

**DATE:** February 15, 2022

**TO:** Board of Trustees

**FROM:** Darrel Robertson, Superintendent of Schools

**SUBJECT:** Establishment of Science, Technology, Engineering and Mathematics (STEM) Alternative Program

**ORIGINATOR:** Kathy Muhlethaler, Assistant Superintendent, Operations and Learning Services

**RESOURCE STAFF:** Lindsay Adrian, Marnie Beaudoin, Sean Jones, Roland Labbe, Valerie Leclair, Ann Parker

**REFERENCE:** [GA.BP Student Programs of Study](#)  
[GAA.BP, Delivery of Student Programs of Study](#)

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## ISSUE

Science, Technology, Engineering and Mathematics (STEM) programming has been implemented in school divisions across North America, and continues to expand. Strong student interest in STEM learning in Edmonton Public Schools warrants the establishment of a STEM alternative program.

## BACKGROUND

A STEM alternative program will provide immersive STEM learning opportunities, enabling students to explore their personal interests, develop skills and knowledge as well as foster creativity and leadership through a focus on STEM. The STEM program will support students to prepare for the future and a successful transition from high school to the world of work and post-secondary. The STEM alternative program will support the Division's Career Pathways model.

Initiated in 2015, Career Pathways embodies the [2018–22 District Strategic Plan](#) and the vision of success, one student at a time. Career Pathways fosters growth and success for every student by supporting their journey from early learning through high school completion and beyond, and enhances public education through communication, engagement and partnerships.

The goal of Career Pathways is to provide students with a broad range of learning opportunities that prepare them for their next steps in life—whether that be post-secondary, the world of work or involvement in their community, so they are able to transition from high school to a life of dignity and fulfillment. Students develop a curiosity about the world around them, and grow skills and competencies through rigorous and relevant projects, activities and experiences connected to curricular outcomes.

## RELATED FACTS

- Many Division schools offer a range of STEM learning opportunities. There is currently no Division school offering immersive STEM learning through an alternative program model.
- W.P. Wagner School currently offers a Campus EPSB STEAM (Science, Technology, Engineering, Arts and Math) course. This is a one semester opportunity for students from across Division high schools

to explore STEAM-based learning through the lens of engineering and architecture.

- STEM Collegiate Canada has submitted a charter school application to Alberta Education. The proposed charter school would be located in Edmonton and will initially open with Grade 7 to Grade 12 in September 2022. The proposed charter school will expand to elementary grades in September 2024.

## RECOMMENDATION

**That the Science, Technology, Engineering and Mathematics (STEM) program as a K–12 Division alternative program, effective September 2022, be approved.**

## CONSIDERATIONS and ANALYSIS

### Student Interest and Demand

In the fall of 2021, Career Pathways invited students from Grade 7 to Grade 12 to participate in a student interest survey to gauge student interest in a variety of potential learning opportunities across all five career pathways:

- Art, Design and Communication
- Business and Information Technology
- Construction, Manufacturing and Transportation
- Health, Education and Human Services
- Natural Resources and Environmental Sciences

The information received through this survey is used to support Division planning related to Career Pathways learning opportunities for students.

### Student Responses

18,849 total responses      37.75% of Division population (Grades 7–12)

Students could select their first, second and third choices from a list of 26 areas of interest. The number and percentage of responses indicates first, second and third choices for each area of interest. The areas of interest included on this table represent those that are most closely related to STEM occupations.

Area of Interest	Number/Percentage of Responses	Ranking out of 26
<b>Health Science</b> Studying, researching, and gaining knowledge to improve health, cure diseases, and understand how humans and animals' function. Related Careers: Dietician, Medical Technologist, Dentist, Pharmacist, Doctor, Nurse, etc.	4,492/7.94%	1st
<b>Business and Entrepreneurship</b> Focusing on financial institutions, commerce, retail operations and entrepreneurial endeavors. Related Careers: Entrepreneur, Accountant, Bookkeeper, Administrative Assistant, Economist, Marketer, Sales Manager, etc.	4,267/7.55%	2nd

