



Grade 9 Assessment of Mathematics 2003–2004

Provincial Report

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Grade 9 Assessment of Mathematics, 2003–2004

Provincial Report

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Marguerite Jackson
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Foreword

Mathematics teaching and learning in Ontario schools, and the concept of mathematical literacy, have been the focus of research, study and review at every level of schooling.

With the recent release of the expert panel report on Grades 4 to 6 mathematics, the Ministry of Education has completed a comprehensive review of mathematics from kindergarten through Grade 12, which has drawn on the expertise of educators and researchers from across the province. In addition, a wide variety of supports and resources, based on the recommendations of the expert panels, have been developed and delivered to teachers throughout Ontario.

The Grade 9 Assessment of Mathematics, conducted during the winter and spring terms of 2004 at schools in the province's district school boards and provincial school authorities, is an important component of our shared commitment to using data as a guide for planning programs that help Ontario students find achievement and success in mathematics.

This report on the results of the Grade 9 Assessment of Mathematics provides an overview of the 2003–2004 results. It examines changes in the percentage of students in both the academic and the applied programs who achieved the province's established standard of Level 3, as well as other levels of achievement. It also presents results for students with special needs and English as a second language (ESL) and English literacy development (ELD) learners and compares results by gender.

This year's assessment results suggest that school and board strategies for improvement are having a positive impact. In both academic and applied mathematics courses, the percentage of students performing at or above the provincial standard has increased over the past year.

In the academic program:

- 68% of the students performed at or above the provincial standard.
- 17% of the students performed at Level 2.
- The percentages of both female and male students performing at or above the provincial standard have increased over the past three years, with little or no gap between the achievement levels of boys and girls.
- The percentage of ESL/ELD learners performing at or above the provincial standard increased this year after having been relatively stable the previous two years.
- The percentage of students with special needs performing at or above the provincial standard has remained stable for the past two years.

In the applied program:

- 26% of the students performed at or above the provincial standard, representing an increase this year after being stable the previous two years.
- 37% of the students performed at Level 2.
- The percentages of female and male students performing at or above the provincial standard have increased this year, with a very small gender gap in favour of males.
- The percentage of ESL/ELD learners performing at or above the provincial standard increased this year after having been stable the previous two years.
- The percentage of students with special needs performing at or above the provincial standard has increased over the past three years.

The numeracy initiatives in place across the province have used data as a tool to inform professional practice and dialogue. Continuing attention to EQAO test data and other school data will assist in ensuring that schools are places where students find success.

A companion document to this report, *Grade 9 Assessment of Mathematics, 2003–2004, Provincial Results: Detailed Data Tables*, may be found on the EQAO Web site, www.eqao.com.

I would like to acknowledge the ongoing work of teachers and school leaders across the province who have contributed, individually and collectively, to improved student achievement. There are many examples of schools and school boards where data are being used. Within this report, we profile two examples of this work.

A handwritten signature in black ink, reading "Marguerite Jackson". The script is fluid and cursive, with the first name and last name clearly legible.

Marguerite Jackson
Chief Executive Officer

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Jerry G. Ponikvar
Chair, Board of Directors

Message from the Chair

Mathematical literacy has become an essential foundation for success in our increasingly technological world. Whether preparing for college or university, an apprenticeship program or the workplace, students must have the skills and abilities to thrive in the knowledge economy.

The Grade 9 Assessment of Mathematics is a critical measure of our success in providing those skills and abilities. The Board of Directors is pleased to note that the 2003–2004 results indicate an increase in the percentage of students performing at the provincial standard over the last year in both academic and applied mathematics.

With 68 percent of the students in Grade 9 academic mathematics performing at or above the provincial standard, we have a great deal to be proud of. At the same time, only 26% of the students in Grade 9 applied mathematics achieved these results. We are encouraged that student results in applied mathematics have improved in 2003–2004, following a two-year period of level achievement, and we share with all of our colleagues in education a continuing challenge to meet the needs of this student population.

We are confident that Ontario's teachers and school and board leaders are working hand in hand with the Ministry of Education to enhance the teaching and learning of mathematics, and that the province-wide focus on both numeracy and literacy will have a positive impact on student achievement.

The Grade 9 Assessment of Mathematics conducted by EQAO, an arm's-length agency of the Ontario government, is a critical component of the teaching and learning process, focused on continued improvement. We, along with educators, parents and other partners in the education process, must continue to work together, sharing views about approaches that are working successfully and identifying strategies for improvement in light of the achievement data.

We recognize and value the dedication and expertise of Ontario's educators. I would like also to acknowledge the work of my colleagues on the Board of Directors, the EQAO staff and the members of EQAO's Assessment Advisory Committee.

I know that we share a commitment to providing every student in Ontario with an education of the highest possible quality.

A handwritten signature in dark ink, reading "Jerry Ponikvar".

