

# Education

## Annual Report Update

### 2021-2022

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## Results Analysis

### Discussion and Analysis of Results

After two years of disruptions, Alberta Education is transitioning back to annual reporting of Provincial Achievement Tests (PATs) to help parents, teachers and school authorities get a better understanding of student performance.

In this report update, results for 2019-20 and 2020-21 are not available due to the impact of recent learning disruptions. As a result, Provincial Achievement Test results for 2021-22 are not assessed against historical results. Caution should be exercised when interpreting the results over time.

Security breaches occurred over the last few days of the 2021-22 Provincial Achievement Test administration window. To maintain the validity of provincial results, student data most likely impacted by these security breaches has been excluded from the overall results.

The targets for 2021-22 were set in December 2021 based on 2018-19 data. These targets were published as part of the performance measures in the 2021-24 Education Business Plan. Caution should be exercised when assessing results relative to targets.

### Outcome Three

#### **Alberta has excellent teachers, school leaders and school authority leaders**

Alberta Education maintains high standards for teachers, school leaders and school authority leaders by ensuring that their preparation and professional growth focus on the competencies needed to help students perform their best. The department also helps foster effective learning and teaching through collaborative leadership. Teachers and leaders are responsible for analyzing learning contexts, attending to local and societal considerations, and applying the appropriate knowledge and abilities to make decisions resulting in quality teaching, leading and learning for all. For these reasons, the government recognizes that supporting and collaborating with teachers and school leaders is essential to the education system.

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*Performance Measure 3.a:***Overall Achievement Test Results in Language Arts and Mathematics*****Rationale***

- Overall student achievement of standards on Provincial Achievement Tests is a sound indicator of whether elementary and junior high students are achieving high standards in Language Arts and in Mathematics, an important outcome for Alberta's K–12 education system.

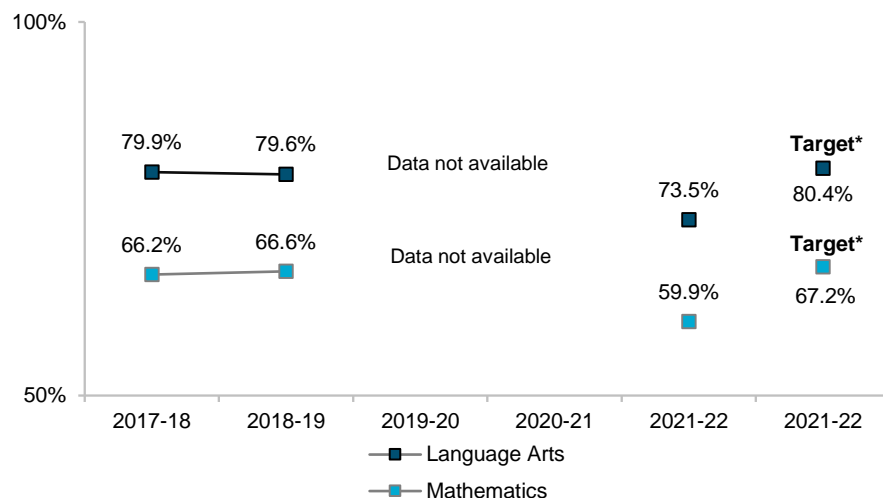
***Targets***

- Targets for overall Language Arts and Mathematics results at the acceptable standards were not met. The targets for 2021-22 were set in December 2021 based on 2018-19 data. Caution should be exercised when assessing results relative to targets.