<b>Computing</b> Developing computer hardware and/or software. Related Careers: Software Developer, Software Test Engineer, Programmer Analyst, Web Developer, Information Technology Specialist, Video Game Developer, etc.	3,888/6.88%	3rd
<b>STEAM (Science, Technology, Engineering, Arts, Math)</b> Using Science, Technology, Engineering, Arts, and Math to tackle challenges and develop solutions. Related Careers: Architect, Engineer, Mathematician, App Developer, Product Designer, etc.	3,813/6.74%	4th
<b>Animal Science and Veterinary</b> Protecting, caring for and conducting research regarding the health and well-being of animals. Related Careers: Veterinarian, Farmer, Animal Trainer, Animal Scientist, Zoologist, Animal Control Worker, etc.	2,421/4.28%	11th
<b>Horticulture and Agriculture</b> Working with garden cultivation and management, learning to grow crops and studying how to raise animals. Related Careers: Landscaper, Farm Worker, Agricultural Engineer, Botanist, Food Scientist, etc.	309/0.55%	25th

Response rates and definitions for all 26 areas of interest are available in the [student interest survey](#) (Attachment I).

### Program Description

The STEM alternative program will deliver the Alberta programs of study through the focus of science, mathematics, engineering and technology and will focus on student-centered learning. Instructional approaches such as project-based learning, design thinking and inquiry will be used across courses and subjects from Kindergarten to Grade 12, to foster authentic, hands-on learning experiences that enable students to research, tackle and solve real world problems in innovative ways. As part of a project approach to learning, students will have the opportunity to share their learning with a variety of audiences such as parents, the community and/or other students.

The STEM program will prepare students to be engaged citizens and to take on leadership roles in a world that demands a high level of knowledge, skills and innovation in technology. The program will seek to provide collaborative learning opportunities with post-secondary institutions, business and industry.

The proposed STEM alternative program reflects the Division’s Career Pathways model.

## Career Pathways Model

The Career Pathways Model fosters growth and success for every student by supporting their journey from early learning through high school completion and beyond, and enhances public education through communication, engagement and partnerships.

The Career Pathways Model is about building awareness, understanding and readiness for a pathway that helps students find dignity and fulfillment in life.

Conversations about Career Pathways will take place throughout a student's journey.



### Kindergarten to Grade 4: Developing Awareness

Students from Kindergarten to Grade 4 will explore their passions, interests and strengths with an emphasis on science, engineering, technology and mathematics. Students will be exposed to a range of curriculum-based STEM learning opportunities through in-class learning, field trips, and community connections to support exploration of passions and interests.

### Grades 5–9: Shaping Understanding

Student awareness of STEM fields and occupations is pursued, as well as the academic requirements of such fields. Student exploration of STEM-related careers begins at this level through STEM-based Career and Technology Foundations (CTF) courses. Students will be exposed to a range of curriculum-based STEM learning opportunities across core and CTF courses, as well as through in-class learning, field trips, and community connections to support exploration of STEM-based fields

### Grades 10–12: Building Readiness

The program focuses on the application of the subjects in a challenging and rigorous manner. Courses and pathways are available in STEM fields and careers, as well as preparation for post-secondary education and employment. Collaboration with post-secondary institutions, business and industry provides students with authentic learning opportunities and experiences. Students are able to select a major area of STEM focus and complete a capping project in their final year.

### Registration

Registrations will follow [HC.AR Student Admission and Enrolment](#). There is no entrance criteria for the STEM alternative program.

### Facilities and Resources

No facility modifications are required to accommodate the STEM alternative program. Career Pathways has available, through a donor contribution, \$120,000 to support innovative teaching and learning. These funds will be available to provide additional supplies, equipment and resources to support the establishment of this program. No additional Division funds will be required.

### Fees

There will not be a STEM program fee. Standard school fees may apply (such as field trips fees, lunch supervision fees, or fees for consumable student course materials, for example).

### Transportation

Edmonton Transit Service (ETS) is the preferred method of transportation for junior and senior high students.

## **NEXT STEPS**

### **Upon approval of the recommendation:**

- Administration will provide a recommendation report for approval to the Superintendent, proposing two school locations to offer the STEM program effective September 2022.
- The two school locations will include a high school and a junior high school offering the STEM program effective September 2022.
- The Division website will be updated to reflect information about the STEM alternative program.
- Once school locations have been confirmed, information about the STEM program will be shared with parents and schools.
- Curriculum and Learning Supports (CLS) will support the identification of curriculum and resources including Locally Developed Courses that will support STEM teaching and learning.
- Career Pathways (CLS) will provide the schools with teacher professional development and explore potential post-secondary, business and industry partnership opportunities.