Jerry G. Ponikvar
Chair, Board of Directors

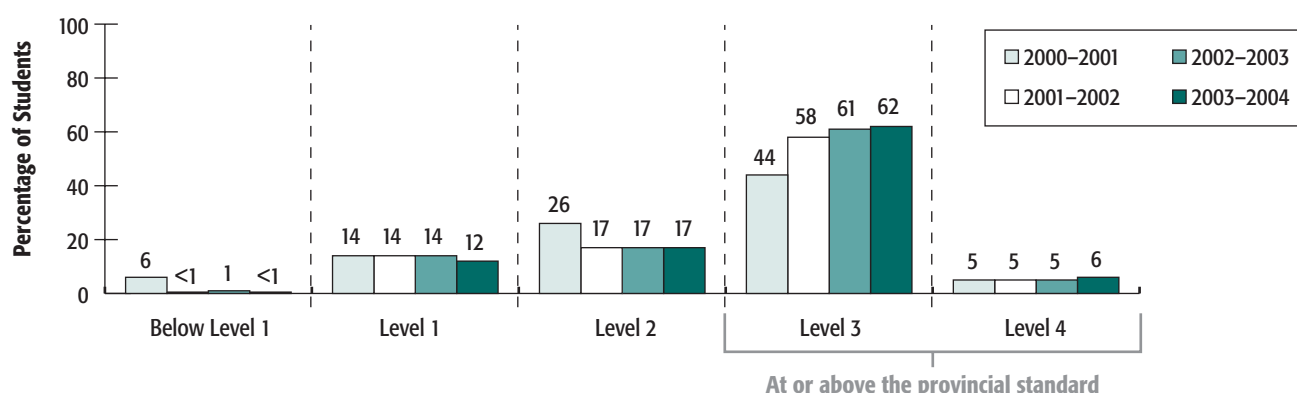


Results at a Glance: Grade 9 Academic Mathematics

Comparison of Results over Time

		2000–2001 # = 95 312	2001–2002 # = 99 094	2002–2003 # = 100 717	2003–2004 # = 102 923
Percentage of Students	Level 4	5%	5%	5%	6%
	Level 3	44%	58%	61%	62%
	Level 2	26%	17%	17%	17%
	Level 1	14%	14%	14%	12%
	Below Level 1	6%	<1%	1%	<1%
	NEIS	3%	3%	<1%	1%
	No Data	1%	1%	2%	1%
	Exempt	1%	<1%	<1%	<1%
	At or Above the Provincial Standard*	49%	64%	66%	68%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

Observations

- 68% of students in the academic program performed at or above the provincial standard.
- There has been an increase in the percentage of students in the academic program performing at or above the provincial standard over the past three years.
- The percentage of students at Level 3 has increased over the past three years.
- The percentage of students at Level 2 has remained constant over the past three years.
- There has been a reduction in the percentage of students at Level 1.
- The percentage of students Below Level 1 has remained relatively stable over the past three years.

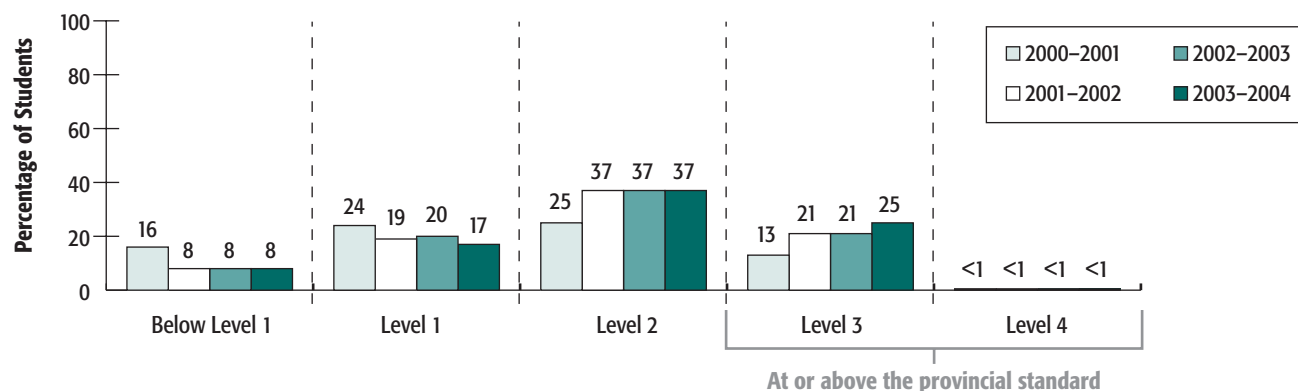


Results at a Glance: Grade 9 Applied Mathematics

Comparison of Results over Time

		2000–2001 # = 41 708	2001–2002 # = 47 220	2002–2003 # = 48 426	2003–2004 # = 50 430
Percentage of Students	Level 4	<1%	<1%	<1%	<1%
	Level 3	13%	21%	21%	25%
	Level 2	25%	37%	37%	37%
	Level 1	24%	19%	20%	17%
	Below Level 1	16%	8%	8%	8%
	NEIS	15%	6%	4%	5%
	No Data	6%	7%	8%	6%
	Exempt	3%	2%	2%	1%
	At or Above the Provincial Standard*	13%	21%	21%	26%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

Observations

- 26% of students in the applied program performed at or above the provincial standard, which is double the proportion in 2000–2001.
- The percentage of students performing at or above the provincial standard increased this year.
- The percentage of students at Level 4 has remained stable over the past four years.
- The percentage of students at Level 3 increased this year.
- The percentage of students at Level 2 has remained constant over the last three years.
- The percentage of students at Level 1 has decreased this year.
- The percentage of students Below Level 1 has remained stable over the past three years.



