

Science



Technology



Engineering



Math

STEM



FATHER MICHAEL TROY
Catholic Junior High School

Framework for STEM

This framework ensures a comprehensive, balanced, and student-centred approach to assessment and reporting, aligning with both STEM (Science, Technology, Engineering, Mathematics) programming, Alberta curriculum, and administrative procedures (APs) outlined by the Edmonton Catholic School Division (ECSD).

The Father Michael Troy Catholic Junior High School STEM program is a program integrated into the core learning experience, designed to inspire curiosity and innovation in science, technology, engineering, and mathematics.

Through the STEM program at Father Michael Troy, students will:

- Engage in coding, robotics, and engineering design projects.
- Develop critical thinking and problem-solving skills.
- Collaborate on innovative solutions to real-world challenges.
- Build a strong foundation for future academic and career success.

STEM Vision

At Father Michael Troy, we inspire students to explore Science, Technology, Engineering, and Mathematics (STEM) through a faith-centred approach. By integrating applied learning with real-world applications, we nurture curiosity and problem-solving skills. With a focus on equity and sustainability, we prepare students to become innovative thinkers, engaged global citizens, and compassionate leaders.



Program Pillars

1

Integrated Curriculum

STEM outcomes appear in each core subject; teachers co-plan interdisciplinary sequences anchored by essential questions and local problems.

2

Applied Design & Technology

Regular experiences in coding, robotics, and engineering design through classes and common school-wide challenges.

3

Career Exploration & Partnerships

Monthly career conversations; field experiences (e.g., ECSD Science Showcase; [Skills Canada Alberta Provincial Competition's TryATrade®](#)).

4

Core Subject Challenges

Students regularly dive deeply into concepts within core subjects during half-day or morning intensive challenges that enhance disciplinary thinking, problem solving, and comprehension.

5

Multi-day Cross-Curricular Challenges

Extended interdisciplinary challenges designed collaboratively with partners such as the University of Alberta, Shad, and Games for Change. These multi-day experiences serve as academic extensions that integrate several subject areas, reinforce Alberta's competencies, and connect directly to each grade's Signature Learning Experiences.

6

Assessment, Reflection, & Portfolios

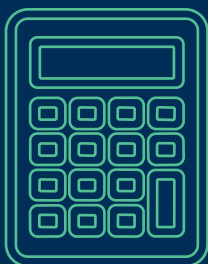
Learning is documented in SpacesEDU portfolios; evidence is tagged to competencies; feedback cycles emphasize growth over time.

7

Professional Collaboration

One Thursday afternoon per month reserved for STEM/PCL collaborative planning, lesson study, and moderation of student work.

STEM Learning in Action



Our STEM students engage in meaningful real-world learning through a combination of community partnerships, monthly core subject challenges, and career exploration.

As part of our commitment to authentic learning, students work with outside organizations such as Shad Canada, the Centre for Mathematics, Science and Technology Education (CMASTE), the University of Alberta, and Games for Change to experience STEM in action—engaging with experts, accessing specialized tools and technologies, and contributing to real research and design experiences beyond the classroom.

Students also take part in teacher-designed core STEM challenges that encourage creativity, design thinking, and problem-solving. These projects push students to explore innovative solutions, collaborate with peers, and apply their learning in practical and imaginative ways.

Career-focused learning is another key component of the program. Students hear from professionals across a range of STEM-related fields, gaining insight into emerging careers and the skills needed to thrive in a rapidly changing world.

Together, these three elements (partnerships, core challenges, and career speakers) reflect the essence of deep learning in our STEM program, helping students build confidence, curiosity, and the competencies that will carry them into the future.

Grade 7

Program Launch (2025–2026)

- **STEM experiences** integrated into each core course across the year.
- **Core Subject Challenge Mornings:** Students participate in short, intensive challenges within subjects such as math, science, ELA, and social studies. These immersions deepen conceptual understanding and develop discipline-specific thinking.
- **Multi-day Cross-Curricular Challenges:** Partner-supported experiences (e.g., University of Alberta, Shad Canada, Games for Change) that blend core subjects and extend classroom learning into real-world, interdisciplinary problem solving.
- **SpacesEDU portfolios** to document evidence and reflection; assessment includes STEM competencies.
- **ECSD Science Showcase/Fair** visit to celebrate inquiry and invite authentic audiences.
- Optional enrichment: Beaver Computing Challenge (computational thinking; November) and Gauss Contest (mathematical problem solving; May).

