

**DATE:** January 22, 2019

**TO:** Board of Trustees

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

**SUBJECT:** Strategic Plan Update: Numeracy

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## ISSUE

The purpose of this Strategic Plan Update report is to provide the Board of Trustees with an overview of the data, strategies and initiatives used in support of high quality teaching and learning of numeracy and mathematics.

## BACKGROUND

In 2018, Edmonton Public Schools formally reaffirmed the District Strategic Plan for the 2018-2022 term. The District Strategic Plan has three priority areas with supporting goals and outcomes. The plan provides common direction and alignment between the work of the Board of Trustees, the Superintendent of Schools and District staff. The plan serves as the foundation for a District culture of evidence-based decision making, assurance and accountability.

To demonstrate the District's commitment to transparency and accountability, Strategic Plan Update reports were introduced in 2016–2017 as an extension of the Annual Education Results Report (AERR). The reports are intended to provide the Board of Trustees with detailed progress towards the goals and outcomes of our Strategic Plan.

## CURRENT SITUATION

This Strategic Plan Update report reflects the work in support of high quality numeracy and mathematics teaching and learning and is in direct response to Priority 1 Goal Two of the 2018-2022 District Strategic Plan, P1 G2: More students demonstrate growth and achieve student learning outcomes with a specific focus on literacy and numeracy.

## KEY POINTS

This Strategic Plan Update report provides the Board of Trustees with an overview of work in support of numeracy and mathematics

## ATTACHMENTS and APPENDICES

ATTACHMENT I Strategic Plan Update: Numeracy

NP:mh

# Strategic Plan Update

## Numeracy

January 22, 2019

## INTRODUCTION

This Strategic Plan Update Report provides the Board of Trustees with an update on the District's efforts in support of numeracy and mathematics learning. Priority 1 of the District's Strategic Plan 2018-2022 calls for the District to foster growth and success for every student by supporting their journey from early learning through high school completion and beyond and the Outcome of Priority 1 Goal Two of the 2018-2022 District Strategic Plan sets the direction that more students will demonstrate growth and achieve student learning outcomes, with a specific focus on literacy and numeracy.

Educators have long known that confidence and capacity in mathematics and numeracy strengthens the foundation for student competencies and lifelong learning. This report outlines the data, strategies and initiatives the staff of Edmonton Public Schools use in support of high quality teaching and learning of numeracy and mathematics.

## WHAT THE DATA TELLS US

The District uses data to inform decisions about numeracy and mathematics teaching and learning supports. This data, which includes both provincial and District-gathered data, tells a story of growth and opportunity.

The District's Provincial Achievement Testing (PAT) results for Grades 6 and 9 and the Diploma Examination results for Grade 12 (Appendix I) provide the opportunity to analyse District trends in student achievement year-over-year and long term. The District's Mathematics Intervention Programming Tool (MIPI) data (Appendix I) inform programming and areas for potential student interventions. Key results related to these data sets include:

### Grades 6 and 9 Mathematics PATs

- In June of 2017 the province introduced a two-part mathematics exam for Grade 6 Mathematics consisting of Part A (no calculator) and Part B (calculator allowed), and this same format was introduced in June of 2018 for the Grade 9 Mathematics exam.
- Over the past two years, the District has seen a concerning outcome related to Grades 6 and 9 Mathematics results, with fewer students meeting the acceptable standard in Part A compared to Part B for the Grade 6 cohort in 2016-2017 and the Grade 9 cohort this past year. A closer look at these results highlighted a disconnect in student understanding between Part A and Part B of the exam.
- The 2016-2017 Grade 6 Mathematics results identified the need to build further capacity in providing learning experiences that enable students to more strongly develop the skills required to successfully challenge Part A of the exam.
- The 2017-2018 Grade 6 Mathematics results improved over the previous year's results at both the acceptable standard and standard of excellence.
- The 2017-2018 Grade 9 Mathematics results indicate that we still have work to do to support strong student outcomes on both Part A and Part B of the mathematics exam, as the District saw a decline in both the overall percentage of students who achieved the acceptable standard and the standard of excellence.