***Discussion***

- Results for the 2019-20 and 2020-21 school years are not available as participation in the Provincial Achievement Tests was impacted by learning disruptions. Caution should be exercised when interpreting the results over time.
- Overall results in Language Arts are calculated as an average of the results in the following seven subjects weighted by the number of individuals that were enrolled:
  - English Language Arts 6 and 9
  - French Language Arts 6 and 9
  - Français 6 and 9
  - English Language Arts 9 (Knowledge and Employability)
- Overall results in Mathematics are calculated as an average of the results in the following three subjects weighted by the number of individuals that were enrolled:
  - Mathematics 6
  - Mathematics 9
  - Mathematics 9 (Knowledge and Employability)
- Due to the impact of the learning disruptions and the June 2022 Grade 9 PAT security breaches, 2021-22 PAT results (at overall and individual subject levels) were not assessed over time.
- To support student learning in core subjects, the ministry provides programs of study and implementation guides for teachers and develops or authorizes learning resources for students in all grades and subjects.

## Overall Percentages of Students Who Achieved Standards on Grades 6 and 9 Provincial Achievement Tests in Language Arts and Mathematics



\*Caution should be exercised when assessing results relative to targets. The targets for 2021-22 were set in December 2021 based on 2018-19 data.

**Source:** Alberta Education

### Notes:

- Results for 2019-20 and 2020-21 school years are not available as participation in the Provincial Achievement Tests was impacted by recent learning disruptions. Caution should be exercised when interpreting the results over time.
- Participation in the tests was impacted by the security breaches that occurred over the last few days of the 2021-22 PAT administration window. Student data most likely impacted by these security breaches has been excluded from the overall results. Caution should be exercised when interpreting the results over time.
- The percentages of students who achieved the acceptable standard include the students who achieved the standard of excellence.
- Overall Language Arts results are a weighted average based on total enrolment in Grades 6 and 9 Language Arts courses.
- Overall Mathematics results are a weighted average based on total enrolment in Grades 6 and 9 Mathematics courses.
- See Endnote A, page 9, for information on assessing results relative to targets, and results over time.
- See Endnote B, Provincial Achievement Tests, pages 11-12.

*Discussion (continued):*

- Compared to previous years, there is a decrease in the number of students writing PATs in 2022 due to the security breaches that occurred over the last few days of the 2021-22 PAT administration window. To maintain the validity of provincial results, student data most likely impacted by these security breaches has been excluded from the overall results. Caution should be exercised when interpreting the results over time.

**Participation Rates for Language Arts and Mathematics Provincial Achievement Tests**  
(in percentages)

| Subject   | 2017-18     | 2018-19     | 2019-20            | 2020-21 | 2021-22     |
|---|-------------|-------------|--------------------|---------|-------------|
| <b>Language Arts</b>                                |             |             |                    |         |             |
| <b>Grade 6</b>                                      |             |             |                    |         |             |
| English Language Arts                               | 91          | 91          | Data not available |         | 85          |
| French Language Arts                                | 96          | 98          | Data not available |         | 95          |
| Français  | 98          | 97          | Data not available |         | 94          |
| <b>Grade 9</b>                                      |             |             |                    |         |             |
| English Language Arts                               | 89          | 88          | Data not available |         | 82          |
| English Language Arts (Knowledge and Employability) | 80          | 80          | Data not available |         | 75          |
| French Language Arts                                | 96          | 97          | Data not available |         | 93          |
| Français  | 96          | 97          | Data not available |         | 93          |
| <b>Overall Language Arts</b>                        |             |             |                    |         |             |
|   | <b>90.1</b> | <b>90.0</b> | Data not available |         | <b>84.2</b> |
| <b>Mathematics</b>                                  |             |             |                    |         |             |
| <b>Grade 6</b>                                      |             |             |                    |         |             |
| Mathematics   | 91          | 91          | Data not available |         | 86          |
| <b>Grade 9</b>                                      |             |             |                    |         |             |
| Mathematics   | 89          | 89          | Data not available |         | 83          |
| Mathematics (Knowledge & Employability)             | 85          | 87          | Data not available |         | 82          |
| <b>Overall Mathematics</b>                          |             |             |                    |         |             |
|   | <b>89.9</b> | <b>89.9</b> | Data not available |         | <b>84.6</b> |

**Source:** Alberta Education

**Notes:**

- Results for 2019-20 and 2020-21 school years are not available as participation in the Provincial Achievement Tests was impacted by recent learning disruptions. Caution should be exercised when interpreting the results over time.
- Participation in the tests was impacted by the security breaches that occurred over the last few days of the 2021-22 PAT administration window. Student data most likely impacted by these security breaches has been excluded from the overall results. Caution should be exercised when interpreting the results over time.
- The percentages of students who achieved the acceptable standard include the students who achieved the standard of excellence.
- Knowledge and Employability courses are designed for students who meet enrolment criteria and learn best through experiences that integrate essential and employability skills in occupational contexts.