Grade 8

Program Expansion (2026–2027)

- Increased depth in design thinking and applied technology.
- **Core Subject Challenge Mornings** that reinforce key disciplinary ideas through hands-on problem solving.
- **Multi-day Cross-Curricular Challenges** co-designed with U of A, Shad Canada, and Games for Change, building toward the grade level signature experience.
- **Experiential Project-Based Learning** builds real-world skills through hands-on exploration.
- **SpacesEDU portfolios** to document evidence and reflection; assessment includes STEM competencies.

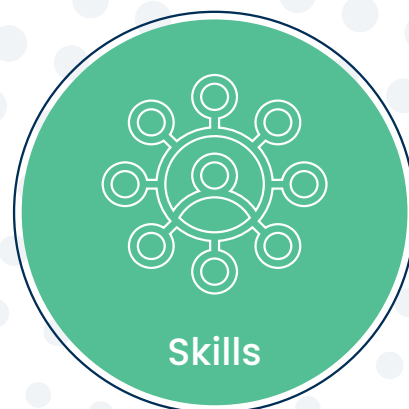
Grade 9

Summit STEM (2027–2028)

- **Core Subject Challenge Mornings** that prepare students for complex, authentic issues.
- **Multi-day Cross-Curricular Challenges** integrating humanities, science, math, and technology as preparation for the Summit Capstone.
- **Summit STEM Capstone** addressing a real community challenge; public exhibition with partner feedback.
- **Skills Canada Alberta** field trip (Provincial Competition) for career exploration, Skill City, and presentations.
- **SpacesEDU portfolios** to document evidence and reflection; assessment includes STEM competencies.
- **Entrepreneurial Focused Showcase**

STEM Competencies

Competencies encompass the knowledge, skills, and attributes that students develop and apply for effective learning, living, and working. They enhance foundational literacy and numeracy and are relevant across all subjects (new LearnAlberta, 2024). In the context of STEM education, these competencies integrate scientific inquiry, technological proficiency, engineering design, and mathematical reasoning (Bybee, 2018). Together with learning outcomes, they “prepare Alberta students for successful and fulfilling lives and to make meaningful contributions to their communities and the world. The Competency Progressions identify behaviours that students may demonstrate by the end of the divisional age range” (new LearnAlberta, 2024).



STEM Competency Reporting

The competencies that will be going into PowerSchool are the new LearnAlberta Competencies. As noted above, competencies are combinations of knowledge, skills, and characteristics that students develop and apply for successful learning, living, and working. They emphasize aspects of learning that apply within and across all subjects and enhance foundational literacy and numeracy. Competencies work together with learning outcomes to prepare Alberta students for successful and fulfilling lives and to make meaningful contributions to their communities and the world.

The homeroom teacher will assign students indicators of success on each of the competencies in PowerSchool at the end of January and June.



Critical Thinking involves reasoning logically to analyze and synthesize new knowledge with existing knowledge in a coherent way.



Problem Solving involves selecting strategies and resources to move from what is known to what is sought.



Research and Managing Information involves research skills as well as organizing and using information for specific purposes.



Creativity and Innovation involves generating and applying knowledge and skills to create something new of value.



Communication involves sharing ideas through oral, written, or non-verbal media.



Collaboration involves working with others to achieve worthy common goals.



Citizenship involves participating in the institutions of our society as educated citizens. Students share responsibilities and approach the world with empathy, intellectual curiosity, and humility.



Personal Growth and Well-being involves managing emotional, intellectual, physical, social, and spiritual aspects of living well. Students develop character and talent and apply the virtues of wisdom, courage, self-control, justice, charity, and hope.

STEM Competency Reporting



Teacher View

The competencies will live in the “Homeroom” section in PowerTeacherPro. There will be three indicators of success for reporting on competencies:

- SC = Shows Consistently
- SP = Shows Progress
- RG = Requires Growth

To assign indicators of success, there are a couple of ways teachers will be able to do this:

Option 1 – Outcomes Page

In the Homeroom section of PowerTeacherPro, go to “A+ Grading” > “Outcomes”. You will see all students and all competencies and can assign an indicator of success by clicking in the appropriate cell and using the score codes on the right.