### Mathematics Diploma Exams

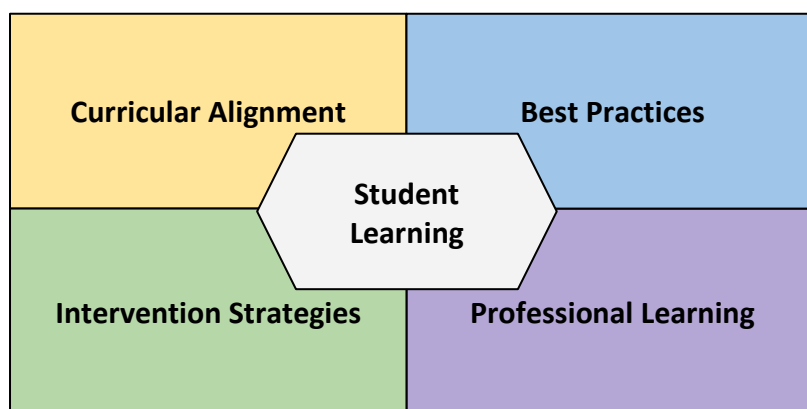
- Overall, the District saw more students challenging Mathematics Diploma Exams in 2017-2018, with 3,996 students challenging the 30-1 exam and 2,510 students challenging the 30-2 exam. These numbers reflect a continued increase in the number of students challenging at the 30-2 level and fewer students at the 30-1 level. This shift in exam participation reflects students navigating their own math and numeracy learning journeys.
- The 2017-2018 Mathematics 30-1 results showed improvement at both the acceptable standard and standard of excellence. District results showed strength in the area of standard of excellence, exceeding that of the provincial average. The District's results at the acceptable standard were comparable to the provincial average.
- Mathematics 30-2 results have remained steady, and continue to reflect strength in the area of standard of excellence and are higher than provincial results for both acceptable standard and standard of excellence.

## MIPI

- MIPI results are used to inform student programming and serve as one indicator students may require interventions in mathematics. These results have remained consistent with the previous school year.

## TEACHER COLLABORATION COMMITTEE FOR MATHEMATICS

Some of the District's results related to numeracy and mathematics signalled the need for an in-depth dive into this area. To gain this deeper perspective, the Superintendent hosted a Teacher Collaboration Committee (TCC) in February of 2018. The purpose of this TCC was "to provide grassroots direction to inform the work of improving mathematical achievement District-wide." Over 60 teachers and principals participated in the TCC to provide input on how to improve student achievement in mathematics, with a particular focus on improving the downward trend occurring in Divisions II and III. From this meeting, a committee consisting of 32 teachers representing the 13 catchments, eight principals and four central teacher consultants was formed. The purpose of the committee was to build upon the feedback and ideas generated during the TCC. The structure and composition of the committee supports a deliberate interplay and collaboration among schools, catchments and central, making it a genuinely systemic response to improving numeracy and mathematics learning outcomes. The TCC for Mathematics identified four major themes intended to address critical areas of focus for student success. The committee has broken out into four working groups to address each of the following themes:



### Curricular Alignment

Teachers identified vertical and horizontal curricular alignment of learning outcomes across grades and divisions as an area of focus for developing teacher capacity and supporting students' gradual building and expansion of skill sets in numeracy and mathematics. Professional learning opportunities and dedicated, ongoing collaboration time at the school and catchment level were highlighted to support the following opportunities in curricular alignment:

- Development of a common language across grades and divisions to support skill and concept development.
- Development of teacher understanding of learning outcomes in previous and next grade/course level.
- Development of common understanding of time and focus required for different learning outcomes, understanding previous and next grade/course level related learning outcomes.
- Communication of potential gaps and emphasis in the scope, sequence and balance of skills and concepts in numeracy and learning outcomes in mathematics.
- Communication of performance standards across grades/courses at the beginning and end of grades and courses.

### Best Practices

Teachers emphasized the need to determine a process for the identification and sharing of best practices emerging across the District to support students. Teachers expressed a need to identify and evaluate research and evidence-based practices to assist with selecting from the extensive number of available numeracy and mathematics strategies and resources. This working group is exploring the following suggestions and initiatives:

- The development of a District repository of vetted strategies and resources, including a common diagnostic tool that could serve to increase awareness of available resources and strategies, increase teacher efficiency and support teacher collaboration.
- The identification of mentorship and capacity building opportunities in the area of numeracy and mathematics through lead teachers, similar to the literacy lead teacher model.
- Identification of best practices including the use of manipulatives, brain research, differentiation, grade/division transition and summative/formative assessment.

### **Intervention Strategies**

Teachers identified intervention strategies as an area of opportunity for the District. They expressed concerns about navigating available resources and strategies to identify appropriate evidence-based interventions.

Teachers indicated that numeracy needs an emphasis similar to literacy within the District and suggested that many of the existing literacy structures can be used as models, including:

- Diagnostic assessment tools aligned with the mathematics program of studies.
- Multiple interventions and strategies to address diverse learners and various grade levels using the Pyramid of Intervention as a construct to guide this work.

### **Professional Learning (PL)**

The committee identified a need for expertise around intervention strategies, as well as for support for teachers to build their confidence and foster a mindset of positivity towards the teaching of numeracy and mathematics.