### *Performance Measure 3.a:*

#### **Language Arts and Mathematics Achievement Test Results by Individual Subject for Students in Grades 6 and 9**

##### ***Rationale***

- Student results on Provincial Achievement Tests in each grade and subject provide detailed information on whether elementary and junior high students are achieving high standards in Language Arts and in Mathematics, an important outcome for Alberta's K–12 education system.

##### ***Target***

- Targets for individual Language Arts and Mathematics subject results were not set in the 2021-24 business plan.

##### ***Discussion***

- Results for 2019-20 and 2020-21 school years are not available as participation in the Provincial Achievement Tests was impacted by recent learning disruptions.
- Due to the impact of recent learning disruptions and the June 2022 Grade 9 PAT security breaches, 2021-22 PAT results (at overall and individual subject levels) were not assessed over time. Caution should be exercised when interpreting the results over time.



### Percentages of Students in Grades 6 and 9 Who Achieved the Acceptable Standard on Provincial Achievement Tests in Language Arts *(in percentages)*

| Subject  | 2017-18 | 2018-19 | 2019-20            | 2020-21 | Previous<br>3-year<br>average* | 2021-22 | Target<br>2021-22** |
|--|---------|---------|--------------------|---------|--------------------------------|---------|---------------------|
| Language Arts  |         |         |                    |         |                                |         |                     |
| Grade 6  |         |         |                    |         |                                |         |                     |
| English Language Arts                                  | 83.5    | 83.2    | Data not available |         | 83.2                           | 76.1    |                     |
| French Language Arts                                   | 85.2    | 87.7    | Data not available |         | 87.7                           | 76.9    |                     |
| Français   | 93.3    | 90.3    | Data not available |         | 90.3                           | 83.0    |                     |
| Grade 9  |         |         |                    |         |                                |         |                     |
| English Language Arts                                  | 76.1    | 75.1    | Data not available |         | 75.1                           | 69.6    |                     |
| English Language Arts<br>(Knowledge and Employability) | 55.7    | 57.4    | Data not available |         | 57.4                           | 50.5    |                     |
| French Language Arts                                   | 81.4    | 82.9    | Data not available |         | 82.9                           | 73.5    |                     |
| Français   | 82.7    | 88.6    | Data not available |         | 88.6                           | 80.0    |                     |
| Overall Language Arts                                  |         |         |                    |         |                                |         |                     |
|  | 79.9    | 79.6    | Data not available |         | 79.6                           | 73.5    | 80.4                |

\*The reported "previous 3-year average" includes only the 2018-19 result.

\*\* Targets for 2021-22 were set in December 2021 based on 2018-19 data. Caution should be exercised when assessing results relative to targets.

**Source:** Alberta Education

#### Notes:

- Results for 2019-20 and 2020-21 school years are not available as participation in the Provincial Achievement Tests was impacted by recent learning disruptions. Caution should be exercised when interpreting the results over time.
- Participation in the tests was impacted by the security breaches that occurred over the last few days of the 2021-22 PAT administration window. Student data most likely impacted by these security breaches has been excluded from the overall results. Caution should be exercised when interpreting the results over time.
- The percentages of students who achieved the acceptable standard include the students who achieved the standard of excellence.
- Knowledge and Employability courses are designed for students who meet enrolment criteria and learn best through experiences that integrate essential and employability skills in occupational contexts.
- See Endnote A, page 9, for information on assessing results relative to targets, and results over time.
- See Endnote B, Provincial Achievement Tests, pages 11-12.