Class Grade: Y1		Calculation: Total Points				
Grade Scale Type: (SC - RG)		Grade: -- -- --				
STUDENT (30)	Y1	COMP.1	COMP.2	COMP.3	COMP.4	COMP.5
1. Albert Einstein	-- --	SP	SP	SP	SP	RG
2. Marie Curie	-- --	SP	SC	SC	SC	SC
3. Galileo Galilei	-- --	SP	SC	SC	SC	SC
4. Vera Rubin	-- --	SC	SC	SC	SC	SC
5. Louis Pasteur	-- --	SC	SC	SC	SC	SC
6. Rachel Carson	-- --	SC	SC	SC	SC	SC
7. Alexander Graham Bell	-- --	SP	SP	SP	SP	SP
8. Katherine Johnson	-- --	SP	SP	RG	SP	SP
9. Isaac Newton	-- --	SC	SC	SC	SC	SC
10. Maria Goeppert Mayer	-- --	SC	SC	SC	SC	SC
11. Neil Degrasse-Tyson	-- --	SC	SC	SC	SC	SP
12. Rosalind Franklin	-- --	SC	SC	SC	SC	SP
13. Stephen Hawking	-- --	SC	SC	SC	SC	SC
14. Hedy Lamarr	-- --	SC	SC	SC	SC	SC
15. Ernest Everett Just	-- --	SC	SC	SC	SC	SC
16. Jane Goodall	-- --	SP	SP	SP	SP	SC
17. Nikola Tesla	-- --	SC	SC	SC	SC	SC

Option 2 – Student by Student

In the Homeroom section of PowerTeacherPro, go to “Students” > “Outcomes Progress” > Select a Student. You will see all the competencies for that student, as well as any associated comments, and can assign indicators of success by clicking on a cell and using the score codes on the right.

Regardless of which option is used, there will be a little black triangle in the corner of any cell where data has been entered; this is expected. From one reporting period to another, if a student has shown progress (e.g. moved from an RG to an SP), the lower indicator of success can simply be replaced with the higher indicator of success in the cell; a comment could be provided to indicate this progress.

7B Homeroom STEM 7B		
COMP.1 - Critical Thinking: Reasons logically to analyze and synthesize n...		SP
COMP.2 - Problem Solving: Selects strategies and resources to move fro...		SP
COMP.3 - Research and Managing Information: Uses research skills as w...		SP
COMP.4 - Creativity and Innovation: Generates and applies knowledge an...		SP
COMP.5 - Communication involves: Shares ideas through oral, written, or ...		RG
COMP.6 - Collaboration involves: Works with others to achieve worthy co...		SP
COMP.7 - Citizenship involves: Participates in the institutions of our societ...		SP
COMP.8 - Personal Growth and Well-being involves: Manages emotional, i...		SP

STEM Competency Reporting



Parent View

The parent landing page on PowerSchool gives an overview of student grades and attendance. From that page, they will need to click on the tab called "Outcomes Grades."

Exp	Last Week					This Week					Course	S1	S2	Y1	Absences	Tardies
	M	T	W	H	F	M	T	W	H	F						
P1(A) P2(C) P4(B) P6(B,E)															2	0
P2(A,E)															0	0
NA(A-E)															0	0
P1(B) P3(D) P5(E)															2	0
P1(B) P3(D) P5(E)															2	0
P1(C) P3(A) P4(D-E)															1	0
P5-P6(C)															0	0

"Outcomes Grades" will take them to the list of current classes in which the student is enrolled. From there, if they click on "Homeroom," they will see the competencies with the indicators of success.

Current Sections

- AM(A-E) PM(A-C,E)Homeroom 06D- 24-25
- NA(A-E)Art 6- 24-25
- NA(A-E)English Language Arts 6- 24-25
- NA(A-E)French as a Second Language 6- 24-25
- NA(A-E)Mathematics 6- 24-25

AM(A-E) PM(A-C,E)Homeroom 06D- 24-25

Outcomes	Y1
HRM.1.1.1 Citizenship: Is considerate and polite	SC
HRM.1.1.2 Citizenship: Accepts responsibility for own actions	SC
HRM.1.1.3 Citizenship: Responds to others in a respectful manner	SC
HRM.1.1.6 Citizenship: Plays well in small and large groups	SC
HRM.1.3.2 Self-Management: Remains focused and on task	SC
HRM.1.3.5 Self-Management: Organizes personal learning materials and space	SC
HRM.1.3.7 Self-Management: Listens attentively during instruction and classroom discussions	SC

Registration & Entrance Requirements

Registration priority is given to resident students. A resident student is one who is Catholic, or has a Catholic parent or guardian, and lives within the school's catchment area.

Non-resident students applying to the Father Michael Troy STEM Program are asked to meet the following entrance requirements for non-resident students:



Teacher Recommendation

A student's current classroom teacher completes the Teacher Recommendation Form. This step helps us gain a fuller understanding of each learner and ensures they are ready to be successful in an enriched STEM environment.



Academic Readiness

Students should be achieving at or above grade level in Grade 6, with developing strengths or a clear interest in:

- Science
- Mathematics
- Technology and problem solving

This helps ensure students are prepared for the increased academic challenge and rigour within the program.