This working group is exploring a variety of themes, including:

- The request for more numeracy-focused PL at the elementary level.
- School or catchment-wide PL to better engage all teachers in building student growth mindset and resiliency in numeracy and mathematics, including increasing students' appreciation for process skills and multiple avenues for problem solving.
- Teachers' ability to flexibly offer multiple interventions and strategies to support diverse learners.

The work of the TCC is deepening collaboration across the District around the topic of numeracy and mathematics. TCC participants take the work of the TCC back to their catchments to build awareness and capacity. As teachers work together across grades, divisions, schools and catchments to share effective strategies, they collectively build common understanding, vocabulary and assessment expertise.

The work of the TCC does not happen in isolation but takes into consideration and aligns with other District level numeracy and mathematics initiatives such as the [Numeracy Guiding Document and Action Plan 2015-2019](#).

## **CONTINUING SUPPORTS AND NEW OPPORTUNITIES**

Additional to the TCC, there are other District initiatives that promote quality teaching and learning in the area of numeracy and mathematics instruction. This work includes:

### **Collaborative School and Catchment Work**

- Ten of thirteen catchments currently have goals related to numeracy as part of their collaborative catchment plans. These plans include mathematics/numeracy professional learning, such as:
  - targeted numeracy interventions
  - Guided Mathematics strategies
  - mathematics literature and the use of mathematics journals
  - mathematics stations and the use of manipulatives
  - sprint methods to improve short term outcomes
- Schools and catchments are also examining the use of common mathematics assessments. To support this work, some catchments have established mathematics lead teachers and have encouraged teachers to engage in communities of practice.

- To increase collaboration across high schools and catchments, high school mathematics department heads have been holding regular meetings.
- Collaboration days for teachers of Mathematics 10-3, Mathematics 20-3 and Mathematics 30-3 are scheduled throughout 2019.

### Professional Learning

- Key professional learning sessions and series for teachers, such as the Foundations of Mathematics and A Guided Approach to Mathematics, have been widely implemented to build foundational knowledge and skills for mathematics instruction. This year, Foundations of Secondary Mathematics was delivered for the first time.
  - In 2017-2018, Curriculum and Resource Support provided numeracy and/or mathematics supports to 1,778 teachers; this includes professional learning sessions, 115 coaching supports and 142 consultations. To date in this 2018-2019 school year, 1,604 teachers and administrators have attended mathematics/numeracy professional learning sessions.
  - Summer Institutes and District-wide mathematics professional learning days continue to be provided; 630 K-12 staff attended the November 26, 2018, professional learning day focused on numeracy. Fifteen teachers attended the Mathematics Summer Institute series in August 2018.

### Supporting Resource Development

- Numerous resources to support mathematics are under development, revisions or are now available, including:
  - Financial Literacy Handbook for teachers is in development and will be available by March 2019.
  - Maximizing Math packages for Kindergarten to Grade 4 are under revision.
  - Literacy in mathematics resources such as [Key Vocabulary Grades K - 9](#) have been developed and are now available for teachers in English, German and Spanish.
  - High-impact resource collections have been compiled, such as [Sample Resources to Support Mathematics \(7-9\)](#).
  - Online learning modules, including Guided Approach to Mathematics, are currently under development.
  - Collaboratively developed high school resources, such as a supplementary questions and activities resource for Mathematics 20-2 and Mathematics 30-2, will be published.

### Parent Supports

- Resources for parents continue to be developed and made available, including:
  - The app for parents, [EPSB Together](#), which is frequently updated with new K-12 numeracy activities.
  - The “More Topics For Parents” section on the epsb.ca website provides information and resources for parents, such as numeracy tips sheets.
  - As part of the Junior High Online Resource Initiative, 29 junior high digital homework support videos, collaboratively designed by Grades 6 to 10 teachers, are currently under development to support the learning of mathematics concepts outside of the classroom.

### Assessment

- The Assessment Tools in Mathematics Literature Review, developed for the District by the University of Alberta, continues to guide the development of the mathematics interventions, including the TCC’s intervention strategies working group.
- The TCC committee is developing a test question bank to replicate the experience of Part A of the PAT for Grades 4 to 9. This test bank is expected to be made available to schools for the end of spring break.

### New Provincial Curriculum

- District resources and professional learning sessions to support numeracy integration across subject areas are under development and will soon be available. These resources and sessions will include high-impact

instructional approaches, strategies, resources and assessment practices that support the development of both literacy and numeracy across curricular subjects.

