

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.