Program Fit

The Father Michael Troy STEM Program is an academic, enriched learning pathway designed to inspire students who are eager to explore STEM concepts more deeply. Students who tend to thrive in this program often show:

- Curiosity and enthusiasm for STEM subjects
- Strong work habits and perseverance
- An interest in collaborative, inquiry-based learning experiences

Making Learning Visible with STEM

SpacesEDU Student Account

Students participate in a weekly STEM reflection through their SpacesEDU account. After completing learning activities, their teacher posts a guided question connected to STEM competency. Students then reflect on what they accomplished during the week, describe their learning process, and make connections to the skills they are developing. This ongoing routine helps students build self-awareness as learners and track their growth throughout the year.



STEM Themes of Study

Each school site will review the STEM themes of study and select the theme(s) that they would like to explore as a community for that school year. Schools may choose to use a common theme across Grades 7, 8, and 9 for the full year, rotate themes at set intervals (for example, by halves or quarters), or assign different goals to each grade level.

Themes	Focus	Examples
Innovation and Design Thinking Refocus on creative problem-solving methods across all disciplines.	Interdisciplinary innovation using iterative processes and creative solutions for real-world challenges.	Engineering prototypes for space exploration, developing creative art-tech installations, or designing educational tools for diverse learners.
Sustainability and Environmental Science Focus specifically on ecological and environmental sustainability.	Exploring solutions to pressing environmental issues through science and technology.	Researching biodiversity conservation strategies, designing carbon capture technologies, or studying urban ecology and its impact on city planning.
Digital Literacy and Emerging Technologies Refocus on foundational skills for engaging with digital tools and technologies.	Developing the skills to navigate, use, and innovate with digital tools effectively.	Creating interactive websites, learning the basics of coding languages, or exploring online security practices.

Themes	Focus	Examples
Artificial Intelligence and Ethical Considerations Expand to address societal, ethical, and human aspects of AI.	Understanding the impact, challenges, and potential of AI on society and individuals.	Debating AI's role in education, analyzing ethical dilemmas in facial recognition, or exploring human-AI collaboration in healthcare.
Engineering for Social Good Refocus on community-centred problem-solving using STEM.	Designing solutions that address equity, access, and human welfare in diverse communities.	Creating low-cost medical devices for rural areas, developing renewable energy sources for off-grid communities, or designing educational games for underserved populations.
The Built Environment Highlight the technical and human aspects of urban design and civil engineering.	Examining how engineering and architecture shape human interaction, sustainability, and functionality in spaces.	Examining how engineering and architecture shape human interaction, sustainability, and functionality in spaces.
Energy and Power Systems Narrow the focus to technical advancements in energy technology.	Investigating innovative approaches to energy generation, storage, and distribution.	Designing energy-efficient buildings, experimenting with hydrogen power systems, or studying battery technologies for renewable energy storage.
Future of Work and Industry 4.0 Highlight the career-readiness and technological shift in industries.	Preparing for the evolving workplace by exploring automation, robotics, and advanced manufacturing.	Building smart factory models, simulating augmented reality-based assembly lines, or creating coding solutions for industrial robots.

Themes	Focus	Examples
Global Challenges and Collaborations Emphasize interdisciplinary teamwork on global issues.	Solving major global challenges by integrating perspectives and leveraging teamwork across cultures and disciplines.	Addressing UN Sustainable Development Goals like water access, creating collaborative STEM projects with schools worldwide, or designing tech solutions for disaster relief.
Food Security and Agricultural Innovation Focus on addressing global food challenges through STEM.	Innovating sustainable farming practices, reducing food waste, and enhancing agricultural productivity.	Designing automated irrigation systems, studying gene-edited crops, or researching alternative protein sources like lab-grown meat.
Human-Centred Design and Accessibility Sharpen focus on inclusivity and improving human lives through technology.	Designing technologies, systems, and environments that prioritize usability, accessibility, and equity.	Developing assistive robots for individuals with disabilities, designing intuitive apps for older populations, or rethinking urban spaces for universal accessibility.
Culture and Identity in STEM Blending STEM with arts and humanities to foster innovative and interdisciplinary thinking.	Exploring how STEM concepts intersect with creativity, culture, and the arts to develop unique solutions and projects.	Designing interactive art installations with robotics, creating music with coding programs, or using engineering to build culturally inspired architectural models.

Implementation Roadmap

PHASE 1

Launch Year



- Integrate familiar Grade 7 STEM across core subjects.
- Participate in SpacesEDU classes and portfolio templates aligned to competencies.
- Confirm partner touchpoints.