## NEXT STEPS

As educators, we know that the development of numeracy skills across all curricular areas supports our students to have the ability, confidence and willingness to engage with quantitative and spatial information to make informed decisions in all aspects of daily living. We also know that providing high quality learning opportunities in the area of mathematics supports students to manage mathematical data, projections, inferences and apply systematic thinking.

Fostering these foundational skills and concepts for students requires a comprehensive and collaborative approach. With the establishment of the TCC for Mathematics and the four working groups of curricular alignment, best practices, intervention strategies and professional learning, the District is demonstrating its commitment to targeted, research-based and practical strategies in support of numeracy and mathematics.

Going forward the District will build on the learnings and momentum of the TCC and continue to work collaboratively between Central, catchments and schools to support a system-wide approach to quality instruction in numeracy and mathematics. The work of the TCC working groups will help provide direction to which continuing efforts and new opportunities are best situated to support student learning in numeracy and mathematics

## PROVINCIAL ACHIEVEMENT TESTS AND MATHEMATICS INTERVENTION PROGRAMMING TOOL (MIPI) RESULTS

### PROVINCIAL ACHIEVEMENT TESTS (GRADES 6, 9 AND DIPLOMA EXAMINATIONS)

Alberta Education Accountability Pillar	Results (in percentages)					Evaluation		
	2013-14	2014-15	2015-16	2016-17	2017-18	Achievement	Improvement	Overall
<b>NUMERACY</b>								
Overall percentage of students in Grade 6 who achieved the acceptable standard and the standard of excellence in Math on Provincial Achievement Tests (overall cohort results).	77.4 (n= 5,943)	76.2 (n= 6,316)	75.6 (n= 6,385)	70.8 (n= 6,598)	73.8 (n= 7,057)	Intermediate	Maintained	Acceptable
	20.5 (n= 5,943)	18.2 (n= 6,316)	17.9 (n= 6,385)	16.1 (n= 6,598)	17.2 (n= 7,057)	Intermediate	Maintained	Acceptable
Overall percentage of students in Grade 9 who achieved the acceptable standard and the standard of excellence in Math on Provincial Achievement Tests (overall cohort results).	70.8 (n= 5,707)	70.2 (n= 5,959)	73.0 (n= 5,954)	70.3 (n= 6,117)	63.6 (n= 6,543)	Intermediate	Declined Significantly	Issue
	24.2 (n= 5,707)	23.9 (n= 5,959)	24.6 (n= 5,954)	26.7 (n= 6,117)	20.8 (n= 6,543)	High	Declined Significantly	Issue
Overall percentage of students who achieved the acceptable standard on Math 30-1 diploma examinations (overall results). <sup>9</sup>	74.0 (n= 4,325)	76.1 (n= 4,187)	72.2 (n= 4,119)	73.8 (n= 4,023)	77.8 (n= 3,996)	n/a	n/a	n/a
Overall percentage of students who achieved the acceptable standard on Math 30-2 diploma examinations (overall results). <sup>9</sup>	71.3 (n= 2,139)	76.0 (n= 2,279)	79.1 (n= 2,396)	77.4 (n= 2,255)	77.4 (n= 2,510)	n/a	n/a	n/a
Overall percentage of students who achieved the standard of excellence on Math 30-1 diploma examinations (overall results). <sup>9</sup>	29.0 (n= 4,325)	33.1 (n= 4,187)	28.6 (n= 4,119)	32.6 (n= 4,023)	37.2 (n= 3,996)	n/a	n/a	n/a
Overall percentage of students who achieved the standard of excellence on Math 30-2 diploma examinations (overall results). <sup>9</sup>	15.1 (n= 2,139)	18.3 (n= 2,279)	21.2 (n= 2,396)	20.3 (n= 2,255)	20.4 (n= 2,510)	n/a	n/a	n/a

#### Notes

9. Caution should be used when interpreting evaluations and results over time for Mathematics 30-1/30-2, as equating was not in place until the 2016/17 school year. Alberta Education does not comment on province wide trends until it has five years of equated examination data.

10. Percentage of students in Grades 4-12 reporting they get help with reading and writing when they need it results were derived from Accountability Pillar data.

### MATHEMATICS INTERVENTION PROGRAMMING TOOL (MIPI) DATA

District Indicators - Interventions MIPI	Results (in percentages)				
	2013-14	2014-15	2015-16	2016-17	2017-18
Percentage of students who may need interventions based on the District's Math Intervention Programming Initiative (MIPI)*	n/a	28.0	24.5	30.0	29.4

\*The MIPI was implemented in the 2014-2015 school year for Grades 2-9, and was expanded to include Grade 10 students in 2015-2016. Students of concern achieved <60% or wrote below grade level.