

EQAO Detailed Analysis: A Focus on Mathematics

Item Information Reports and Cohort Reports

1. Mathematics 2016-2017: Item information Report (IIR) Analyses

- Item Information Reports are provided to all schools to analyze school and individual student performance on EQAO assessments. Data include achievement of individual students, students in the school, students in the Board, and all students in the province.
- Questions are broken down by:
 - Mathematics strand (Number Sense & Numeration, Measurement, Geometry & Spatial Sense, Patterning & Algebra, Data Management & Probability)
 - Achievement Chart Categories (Knowledge and Understanding, Thinking, and Application)
 - Question type (Multiple Choice or Open Response)

Grade 3 Mathematics:

- Students performed better on multiple choice items than on open response questions.
- No strand stood out as particularly strong.
- Strong performance in the achievement chart category of Knowledge and Understanding across strands.
- Thinking and Application from the achievement chart categories are both areas in need of further improvement.

Table 1: Grade 3 IIR Mathematics Strand and Skill

Strand	Type of question					
	Multiple choice			Open response		
	Number of questions	Below 70%	Above 70%	Number of questions	Below 70%	Above 70%
Number Sense & Numeration	7	3	4	2	2	0
Measurement	8	5	3	1	1	0
Geometry & Spatial Sense	4	2	2	2	2	0
Patterning & Algebra	6	3	3	1	0	1
Data Management & Probability	3	2	1	2	2	0

Target Skill	Number of questions	Below 70%	Above 70%
Knowledge and Understanding	12	2	10
Thinking	8	8	0
Application	16	12	4

Grade 6 Mathematics:

- Greatest strength was in the strands of Number Sense and Numeration, and Measurement.
- Questions related to Geometry and Spatial Sense, Patterning and Algebra, and Data Management and Probability presented the greatest challenge for students.
- Strong performance in the achievement chart category of Knowledge and Understanding across strands.
- Thinking and Application Skills are categories in need of further improvement.
- Patterns on open response and multiple choice are similar and in need of further improvement.

Table 2: Grade 6 IIR Mathematics Strand and Skill

Strand	Type of question					
	Multiple choice			Open response		
	Number of questions	Below 70%	Above 70%	Number of questions	Below 70%	Above 70%
Number Sense & Numeration	6	3	3	2	1	1
Measurement	7	4	3	1	1	0
Geometry & Spatial Sense	4	3	1	2	1	1
Patterning & Algebra	6	5	1	1	0	1
Data Management & Probability	6	5	1	1	0	1

Target Skill	Number of questions	Below 70%	Above 70%
Knowledge and Understanding	8	2	6
Thinking	12	8	4
Application	16	13	3

Grade 9 Mathematics: Applied

- The performance of Grade 9 students in the applied course in multiple choice and open response questions across all strands was low.
- Performance was somewhat better on Knowledge and Understanding, and on Application
- Students in the applied course struggled in the category of Thinking.

Table 3: Grade 9 Applied IIR Mathematics Strand and Skill

Winter - Strand	Type of question					
	Multiple choice			Open response		
	Number of questions	Below 70%	Above 70%	Number of questions	Below 70%	Above 70%
Number Sense & Algebra	7	5	2	2	0	2
Linear Relations	11	9	2	3	3	0
Measurement & Geometry	7	6	1	2	2	0

Spring - Strand	Type of question					
	Multiple choice			Open response		
	Number of questions	Below 70%	Above 70%	Number of questions	Below 70%	Above 70%
Number Sense & Algebra	7	4	3	2	1	1
Linear Relations	11	9	2	3	2	1
Measurement & Geometry	6	5	1	2	2	0

Winter - Target Skill	Number of questions	Below 70%	Above 70%
Knowledge and Understanding	8	4	4
Thinking	10	9	1
Application	13	11	2

Spring - Target Skill	Number of questions	Below 70%	Above 70%
Knowledge and Understanding	8	5	3
Thinking	10	10	0
Application	13	8	5

Grade 9 Mathematics: Academic

- Measurement and Geometry, and Linear Relations presented the greatest challenge for Grade 9 students in the academic course.
- Students in the academic course struggled in the category of Thinking.

Table 4: Grade 9 Academic IIR Mathematics Strand and Skill

Winter - Strand	Type of question					
	Multiple choice			Open response		
	Number of questions	Below 70%	Above 70%	Number of questions	Below 70%	Above 70%
Number Sense & Algebra	5	2	3	1	1	0
Linear Relations	6	3	3	2	0	2
Analytic Geometry	6	4	2	2	1	1
Measurement & Geometry	6	4	2	2	1	1

Spring - Strand	Type of question					
	Multiple choice			Open response		
	Number of questions	Below 70%	Above 70%	Number of questions	Below 70%	Above 70%
Number Sense & Algebra	5	3	2	1	0	1
Linear Relations	6	3	3	2	1	1
Analytic Geometry	7	3	4	2	1	1
Measurement & Geometry	6	4	2	2	2	0

Winter - Target Skill	Number of questions	Below 70%	Above 70%
Knowledge and Understanding	8	2	6
Thinking	10	8	2
Application	13	4	9

Spring - Target Skill	Number of questions	Below 70%	Above 70%
Knowledge and Understanding	8	3	5
Thinking	10	8	2
Application	13	4	9