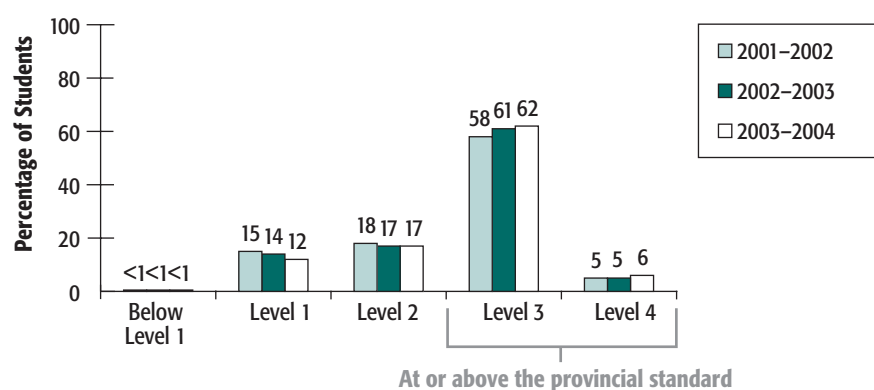
Grade 9 Academic Mathematics Trends

Trends by Gender

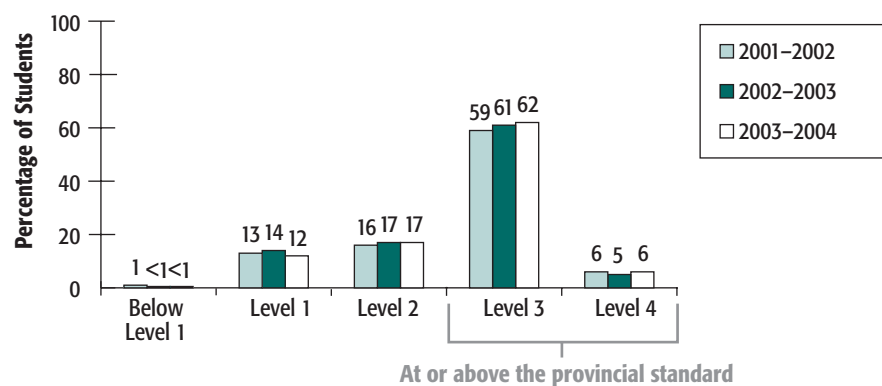
		2001–2002		2002–2003		2003–2004	
		Female # = 49 772	Male # = 48 181	Female # = 51 352	Male # = 48 750	Female # = 52 104	Male # = 49 916
Percentage of Students	Level 4	5%	6%	5%	5%	6%	6%
	Level 3	58%	59%	61%	61%	62%	62%
	Level 2	18%	16%	17%	17%	17%	17%
	Level 1	15%	13%	14%	14%	12%	12%
	Below Level 1	<1%	1%	<1%	<1%	<1%	<1%
	NEIS	3%	3%	<1%	<1%	1%	1%
	No Data	1%	1%	2%	2%	1%	1%
	Exempt	<1%	1%	<1%	<1%	<1%	<1%
	At or Above the Provincial Standard*	63%	65%	66%	66%	68%	68%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.

Female



Male



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

Observations

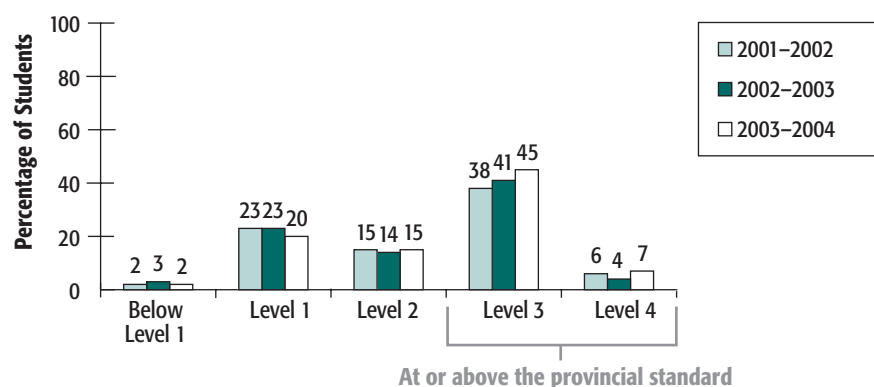
- The percentages of both female and male students performing at or above the provincial standard have increased over the past three years.
- There is little or no gender gap in Grade 9 academic mathematics achievement. The small gender gap in 2001-2002, favouring males, has not been in evidence for the past two years.
- Over the past three years, the percentages of female and male students in the academic program at Level 4 and Level 2 have remained relatively stable. The percentages of female and male students at Level 3 have increased. The percentage of female students at Level 1 has decreased, while the percentage of male students at Level 1 has varied.



Trends for ESL/ELD Learners¹

		2001–2002 # = 2693	2002–2003 # = 3045	2003–2004 # = 2471
Percentage of Students	Level 4	6%	4%	7%
	Level 3	38%	41%	45%
	Level 2	15%	14%	15%
	Level 1	23%	23%	20%
	Below Level 1	2%	3%	2%
	NEIS	3%	1%	1%
	No Data	1%	2%	1%
	Exempt	12%	11%	8%
	At or Above the Provincial Standard*	44%	45%	52%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

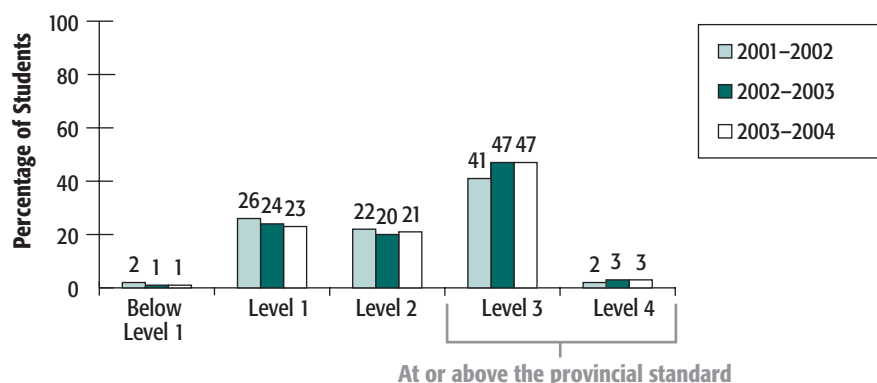
Observations

- The percentage of ESL/ELD learners in the academic program performing at or above the provincial standard increased this year after having been relatively stable the previous two years.
- Over the past three years, the percentage of ESL/ELD learners in the academic program at Level 4 has varied, the percentage at Level 3 has increased and the percentage at Level 2 has remained relatively stable.
- This year there has been a reduction in the percentage of ESL/ELD learners in the academic program at Level 1 compared to the previous two years.

Trends for Students with Special Needs

		2001–2002 # = 2386	2002–2003 # = 4181	2003–2004 # = 3563
Percentage of Students	Level 4	2%	3%	3%
	Level 3	41%	47%	47%
	Level 2	22%	20%	21%
	Level 1	26%	24%	23%
	Below Level 1	2%	1%	1%
	NEIS	4%	1%	2%
	No Data	2%	2%	2%
	Exempt	2%	2%	1%
	At or Above the Provincial Standard*	43%	50%	50%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

Observations

- The percentage of students with special needs in the academic program performing at or above the provincial standard has been stable the past two years.
- Over the past three years, the percentage of students with special needs in the academic program at Level 4 has remained relatively stable, the percentage at Level 2 has varied and the percentage at Level 1 has decreased.
- The percentage of students with special needs in the academic program at Level 3 has remained stable the past two years.