## **ATTACHMENTS and APPENDICES**

ATTACHMENT I [Student Interest Survey](#)

AP:kd



Participating Students

18849

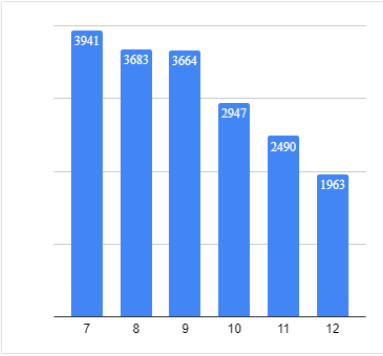
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Participating Schools

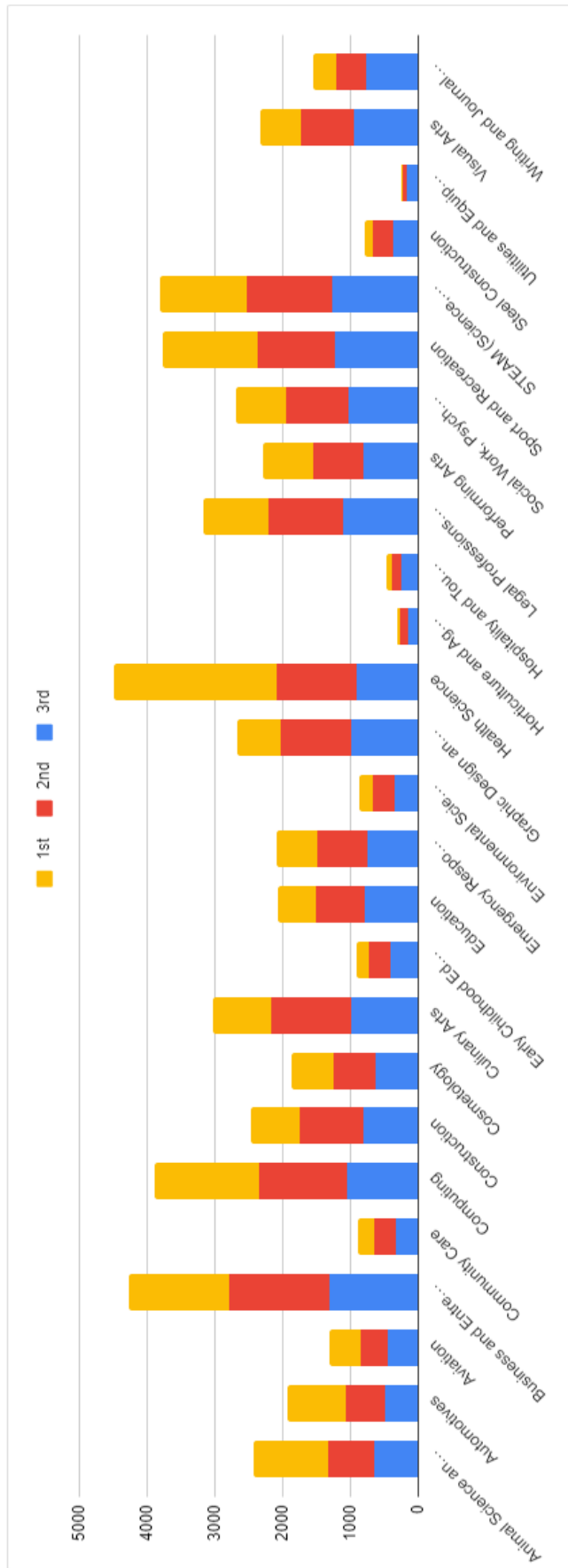
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83.67%