2. All Levels of Achievement over Time

Mathematics: Grade 3 and Grade 6

GRADE 3	Mathematics				
	Below Level 1	Level 1	Level 2	Level 3	Level 4
2012 – 2013	<1%	2%	28%	54%	13%
2013 – 2014	<1%	4%	27%	54%	12%
2014 – 2015	1%	4%	30%	51%	13%
2015 – 2016	NP	NP	NP	NP	NP
2016 – 2017	<1%	4%	30%	49%	14%

GRADE 6	Mathematics				
	Below Level 1	Level 1	Level 2	Level 3	Level 4
2012 – 2013	<1%	12%	30%	42%	13%
2013 – 2014	<1%	13%	31%	42%	12%
2014 – 2015	<1%	15%	31%	37%	15%
2015 – 2016	NP	NP	NP	NP	NP
2016 – 2017	<1%	18%	31%	37%	12%

- In Primary Math, the percentage of students at Level 4 has remained relatively stable; the percentage of students at Level 3 decreased; the percentage of students at Level 2 and Level 1 has increased.
- In Junior Math the percentage of students at Level 4 and Level 2 has remained relatively consistent; the percentage of students at Level 3 decreased and the percentage at Level 1 increased.

Mathematics: Grade 9 Academic and Applied

GRADE 9 Academic	Mathematics				
	Below Level 1	Level 1	Level 2	Level 3	Level 4
2012 – 2013	<1%	4%	11%	73%	11%
2013 – 2014	<1%	4%	12%	73%	10%
2014 – 2015	<1%	5%	11%	71%	12%
2015 – 2016	<1%	5%	11%	75%	9%
2016 – 2017	<1%	5%	11%	72%	11%

GRADE 9 Applied	Mathematics				
	Below Level 1	Level 1	Level 2	Level 3	Level 4
2012 – 2013	5%	15%	39%	33%	8%
2013 – 2014	5%	14%	36%	37%	9%
2014 – 2015	4%	14%	36%	34%	10%
2015 – 2016	4%	14%	36%	36%	10%
2016 – 2017	3%	15%	35%	35%	12%

NP = “Non-participating” indicates did not participate.

- In Academic Mathematics, the percentage distribution across levels is consistent across years.
- In Applied Mathematics, there is a decrease in the percentage of students at Level 2 and an increase in the percentage at Level 4.

3. Tracking a cohort in the Board Mathematics

Intersection by Level - Grade 3 (2013-2014) and Grade 6 (2016-2017)

Mathematics			Grade 6 in 2016-2017						
Number of Students in the Cohort = 5578*			Level 4	Level 3	Level 2	Level 1	NE1	No Data	Exempt
Grade 3 in 2013-2014	Level 4	661	49%	45%	5%	1%	0%	<1%	0%
	Level 3	3028	12%	52%	30%	5%	<1%	<1%	<1%
	Level 2	1518	1%	14%	46%	38%	1%	1%	<1%
	Level 1	211	0%	3%	17%	76%	<1%	1%	2%
	NE1	14	0%	0%	7%	64%	7%	0%	21%
	No Data	20	0%	10%	45%	35%	10%	0%	0%
	Exempt	126	1%	3%	13%	36%	2%	3%	42%

Level 4: 45% moved to Level 3; 5% moved to Level 2

Level 3: 30% moved to Level 2; 12% moved to Level 4

Level 2: 38% moved to Level 1; 14% moved to Level 3

Level 1: 17% moved to Level 2; 3% moved to Level 3

Intersection by Level - Grade 6 (2013-2014) and Grade 9 (2016-2017)

Applied Course			Grade 9 in 2016-2017					
Number of Students in the Cohort = 1299*			Level 4	Level 3	Level 2	Level 1	Below Level 1	No Data
Grade 6 in 2013-2014	Level 4	3	67%	33%	0%	0%	0%	0%
	Level 3	164	27%	51%	16%	2%	2%	1%
	Level 2	642	13%	44%	32%	8%	1%	1%
	Level 1	472	4%	22%	43%	22%	7%	1%
	NE1	5	0%	40%	20%	40%	0%	0%
	No Data	6	17%	33%	33%	17%	0%	0%
	Exempt	7	0%	29%	29%	29%	0%	14%

Applied Mathematics

The majority of students taking Applied Mathematics performed at Level 1 or 2 in Grade 6.

Level 3: 27% moved to Level 4; 16% moved to Level 2

Level 2: 44% moved to Level 3; 13% moved to Level 4; 8% moved to Level 1

Level 1: 43% moved to Level 2; 22% moved to Level 3; 4% moved to Level 4; 7% moved Below Level 1

Academic Mathematics

Academic Course			Grade 9 in 2016-2017					
Number of Students in the Cohort = 3979*			Level 4	Level 3	Level 2	Level 1	Below Level 1	No Data
Grade 6 in 2013-2014	Level 4	662	38%	61%	<1%	<1%	0%	<1%
	Level 3	2134	9%	80%	7%	2%	<1%	1%
	Level 2	1035	1%	67%	21%	10%	1%	1%
	Level 1	128	0%	45%	29%	22%	3%	1%
	NE1	1	0%	0%	0%	100%	0%	0%
	No Data	13	15%	62%	23%	0%	0%	0%
	Exempt	6	0%	50%	33%	17%	0%	0%

Academic Mathematics

The majority of students taking Academic Mathematics performed at Level 3 or Level 4 in Grade 6.

Level 4: 61% moved to Level 3

Level 3: 9% moved to Level 4

Level 2: 67% moved to Level 3; 10% moved to Level 1

Level 1: 29% moved to Level 2; 45% moved to Level 3; 3% moved Below Level 1

Note: A review of the Intersection Reports for previous cohorts showed relatively consistent patterns.