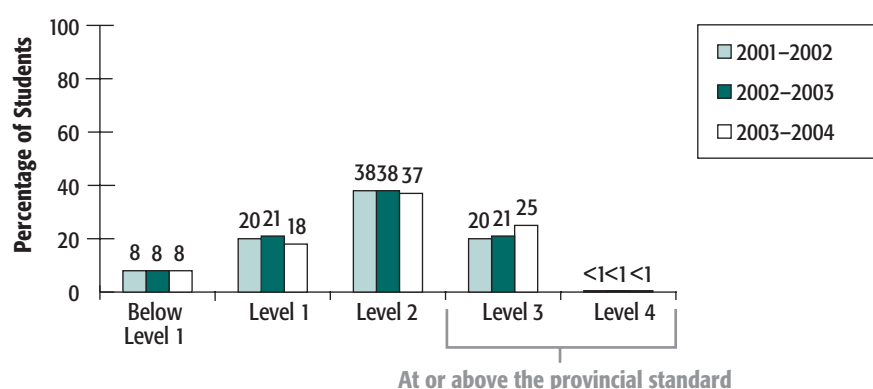
Grade 9 Applied Mathematics Trends

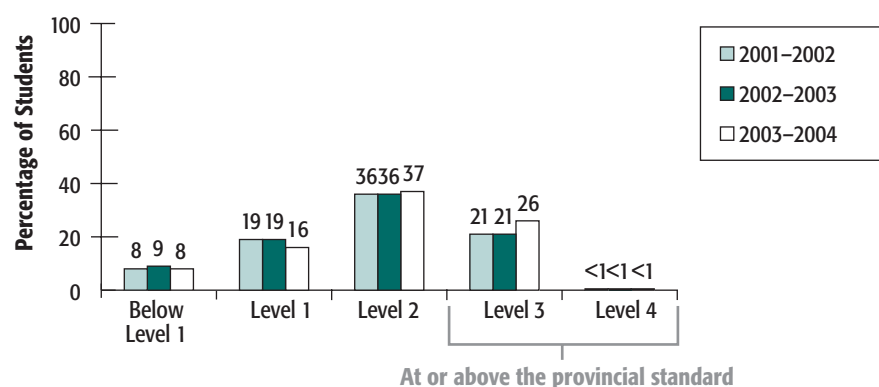
Trends by Gender

		2001–2002		2002–2003		2003–2004	
		Female # = 20 786	Male # = 25 615	Female # = 21 387	Male # = 26 625	Female # = 22 292	Male # = 27 223
Percentage of Students	Level 4	<1%	<1%	<1%	<1%	<1%	<1%
	Level 3	20%	21%	21%	21%	25%	26%
	Level 2	38%	36%	38%	36%	37%	37%
	Level 1	20%	19%	21%	19%	18%	16%
	Below Level 1	8%	8%	8%	9%	8%	8%
	NEIS	5%	7%	3%	5%	5%	6%
	No Data	6%	6%	7%	7%	6%	6%
	Exempt	2%	3%	2%	2%	1%	1%
	At or Above the Provincial Standard*	20%	21%	21%	21%	25%	26%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.

Female



Male

Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

Observations

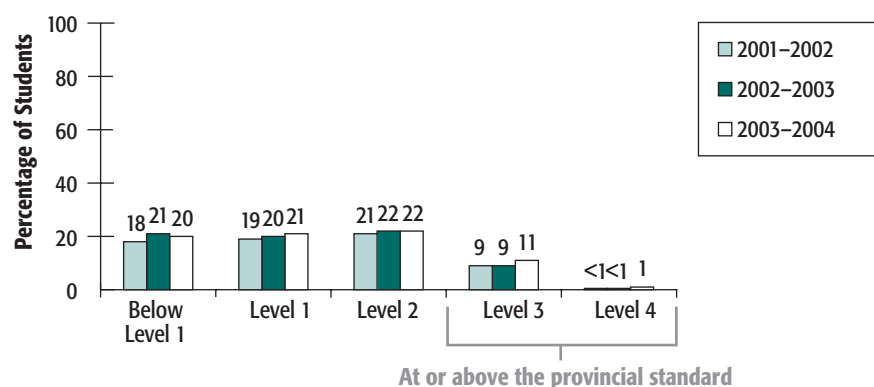
- The percentages of female and male students performing at or above the provincial standard increased this year after having been relatively stable the previous two years.
- Over the past three years, the percentages of female and male students in the applied program at Level 4 and Level 2 and Below Level 1 have remained relatively stable and the percentages at Level 3 have increased. The percentage of female students in the applied program at Level 1 has varied and the percentage of male students at Level 1 has decreased this year compared to the previous two years.
- Although there is a very small gender gap in Grade 9 applied mathematics achievement this year in favour of males, there has been little or no difference between the performance of male and female students in the applied program across the years.