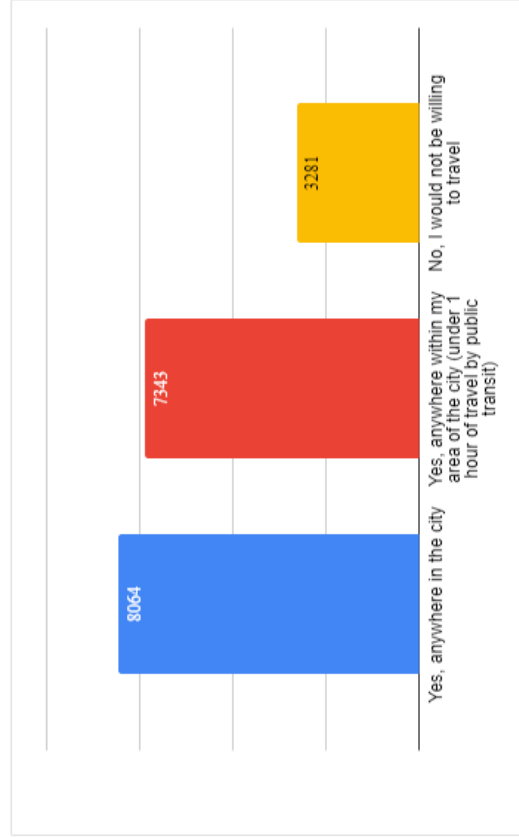
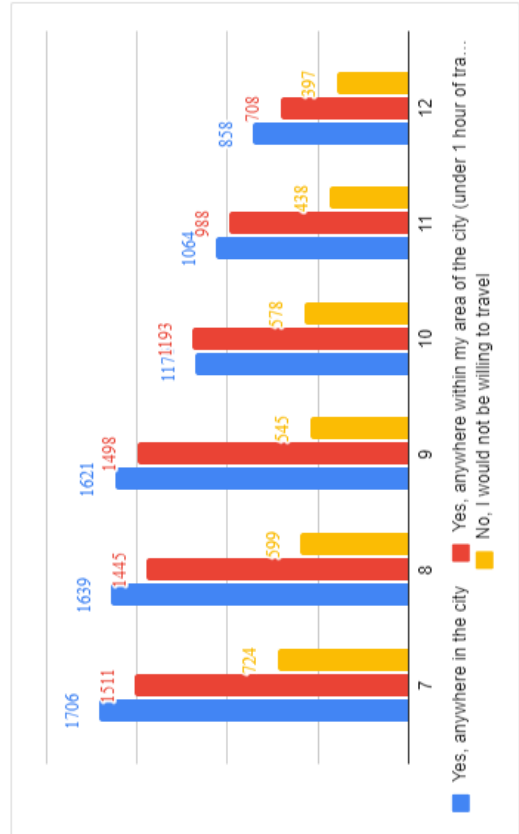
Grade Responses



### Areas of Student Interest



### Willingness to Travel



## Descriptions of Fields of Interest Provided on the Survey

### 1. Animal Science/Veterinary

Protecting, caring for and conducting research regarding the health and well-being of animals.

Related Careers: Veterinarian, Farmer, Animal Trainer, Animal Scientist, Zoologist, Animal Control Worker, etc.

### 2. Automotives

Performing preventative maintenance, diagnosing problems and repairing many types of vehicles.

Related Careers: Auto Body Technician, Automotive Painter, Automotive Repair, Mechanic, Truck and Transport Mechanic, Railcar Repair, etc.

### 3. Aviation

Operating and maintaining aircraft and working in the airline industry.

Related Careers: Aerospace Engineer, Air Traffic Controller, Aircraft Mechanic, Flight Attendant, Pilot, etc.

### 4. Business and Entrepreneurship

Focusing on financial institutions, commerce, retail operations and entrepreneurial endeavours.

Related Careers: Entrepreneur, Accountant, Bookkeeper, Administrative Assistant, Economist, Marketer, Sales Manager, etc.

### 5. Community Care

Providing basic health services for clients who have medical conditions.

Related Careers: Caregiver, Client Care Attendant, Geriatric Health Aide, Home Support Worker, Nursing Assistant, etc.

### 6. Computing

Developing computer hardware and/or software.

Related Careers: Software Developer, Software Test Engineer, Programmer Analyst, Web Developer, Information Technology Specialist, Video Game Developer, etc.

### 7. Construction

Design, planning, creation and maintenance of residential, commercial and industrial buildings. (Indeed.com)

Related Careers: Construction Trades, Concrete Finisher, Drywall Installer, Glazier, Roofer, etc.

