a lexicon of aviation words necessary for further discourse in navigation
- Analyze a proposed route and create a suitable flight plan
- Describe how aircraft type, weather, airspace and topography inform flight planning
- Understand and describe how dead-reckoning, pilotage and instrument navigation inform flight planning

**Safety Management**

- Find and analyze accident, incident or occurrence reports and make recommendations
- Understand the philosophy of modern safety management systems (SMS)

**Air Law**

- Have a working knowledge of the body of aviation law in Canada
- Correlate specific regulations with various aircraft operations

### Career Explorations

- Describe the breadth of aviation careers available
- Evaluate various career options based on personal preference, experience and required training
- Calculate the cost of training for a specific career and estimate the expected remuneration
- Create a resume and cover letter appropriate for a chosen career choice

### Big Ideas – Elaborations

**Global and local trends:** Research and understand how modernization, globalization and hiring practices over time change supply and demand for skilled workers.

**Technical knowledge:** Specifically, develop a working understanding of the common technical terms for general aviation

### Curricular Competencies – Elaborations

#### Recognize personal priorities and consider their influence on values, actions and preferred futures

- Sample activities: Explore through research, interactions with industry representatives and a mentor how certain aviation related professions correlate with specific lifestyles, e.g. travel, shift work, behavior becoming.
- Sample questions: What criteria are available to evaluate career/personal preference fitment?

#### Research career opportunities and develop an understanding of how to pursue that career

- Sample activities: Using Transport Canada and aviation publications together with conversations with industry representative, research one or more specific aviation career possibilities and possible paths to that career.
- Sample questions: What steps do I need to take now, and in the next five years to achieve a specific aviation career?

#### Examine the concept of proactive and predictive safety management systems (SMS) and how they can inform our choices

- Sample activities: Examine an SMS to see how it functions to support a safety-based environment.
- Sample questions: How might an SMS be used to [increase safety at your current work place / reduce bullying at your school / other?

#### **Collaborate with a mentor**

- Sample activities: Find a person from within the industry and establish a career-based dialogue.
- Sample questions: How can a mentor create a foundation for networking? How can a mentor help me evaluate my career path decisions?

#### **Navigation planning**

- Sample activities: Considering aircraft performance, airspace and prevailing and forecast meteorological conditions, plan a trip from a to b and discuss considerations
- Sample questions: How can existing tools aid the safe planning of a trip? What risks and hazards can be predicted and what measures could be taken to mitigate them?

#### **Weight and balance**

- Sample activities: Using physical and mathematical models, explore the effect of weight and arm in relationship to moment.
- Sample questions: How does weight and arm affect moment? How does weight and C of G affect performance?

#### **Capstone Project**

- Prescribed activity: The student will engage in a research project that expands their understanding of an area of aviation of their interest, using online, print and interview/mentor-based information. The research will be based on a proposal (rationale) and be presented to the class using a presentation media of their choice. Presentations are witnessed by the class and a person or persons of the student's choice.

#### **Personal witness**

- A witness is a person of the student's choice who observes and celebrates learning. The witness could be a family member, an industry mentor, or a trusted teacher or administrator. A witness shares the value of the learning and increases the student's self-efficacy as their work is worthy of examination and acclaim.

## Content – Elaborations

Sample topics: As indicated in Learning Standards: Content

### **Recommended Instructional Components:**

While many view aviation as just flying, the breadth of available careers in aviation is difficult to measure. Likewise, the diversity of those drawn to careers in aviation is accordingly wide. For this reason, Aviation Explorations 12 is intentionally general with a great deal of flexibility in student assessment, multiple modalities of instruction, and places a priority on student choice in the capstone assignment.

Curriculum will be delivered through:

- Direct instruction
- Interactive instruction
- In-class discussion, group interaction and cooperative learning
- Place-based learning
- Project-based learning
- Hands on opportunities, inspection and analysis
- Aviation related guest speakers
- Guided independent investigation
- LMS support for class notes, assignments, and a-synchronous teacher support.

### **Recommended Assessment Components: Ensure alignment with the [Principles of Quality Assessment](#)**

Formative assessment, both formal and informal, is key to student success in this course based on its student-centricity. Supporting student needs, interests and career objectives, the teacher may assess classroom participation, written quizzes, project work, etc. to support learning. The capstone project will form a significant portion of the summative assessment in this course. Again, due to the breadth of this course and the potential diversity of learners, it is expected that the possible choices of projects will demand professional creativity in the creation of summative assessment that supports both assessment for and of learning.

### **Learning Resources:**

Online resources:

- LEC Online Learning Management System (Moodle)
- Canadian Aviation Regulations, <http://www.tc.gc.ca/eng/acts-regulations/regulations-sor96-433.htm>
- Transport Canada Aeronautical Information Manual, <http://publications.gc.ca/site/eng/283866/publication.html>
- Study and Reference for the Canadian Private Pilot Licence (This site shows the material required for the Canadian private pilot licence.) <http://www.tc.gc.ca/eng/civilaviation/publications/tp12880-menu-5523.htm>
- Transport Canada - Careers in Aviation <https://www.tc.gc.ca/eng/civilaviation/opssvs/secretariat-207-1237.htm>

Print Resources:

- Flight Training Manual, 4th Edition. Transport Canada

- From the Ground Up, Aviation Publishers Co. Ltd.
- Vancouver VTA (AIR 1901), (aviation chart, 250,000:1)
- Vancouver VNC (AIR 5004), (aviation chart, 500,000:1)