Trends for ESL/ELD Learners¹

		2001–2002 # = 2094	2002–2003 # = 2236	2003–2004 # = 2013
Percentage of Students	Level 4	<1%	<1%	1%
	Level 3	9%	9%	11%
	Level 2	21%	22%	22%
	Level 1	19%	20%	21%
	Below Level 1	18%	21%	20%
	NEIS	6%	6%	5%
	No Data	3%	6%	5%
	Exempt	23%	15%	14%
	At or Above the Provincial Standard*	9%	9%	12%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

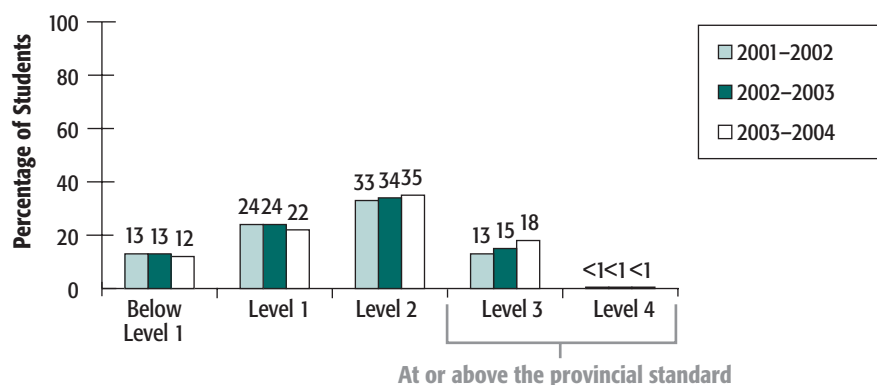
Observations

- The percentage of ESL/ELD learners in the applied program performing at or above the provincial standard, Level 3, increased this year after being stable the previous two years.
- Over the past three years, the percentage of ESL/ELD learners in the applied program at Level 2 has remained relatively stable, the percentages at Level 1 and Level 3 have increased and the percentage Below Level 1 has varied.

Trends for Students with Special Needs

		2001–2002 # = 8869	2002–2003 # = 11 959	2003–2004 # = 12 269
Percentage of Students	Level 4	<1%	<1%	<1%
	Level 3	13%	15%	18%
	Level 2	33%	34%	35%
	Level 1	24%	24%	22%
	Below Level 1	13%	13%	12%
	NEIS	8%	4%	5%
	No Data	5%	6%	5%
	Exempt	5%	4%	2%
	At or Above the Provincial Standard*	13%	15%	19%

* These percentages are based on the actual number of students and cannot be calculated simply by adding the (rounded) percentages of students at Levels 3 and 4.



Note: As bar graphs do not show the exempt, no data and NEIS categories, percentages in these bar graphs will not add up to 100.

Observations

- The percentage of students with special needs in the applied program performing at or above the provincial standard has increased over the past three years.
- Over the past three years, the percentage of students with special needs in the applied program at Level 4 has remained stable, and the percentages at Level 3 and at Level 2 have increased.
- The percentages of students with special needs in the applied program at Level 1 and Below Level 1 decreased this year compared to the previous two years.



School and School Board Improvement Planning

During the period 2000–2004, school boards have submitted improvement plans to EQAO yearly. Results of the 2003–2004 Grade 9 Assessment of Mathematics suggest that strategies being implemented by schools and boards are producing positive results.

Between 2001 and 2004, several school boards demonstrated significant increases in the percentage of students achieving the provincial standard. From among these boards, selected boards' improvement plans for 2002–2003 and 2003–2004 were analyzed to determine whether there were common factors that might account for the recent significant improvement. The following are some of the key general findings:

- All of these board improvement plans provided general goals for mathematics and, in some cases, identified priority areas for improvement.
- Most of the action plans identified specific improvement strategies, indicators that actions had occurred, timelines for implementation and who was responsible.
- All of these plans mentioned having analyzed EQAO assessment results and trends for mathematics.

Successful schools understand the importance of using data to plan for and track improvement. When school learning communities use data to establish goals and engage in co-operative activities to achieve these goals, great gains can be made.

As schools and boards develop improvement plans, they are encouraged to refer to their own data as well as the following documents available on the EQAO Web site:

- *EQAO Guide to School and Board Improvement Planning* (2002)
- *Using Data to Promote Student Success: A Brief Guide to Assist School Administrators in Interpreting Their Data* (2004)

EQAO commends the work of the education leaders from across the province who have contributed their expertise to the development of Ontario Ministry of Education publications. EQAO supports and encourages the use of the following:

- *The Ontario Curriculum, Grades 9 and 10: Mathematics*
- *The Ontario Curriculum Exemplars, Grade 9: Mathematics*
- *Leading Math Success—Mathematical Literacy, Grades 7–12: The Report of the Expert Panel on Student Success in Ontario*
- *Targeted Implementation & Planning Supports: Grades 7, 8, 9 Applied Mathematics* (TIPS)

All of these documents are available on the Ministry of Education Web site at www.edu.gov.on.ca, with the exception of the TIPS document, which is available on

the Ontario Curriculum Centre Web site at www.curriculum.org/occ/. EQAO recognizes that school boards, school principals and teachers have made literacy and numeracy instruction a priority. Having considered the 2003–2004 achievement results, the trends over time, the data collected from the Student Questionnaire and the Teacher Questionnaire and the comments from the educator scorers, EQAO recommends that school boards, school administrators and teachers continue to do the following:

Planning and using information

- Gather and analyze data from the EQAO results as well as classroom, school and board sources to set numeracy goals and develop improvement plans at the board and school levels.
- Track student data over time to inform teacher practice.

Building capacity and expertise

- Analyze the assessment data and address areas in which students have not adequately mastered the skills.
- Encourage numeracy committees and teachers across grades and subjects to share effective instructional practices.

Collaborating with community partners

- Connect with the community, including parents and school councils, to support student learning.



Strategies for Instruction

Areas of Focus

The *Item Information Report: School, Board, Province* was the source of the following provincial information. This report, which contains data about the range of student responses to items on this year's Grade 9 Assessment of Mathematics, is available to schools and school boards.

Schools and boards should consider the analysis of their own performance in light of the provincial data.

EQAO suggests that teachers employ the following instructional methods, which place importance on building meaning and conceptual understanding.