### 8. Cosmetology

Improving the appearance of a customer's face, hair, or skin using make-up and beauty treatments.

Related Careers: Hair Stylist, Nail Technician, Salon or Spa Manager, Wedding and Event Stylist, Makeup Artist, Esthetician, etc.

### 9. Culinary Arts

Preparing meals, managing food inventory and eating establishments.

Related Careers: Chef, Food and Beverage Manager, Cook, Caterer, etc.

### 10. Early Childhood Education and Childcare

Working with young children and families in child care centres, school-based programs, home settings or other educational settings.

Related Careers: Daycare Worker, Daycare Supervisor, Early Childhood Educator, Preschool Helper, etc.

### 11. Education

Working to support learning at various stages in people's lives.

Related Careers: Classroom Teacher, Educational Assistant, Post-Secondary Instructor, Professor, Principal, etc.



## 12. Emergency Response

Responding to unexpected or dangerous occurrences and reducing the impact of the event on people and the environment.  
Related Careers: Emergency Medical Responder, Firefighter, Police Officer, etc.

## 13. Environmental Science and Alternative Energy

Gathering data and monitoring environmental conditions. Analyzing environmental problems and developing solutions.  
Related Careers: Environmental Scientist, Geological Engineer, Hydrologist, Climate Change Researcher, Energy Broker, etc.

## 14. Graphic Design and Media

Combining art and technology to communicate ideas through images and layout.  
Related Careers: Graphic Designer, Animator, Web Developer, Creative Director, etc.

## 15. Health Science

Studying, researching, and gaining knowledge to improve health, cure diseases, and understand how humans and animals' function.  
Related Careers: Dietician, Medical Technologist, Dentist, Pharmacist, Doctor, Nurse, etc.

## 16. Horticulture and Agriculture

Working with garden cultivation and management, learning to grow crops and studying how to raise animals.  
Related Careers: Landscaper, Farm Worker, Agricultural Engineer, Botanist, Food Scientist, etc.

## 17. Hospitality and Tourism

Accommodating guests with lodging, food and drink service, event planning, transportation and travel.  
Related Careers: Guest Services, Event Planner, Tour Guide, Banquet Services Staff, etc.

## 18. Legal Professions and Criminology

Researching laws, analyzing data, reviewing evidence and making judicial decisions.  
Related Careers: Lawyer, Criminologist, Crime Scene Investigator, Court Clerk, etc.

## 19. Performing Arts

Conveying artistic messages using voice, body or objects.  
Related Careers: Actor, Director, Makeup Artists, Music Director, Set Designer, Producer, Dancer, Choreographer, Singer, Costume Designer, etc.

## 20. Social Work, Psychology and Psychiatry

Understanding problems at home, at the workplace, or in the community and identifying strengths, or resources that can help.  
Related Careers: Social Worker, Psychologist, Psychiatrist, Mediator, Community Health Worker, etc.

## 21. Sport and Recreation

Planning, organizing, directing, controlling and evaluating the operations of recreational sports and fitness programs and services.  
Related Careers: Exercise Physiologist, Athlete, Health Educator, Coach, Personal Trainer, Referee, etc.

## 22. STEAM (Science, Technology, Engineering, Arts Math)

Using Science, Technology, Engineering, Arts, and Math to tackle challenges and develop solutions.  
Related Careers: Architect, Engineer, Mathematician, App Developer, Product Designer, etc.

## 23. Steel Construction

Using tools, machines and your hands to make engines, computers, toys, electronic devices, control panels and more.  
Related Careers: Welder, Metal Fabricator, Boilermaker, Millwright, etc.

#### 24. Utilities and Equipment Operation

Operating maintenance equipment and vehicles, such as excavators and loading machines for electricity, gas, water, or sewage.

Related Careers: Equipment Technician, Construction Equipment Operator, Operating Engineer, etc.

#### 25. Visual Arts

Using creative abilities to convey messages through various types of media.

Related Careers: Painter, Sculptor, Art Consultant, Art Historian, Curator, Cartoonist, Fashion Designer, etc.

#### 26. Writing and Journalism

Conveying a message through various types of written media.

Related Careers: Author, Journalist, Broadcaster, Cartoonist, Podcaster, Social Media Influencer, etc.