### Percentages of Students in Grades 6 and 9 Who Achieved the Acceptable Standard on Provincial Achievement Tests in Mathematics *(in percentages)*

| Subject                                      | 2017-18 | 2018-19 | 2019-20            | 2020-21 | Previous<br>3-year<br>average* | 2021-22 | Target<br>2021-22** |
|--|---------|---------|--------------------|---------|--------------------------------|---------|---------------------|
| Mathematics                                  |         |         |                    |         |                                |         |                     |
| Grade 6                                      |         |         |                    |         |                                |         |                     |
| Mathematics                                  | 72.9    | 72.5    | Data not available |         | 72.5                           | 64.1    |                     |
| Grade 9                                      |         |         |                    |         |                                |         |                     |
| Mathematics                                  | 59.2    | 60.0    | Data not available |         | 60.0                           | 53.0    |                     |
| Mathematics<br>(Knowledge and Employability) | 57.4    | 59.6    | Data not available |         | 59.6                           | 55.3    |                     |
| Overall Mathematics                          |         |         |                    |         |                                |         |                     |
|  | 66.2    | 66.6    | Data not available |         | 66.6                           | 59.9    | 67.2                |

\*The reported "previous 3-year average" includes only the 2018-19 result.

\*\* Targets for 2021-22 were set in December 2021 based on 2018-19 data. Caution should be exercised when assessing results relative to targets.

**Source:** Alberta Education

#### Notes:

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## Performance Measure Methodology

### Endnote A: Technical Notes

#### **Assessing Results Relative to Targets**

Performance targets set expectations for results within specific time frames and are the basis for planning improvements and assessing results that are within the sphere of influence of the Ministry and school authorities. They are an important way to gauge whether the education system is improving or falling behind in obtaining desired results in key areas. Targets clearly establish desired levels of performance better than recent performance, to be attained within a specific time frame. Targets are quantifiable and expressed in numerical terms, such as percentages or ratios. They are used as a key tool to drive, measure, improve and manage performance.

For measures based on achievement tests, a one-sample Chi-square statistical test is used to determine whether the result is significantly different from the target and whether the target is met, not met or exceeded. The magnitude of the difference required between the result and the target to establish significance depends on the sample size, for example, the number of students writing an exam, and the proportion of students meeting standards.

#### **Assessing Results Over Time**

Changes over time are assessed with a two-sample Chi-square statistical test for measures based on tests of student learning or on administrative data, i.e., derived from tracking groups of students over time, such as participation rates in Language Arts Provincial Achievement Tests. The test determines whether the difference between two proportions (e.g., base year and current year results) is significant. The calculation of Chi-square is based on the difference between what was observed and what would be expected assuming that the proportions were the same. Under a simple test of proportions, a Chi-square value of “1” represents a difference of one standard deviation, while a Chi-square value of 3.84 is significant at the five per cent level.

### Trend Lines

Although not appearing in the annual report update, trend lines are an aid to interpreting the results for measures reported in the annual report update. Trend lines augment data interpretation techniques already in use to determine the significance of changes in measure results over time.

Trend lines are used to develop an expected value for a current result given historical results. The expected value can then be compared with the actual result. In this way, trend lines provide a useful method of understanding year-to-year fluctuations and shift the focus from smaller year-to-year changes by providing information about the direction of results over the longer-term. In particular, it is of interest whether results are tracking towards the performance target for the measures that have not met targets.

Discussion of results over time for measures with at least three data points are supported by trend lines. The type of trend line used is selected based on an informed interpretation of the data series underlying the trend.

Logarithmic trend lines are appropriate for proportional data, i.e., data expressed as percentages of a whole and therefore ranging between zero per cent and 100 per cent, such as the performance measures in this report. A logarithmic trend line is a best-fit straight line that is most useful when the rate of change in the data increases or decreases quickly, then levels out.