- Promote discussion by posing open-ended questions and using prompts that require students to give evidence of what they know and can do: for example, *Justify your answer. Explain your thinking.*
- Make explicit connections between mathematics and contexts and incorporate visual and concrete representations as well as technology into instruction, so that students learn to use multiple representations of concepts and have alternative ways of developing understanding.
- Give students opportunities to construct physical models of abstract mathematical ideas by using concrete materials and manipulatives.
- Teach students to learn and do mathematics by making varied representations of their mathematical thinking.
- Make explicit connections between the mathematics and visual and concrete representations to make the dialogue between the teacher and the student more accessible.
- Use varied assessment and differentiated instruction to help students' understanding grow and to help them progress along the continuum of learning.

Addressing the Achievement Data

EQAO's Grade 9 Assessment of Mathematics is based on the expectations of *The Ontario Curriculum, Grades 9 and 10: Mathematics*. It is important that teachers focus their mathematics instruction and assessment on the expectations in *The Ontario Curriculum*.

Because the data suggest that students in both academic and applied programs have difficulty identifying the important elements of problems and showing understanding of the relationships among them, as well as drawing appropriate conclusions supported with evidence, EQAO suggests that teachers teach students how to solve problems and give them opportunities to solve problems both in groups and individually. Model good solutions and approaches to problems. Coach students through the problem-solving process and provide them with differentiated instruction.

*Because most students in applied programs engage in multi-stepped problems but are unable to provide a complete solution (Task: Everyone's a Winner with Math, part c, and Task: Global Proportions, part c),** EQAO suggests that teachers teach the skills required to solve multi-step problems. Concentrate on the "Understand the Problem" stage, using prompts such as "What kind of answer do you expect? How will you know when you are done?" Expose students to various solutions to the same problem by having them share strategies and consider different approaches to the problem as well as different solutions.

*Although most students in academic programs engage in multi-stepped problems, the data indicates that while many students' solutions complete the mathematical steps of the problem, they do not reconnect to the context of the problem (Task: Everyone's a Winner with Math, part c, and Task: Math Munch, part d),** EQAO suggests that teachers teach the skills required to solve multi-step problems. Model the processes of analyzing, summarizing and generalizing, using prompts such as "How do you know that you are correct? How do you know that you are done? What does your answer mean in the context of the question? Will your answer work all the time or just some of the time? Is this the best way to do this?" Expose students to various approaches and solutions to the same problem by having them explain their solutions to peers.

Because many students in applied programs are able to substitute into measurement formulas and evaluate when they are given a formula but demonstrate a lack of understanding of how to use their mathematics to model a problem (Task: Global Proportions), EQAO encourages teachers to give students opportunities, in group settings, to explore, discuss and practise fitting their mathematics to the context. Integrate concrete materials into classroom activities to engage students in investigating mathematical relationships so that they deepen their understanding of measurement concepts. Teachers benefit from observing colleagues working with students who are using concrete materials to model and represent mathematical understanding.



Because assessment data for multiple-choice questions indicate that students in applied programs struggle with concepts related to analytic geometry, and 94% of teachers of applied programs indicate that they have access to graphing calculators within their school, EQAO suggests that teachers introduce and teach the concepts of analytic geometry through students' prior knowledge of relationships.

- Provide opportunities for students to connect concrete models in relationships to algebraic models in analytic geometry using graphing technology.
- Have students work in groups and share their thinking with one another, before the class reflects as a large group.
- Ensure that students connect algebraic models to the initial contexts from which they were developed.

Because data for extended-response questions as well as for incorrect answer selections in multiple-choice questions indicate that students engage in questions and start with an appropriate strategy but are not attending to details in the context of the problem to implement a full problem-solving process (Task: Global Proportions and multiple-choice 1), EQAO suggests that teachers use the following instructional strategies to build student skill in writing solutions:

- Model for students the processes of analyzing, selecting and applying appropriate strategies that lead to accurate solutions.
- Model good problem-solving techniques by having the class develop solutions together.
- Model a variety of appropriate solutions to a problem. Have students recognize that there can be several strategies to solve a problem and that they can learn by listening to alternative responses.
- Help students to understand the characteristics of a good solution, which include accurate and specific information with clear, complete and well-organized explanations. Analyze solutions together as a class. Have students explain how to improve a solution.

Because 83% of students in applied programs and 97% in academic programs indicate that they spend time on homework on any given day, EQAO suggests that teachers continue to assign purposeful homework. Use the results of homework to inform planning decisions about content, processes for delivery and ways of providing evidence of achievement. Consider varying the types of work assigned to meet the learning needs of the students.

*Because 68% of teachers who completed the Teacher Questionnaire for an applied classroom and 56% of teachers who completed the Teacher Questionnaire for an academic classroom indicated that they and/or their Grade 9 mathematics students seldom or never run dynamic geometry software, and because overall curriculum expectations of both programs require its use to investigate, EQAO suggests that teachers give students opportunities to investigate mathematical concepts using dynamic geometry software. The Ministry of Education resource *Targeted Implementation & Planning Supports: Grades 7, 8, 9 Applied Mathematics* (TIPS)*

includes pre-made dynamic geometry software sketches for the Grade 9 mathematics curriculum. Teachers benefit from professional learning activities in which they work with colleagues using hardware and software applications related to mathematics in the curriculum. Once the teachers are comfortable with the technologies, discussions about how to integrate technologies into instructional and assessment plans are useful.

Because 59% of students in the applied program and 72% in the academic program said that they understood most of the mathematics they are taught, EQAO suggests that teachers continue to implement strategies to deal with diversity in their classes. Since students differ significantly in their learning styles, interests and readiness for learning, instructional strategies and decisions about content, processes for delivery and ways of providing evidence of achievement should vary accordingly.

Differentiated instruction includes

- using a variety of groupings to meet student needs;
- providing students with some choice in instruction/assessment activities and
- presenting students with appropriate challenges according to their readiness to learn, interests and learning style.

* Grade 9 Release Items found at <http://www.eqao.com>



Successful Schools: Case Studies

Successful school improvement strategies

EQAO is pleased to profile two schools that offer examples of school improvement strategies demonstrating the importance of systematic leadership, the value of using assessment data and the results a school can achieve when commitment is shared among school leaders, staff and parents.