PHASE 2

Expansion



- Integrate linked Grade 8; implement experiential project-based learning (starting 2027).
- Expand partner hosted Thursday Experiences and monthly career talks.
- Engage SpacesEDU classes and portfolio templates aligned with competencies.
- Expand partner touchpoints.

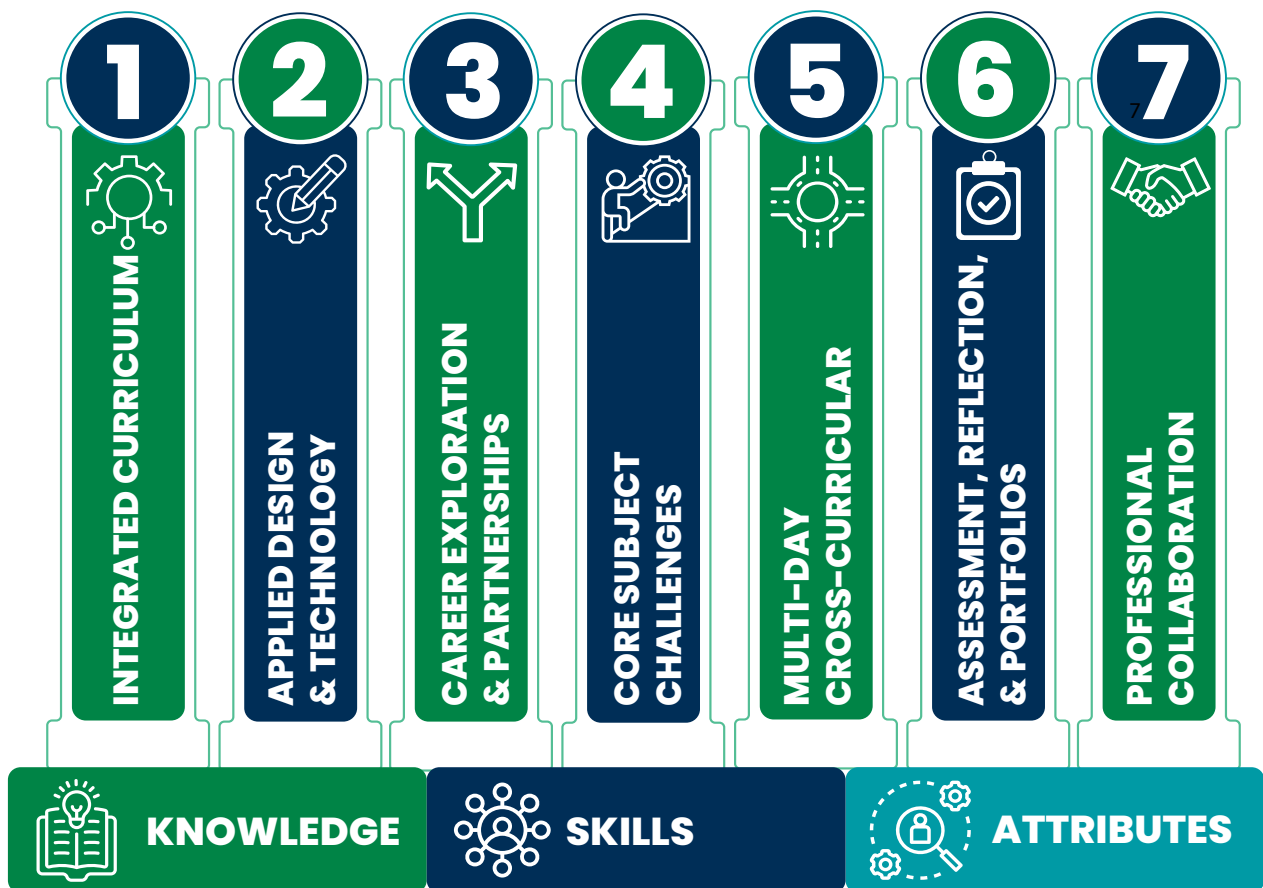
PHASE 3

Full 7–9 Continuum



- Integrate interdisciplinary Grade 9 STEM in core subjects.
- Strengthen cross-grade coherence and moderation; prepare Grade 9 Summit launch.
- Immerse SpacesEDU classes and portfolio templates aligned with competencies
- Amplify partner touchpoints.
- Launch Grade 9 Summit STEM Capstone; formalize public showcase and community review.
- Annual Skills Alberta field trip; publish Annual STEM Impact Report.

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STEM FRAMEWORK





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