A logarithmic trend line is calculated using the following formula:

$Y = c \ln(x) + b$ , where  $c$  and  $b$  are constants and  $\ln( )$  is the natural logarithm function and  $x$  is the year of the series.

## **Endnote B: Methodology for Performance Measures**

Described below are the methodologies used to calculate the measures that are derived from provincial assessments of student learning and from other information about Alberta students in the Ministry of Education's data systems.

### **Definition of Alberta Student**

Starting from 2013-14, the definition of an Alberta student is an individual who is registered as of September 30 of the school year in a school located in Alberta, where "school" means a structured learning environment through which an education program is offered to a student by: a board (includes public, separate, Francophone, Lloydminster); an operator of a private school; an early childhood services (ECS) program private operator; the operator of a charter school; a parent giving a home education program; the Minister. It also includes other Alberta-located educational institutions providing ECS to Grade 12 curriculum instruction, specifically Federal (First Nations' schools and those operated by Corrections Canada); and provincial authorities (such as Bow Valley College and NorQuest College).

### **Provincial Achievement Tests**

Students in Grades 6 and 9 write Provincial Achievement Tests annually in Language Arts and Mathematics along with Science and Social Studies. The achievement test results for Grades 6 and 9 provide information on how well Alberta students in public, separate, Francophone, charter and accredited private schools are meeting provincial standards in the core academic subjects. Tests are developed and administered by teachers and educators and are based on the provincial curriculum. Results are reported in relation to the acceptable standard and standard of excellence.

A student achieving the acceptable standard in a specific grade shows an adequate understanding of the core knowledge and adequate basic skills essential to that course. A student achieving the standard of excellence consistently shows a deeper understanding of the concepts of the course by demonstrating an ability to integrate information and evaluate it from various points of view.

For each achievement test, the cut scores for the acceptable standard and the standard of excellence are set initially by a standard-setting committee of about 20 teachers selected from across the province using the Modified Angoff and Bookmark Standard Setting Procedures. These procedures use teachers' judgment to determine a minimum number of items a student must answer correctly – the cut score – to achieve each standard. In subsequent years, the cut scores for each test are adjusted through test equating. This ensures the standards remain constant even if test difficulty varies slightly from year to year. Whenever curriculum is revised, the standard-setting process is done again.

Results on these tests are calculated and presented on the basis of the total number of students in each grade who demonstrated the standards. Results for mathematics include student results on both English and French versions of the tests. Historically, given the large number of students in each grade (more than 40,000), typically differences in results from year-to-year of more than 0.4 percentage points on each test are considered significant. French Language Arts and Français courses have higher significant difference values (1.1 to 3.9 percentage points, depending on the number of students in each course), because fewer students are in these courses.

Not all students write the Provincial Achievement Tests. Achievement test results are not available for students who:

- were absent
- were excused from writing by the superintendent because participation would be harmful to the student or the student could not respond to the test instrument

- wrote but whose results were withheld or invalidated
- wrote only one part of the two-part Language Arts or only Part A of the Grade 6 Mathematics Test.

It is possible that some of these students, under different circumstances, could have demonstrated achievement of standards on the test.

Participation rates in achievement tests are calculated by dividing the number of students in the grade who wrote the test by the sum of total enrolment in the grade plus the ungraded students who are in the corresponding year of schooling.

Provincial overall results in Language Arts and Mathematics present weighted averages based on the number of students enrolled in each course. Test results and participation are recorded and aggregated in ministry systems. Provincial, school authority and school results are available at Provincial Achievement Tests.

In this report update, results for 2019-20 and 2020-21 are not available due to the impact of recent learning disruptions. Additionally, security breaches occurred over the last few days of the 2021-22 Provincial Achievement Test administration window. To maintain the validity of provincial results, student data most likely impacted by these security breaches has been excluded from the overall results. Caution should be exercised when assessing results relative to targets, and when interpreting the results over time.