College Heights Secondary School, Upper Grand District School Board

Our profile

- Secondary school located in Guelph
- A very high-needs student population
- 50% of students have Individual Education Plans (IEPs)

Our EQAO results

Applied

	2001–2002	2002–2003	2003–2004
Number of students	53	62	56
Exempted students	0	0	0
Percentage at Level 3 or above	21%	47%	52%
Percentage at Level 2	51%	29%	46%
Percentage at Level 1	11%	6%	2%

Key factors in our improvement

- Clear goals for improvement
- Continuing professional development
- Use of supports such as technology and manipulatives
- Ongoing assessment and rapid student feedback
- Small class sizes and personal attention to student needs
- Volunteer and parent programs
- Creativity and dedication of teaching staff

Our story

David Miller, Principal

College Heights Secondary School is a vocational school that offers applied, essential, and open courses to Grades 9 and 10 students. At the senior level, mainly college and workplace destination courses are offered. The overwhelming majority of our students leave school to enter the workforce directly. Approximately 10 to 15 students sign on as apprentices in a trade, and about the same number start at a community college.

Most of the students who come to this school have experienced academic and social challenges in elementary school or feel the strong need to experience a more hands-on form of education.

We have traditionally had a very high dropout rate, which we are attempting to reduce on an ongoing basis. We register approximately 150 new students in Grades 9 to 12 each year. Prior to 2004, the average number of graduates was just over 50. In 2004, 70 students graduated. Our goal is to increase that number to 80 in 2005 and continue to graduate more students in the future.

Given the numerous challenges we face within the school and the community, these results, as well as our EQAO results in Grade 9 mathematics over time, represent an outstanding accomplishment and incredible dedication on the part of our teaching staff to the needs of our students. In particular, our Grade 9 mathematics results can be credited in large part to Roberta Kraven, who has shown tremendous leadership of a caring and involved learning community at College Heights.

Roberta Kraven, Teacher

Considering my students' backgrounds, prior knowledge and life struggles, I am very pleased when some of them achieve a Level 1. The fact that so many have achieved a Level 3 is a huge reward. Many contributing factors have led to our success.

- **Best practices:** I am always evolving as a teacher. I change my presentation of curriculum, assessments and activities every semester, and I try to incorporate lessons to suit many learning styles. On a daily basis, I try to change methods frequently throughout a class to engage students continuously in their learning. I also try to make lessons as relevant as possible to students' lives.
- **Professional development:** I develop strategies through workshops that I attend, education websites, EQAO sample lessons, other teachers, and books. I participated in the EQAO assessments a few years ago, and that helped me understand how the tests are marked and how to assist my own students.
- **Use of classroom supports:** I use graphing calculators, software, and a data projector for some lessons and for review. I also make use of manipulatives, including multilink cubes, algebra tiles, origami, jeopardy, coordinate battleship, and geoboards.
- **Student communication:** I have students write poetry; I play corny songs to deal with specific expectations; I have them explain mathematics with symbols and words, all of which helps them understand more deeply.
- **Assessment:** I truly believe the purpose of assessment is to improve student learning. It has a far underrated role in the learning expectations. I use constant formative assessment with immediate feedback, and I continually provide grades so students always know how they are doing. As well, I have a completion chart with stars for assignments or tests finished, which helps students stay caught up.



- **Class size:** Our building was designed for class sizes of about 15, and I have advocated to keep my numbers reasonable. Given the challenges our students face, smaller class sizes are essential.
- **Volunteers:** I am the volunteer coordinator for the school, and so far this year we have approximately 150 volunteers in the building. The majority are university students who need classroom experience, but some are certified and retired teachers. This addition to my class is invaluable.
- **Exemplars:** I have been collecting student work at various levels, so that I can provide students with examples to compare with their own work. It helps them see the difference between a Level 1 and a Level 4 and to set goals for themselves.
- **Individual attention:** One of the key reasons for my students' success, I believe, is that I look at each student individually and work with each student on his or her personal goals.
- **A group spirit:** During EQAO days, I provide breakfast bagels and treats from the bakeshop. I make it a big deal. I really boost their egos and do a power review the mornings before testing. We are in it together for the entire semester—the learning, the failures and the accomplishments.

I recall reading that the most powerful tool for change in student performance is improved teaching. So I will always have work to do. I find teaching this curriculum fun and rewarding, and I try above all to convey that enthusiasm to my students. And of course, their accomplishments are a very satisfying reward.

St. Michael High School, Catholic District School Board of Eastern Ontario

Our profile

- Rural school in Kemptville
- Students come from various socio-economic backgrounds, predominantly lower middle class
- Includes Grades 7 and 8

Our EQAO results

Academic

	2001–2002	2002–2003	2003–2004
Number of students	73	70	82
Exempted students	0	0	0
Percentage at Level 3 or above	84%	93%	91%
Percentage at Level 2	12%	4%	7%
Percentage at Level 1	3%	1%	1%

Applied

	2001–2002	2002–2003	2003–2004
Number of students	29	40	65
Exempted students	0	0	0
Percentage at Level 3 or above	45%	55%	63%
Percentage at Level 2	41%	40%	29%
Percentage at Level 1	10%	5%	8%

Key factors in our improvement:

- Partnering with Grades 7 and 8 math teachers prior to Grade 9
- Parent communication
- Immediate intervention by teachers
- Promotion of the EQAO test as an important activity
- Use of technology
- Early identification of students at risk
- Limited class sizes for Grade 9 math
- Excellent teaching staff and a strong culture of success



Our story

Mark Musca, Principal

If I were to boil our success down to one factor, it would be the excellence of our teachers. Our Grades 7 and 8 teachers work very diligently to prepare our students for high school, and our Grade 9 teachers are experts in delivery of the math curriculum. Over time, we have developed a number of best practices.

- **Partnering:** a process for ensuring success that starts long before Grade 9; we do a great deal of partnering between our Grade 9 and Grades 7 and 8 teachers, and we have a strong professional learning community focused on literacy and numeracy skills.
- **Emphasis on Grade 9:** understanding that success in math and literacy in Grade 9 is integral to a student's success in high school, and therefore a great deal of emphasis is placed on Grade 9 English and math.
- **Strong communication:** with parents in Grade 8, so that they see the value of both academic and applied classes; we build some trust in our judgment about which courses may best suit each individual child. We also have immediate teacher/parent communication whenever a student fails a test, when a pattern of incomplete homework becomes apparent, or when assignments aren't handed in.
- **Intervention:** immediate intervention by teachers so that students realize failure is not an option.
- **Learning philosophy:** we teach students to persevere and work through difficult problems, and we emphasize that, on any test or activity, they should always try for "part marks" if they are struggling with a problem.
- **EQAO:** we promote the EQAO test as an important activity; in fact, the teachers mark a portion of the test and make it count as part of the child's course mark, to ensure that students take the test seriously.
- **Technology:** teachers have embraced the use of technology in math classes, with frequent use of software and graphing calculators.
- **Special Education:** strong special education support with an emphasis in the IEP on numeracy and literacy skills.
- **Students at risk:** we try to identify students at risk early and provide early intervention.
- **Staffing:** as an administration, we staff purposefully, know that success in Grade 9 is important to a child's future, and assign our experienced teachers to these courses.
- **Class size:** we do our best to limit class sizes for academic and applied classes.
- **A culture of success:** teachers attend professional development and other in-service meetings, and we encourage a strong sense of team, a strong professional learning community, and a professional dialogue around mathematics.



The EQAO Assessment Process

In order to fulfill its mandate, EQAO conducts several province-wide assessments, among them the Grade 9 Assessment of Mathematics.

This assessment is conducted twice annually and involves all Grade 9 students taking applied or academic mathematics courses in publicly funded schools in Ontario. The results of this assessment provide individual, school and school board data on student achievement at a critical stage in a student's education.

EQAO posts board and school results on its Web site for public access. As well, EQAO publishes an annual *Provincial Report on Achievement* for education stakeholders and the general public. Data from the assessments provide valuable information to support improvement planning at the school and school board levels.

Design and Development

EQAO education officers work in consultation with mathematics educators across the province in all aspects of the Grade 9 Assessment of Mathematics, including design, development, content review, field testing, administration, marking and reporting.

The Grade 9 Assessment of Mathematics is developed in keeping with the *Principles of Fair Student Assessment Practices for Education in Canada* (1993), a document created by representatives of national education institutions and associations and widely endorsed by Canada's education community.

In Grade 9, students choose between two types of courses, applied and academic. EQAO develops separate versions of the Grade 9 Assessment of Mathematics for students in applied and academic courses. Since some of the expectations for applied and academic courses overlap, approximately 40% of the assessment items are common.

Parallel versions of the assessment are developed for English- and French-language schools. The versions have the same number and kinds of questions but reflect variations in the curricula for the two languages.

The Grade 9 Assessment of Mathematics measures how well students have met the provincial expectations as outlined in *The Ontario Curriculum, Grades 9 and 10: Mathematics*. The assessment contains performance-based activities requiring written responses and multiple-choice questions through which students can demonstrate what they know and what they can do.

Students are assessed as to how well they demonstrate knowledge and skills in four strands of mathematics: number sense and algebra, relationships, analytic geometry, and measurement and geometry.

Procedures to ensure consistency and validity

EQAO has specific procedures in place to ensure that the administration of the assessment is consistent and fair for all students. Students work independently in a quiet environment, supervised by teachers. Teachers are given a script that must be followed to ensure that a common message is given to all students throughout the province.

Students with special needs are provided with accommodations according to EQAO guidelines. ESL and ELD learners are provided with special provisions described in EQAO's *Steps and Teacher's Scripts: Grade 9 Assessment of Mathematics*. All teachers responsible for administering the assessment receive detailed guidelines and follow the Teacher's Scripts.

Each school is sent an English- or French-language CD-ROM for use in training teachers to administer the assessment. Additional resources, such as guides and instructions, are provided to ensure the same administrative and accommodation procedures are followed for all students across the province. Quality assurance procedures help ensure that EQAO's assessments produce valid and reliable data.

Administration and marking

The Grade 9 Assessment of Mathematics is conducted twice annually—in January for students in first-semester courses and in June for students in second-semester and full-year courses. Principals have the option of administering the assessments over two or four days. An additional day is required in school boards selected to complete an additional component that contains field-test materials.

Students work independently to solve problems, write their responses and answer multiple-choice questions.

The Grade 9 Assessment of Mathematics is marked by teachers trained in marking. Marking provides teachers with valuable professional development in the area of assessing student achievement.

Levels of achievement

EQAO uses a four-level scale to report on student achievement in mathematics. This scale is based on *The Ontario Curriculum, Grades 9 and 10: Mathematics* and sets Level 3 as the provincial standard. Levels 1 and 2 indicate achievement below the provincial standard, while Level 4 indicates achievement beyond the expected standard.



The overall result for mathematics is derived by combining the results from the performance-based section with those from the multiple-choice section. Results are derived from multiple sources (four categories and four strands applied to the written responses and to the multiple-choice section).

Endnote

1. As of 2003–2004, identification of ESL/ELD learners is aligned with Ministry of Education ESL/ELD Resource Guide (2001).

Working together

to improve student learning

The Education Quality and Accountability Office (EQAO) is dedicated to working with the education community and to enhancing the quality and accountability of the education system in Ontario. This is achieved through student assessments that produce objective, reliable and relevant information, and through the timely public release of this information along with recommendations for system improvement.

Values

- EQAO values student learning above all other interests.
- EQAO values information that has the potential to bring about constructive change and improvement.
- EQAO values the dedication and expertise of Ontario's educators and works in partnership with them in all of its activities.
- EQAO values the delivery of its programs and services with equivalent quality in both English and French.

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