PIRLS/ePIRLS 2016
Canada in Context

Canadian Results from the Progress in International Reading Literacy Study

cmec

PIRLS/ePIRLS 2016
Canada in Context

Canadian Results from the Progress in International Reading Literacy Study

Authors

Pierre Brochu, Consultation MEP Consulting
Kathryn O'Grady, Council of Ministers of Education, Canada
Tanya Scerbina, Council of Ministers of Education, Canada
Yitian Tao, Council of Ministers of Education, Canada

cmec
Council of Ministers of Education, Canada
Conseil des ministres de l'Éducation (Canada)

The Council of Ministers of Education, Canada (CMEC) was formed in 1967 by the jurisdictional ministers responsible for education to provide a forum in which they could discuss matters of mutual interest, undertake educational initiatives cooperatively, and represent the interests of the provinces and territories with national educational organizations, the federal government, foreign governments, and international organizations. CMEC is the national voice for education in Canada and, through CMEC, the provinces and territories work collectively on common objectives in a broad range of activities at the elementary, secondary, and postsecondary levels.

Through the CMEC Secretariat, the Council serves as the organization in which ministries and departments of education undertake cooperatively the activities, projects, and initiatives of particular interest to all jurisdictions. One of the activities on which they cooperate is the development and implementation of pan-Canadian testing based on contemporary research and best practices in the assessment of student achievement in core subjects.

The Council of Ministers of Education (Canada) would like to thank the students, their parents and teachers, and the administrators in schools and ministries/departments of education whose participation in PIRLS ensured its success. We are truly grateful for your involvement in this study, which will contribute significantly to a better understanding of educational policies and practices in the fundamental area of reading literacy in the early years.

Council of Ministers of Education, Canada
95 St. Clair West, Suite 1106
Toronto, Ontario M4V 1N6

Telephone: (416) 962-8100
Fax: (416) 962-2800
E-mail: cmec@cmec.ca

ISBN 978-0-88987-506-7

Ce rapport est également disponible en français

TABLE OF CONTENTS

Introduction 1

What is PIRLS? 1
Participation levels in Canada 3
Why did Canada participate in PIRLS 2016? 4
Conceptual framework: assessing reading literacy in PIRLS and ePIRLS 2016 6
Definition of reading literacy 6
Purposes for reading 7
Processes of comprehension 8
Reading literacy behaviours and attitudes 9
Learning contexts: home, classroom, school, and community 10
Sampling features of PIRLS 2016 11
Target population 11
General sampling approach 12
Quality assurance 13
Student and school participation in PIRLS 2016 13
General design of the assessment 14
Selecting PIRLS 2016 reading passages 15
Question types and scoring procedures 16
Test design 17
Background questionnaires 17
Objectives and organization of this report 18

1. Canadian Results at the International Benchmarks 21

Students' reading performance at the international benchmarks 23
Reading performance at the international benchmarks by language of the school system 25
Reading performance at the international benchmarks by gender 27
Sample questions to illustrate the benchmarks 28

2. Canadian Achievement Results by Average Score 29

Results in reading for participating countries and Canadian provinces 29
Canadian results in reading by language of the school system 31
Canadian results in reading by gender 32
Canadian results for reading purposes and comprehension processes 34
Achievement in reading by reading purpose 34
Achievement in reading by comprehension process 35
Trends in reading achievement 36

3. Exploring Contextual Factors Related to Reading Achievement 39
The home context 39
Immigration background and languages spoken at home 40
Reading engagement of parents 41
Students' resources at home 42
Parents' reading habits and attitudes 43
Student confidence in their reading ability 45
Student self-efficacy in computer use 46
Attending pre-primary education 47
Age at the beginning of the primary grades 48
Homework 49
Digital devices 51
The school context 52
Teacher characteristics 52
Teacher demographics 53
Teacher education level 53
Teacher professional development 54
Teacher job satisfaction 56
School characteristics 57
Socioeconomic level of the school 57
School libraries 60
School emphasis on academic success 62
Student factors limiting instruction 64
Student readiness to learn 65
School discipline and safety 66
Student bullying 67

Conclusion 69
Overview of results 69
Performance by language of the school system 70
Performance by gender 70
Performance by reading purpose and comprehension process 70
Performance comparisons over time 71
Contextual factors influencing scores 71
The home environment 71
The school context 72
Final statement 73

References 75

Appendix A – Exclusion and response rates in Canada 81

Appendix B – Data Tables 87

LIST OF FIGURES

Introduction **1**

FIGURE 1 PIRLS 2016 – Canadian jurisdictions by participation level 4

1. Canadian Results at the International Benchmarks **21**

FIGURE 1.1 PIRLS 2016 – Proportion of students reaching international benchmarks 24

FIGURE 1.2 ePIRLS 2016 – Proportion of students reaching international benchmarks 25

2. Canadian Achievement Results by Average Score **29**

FIGURE 2.1 PIRLS 2016 – Achievement results by average score 30

3. Exploring Contextual Factors Related to Reading Achievement **39**

FIGURE 3.1 PIRLS and ePIRLS 2016 – Reading achievement for students by immigration status 40

FIGURE 3.2 PIRLS 2016 – Relationship between speaking the language of the test at home and reading achievement 41

FIGURE 3.3 PIRLS 2016 – Relationship between home resources for learning and reading achievement 43

FIGURE 3.4 PIRLS 2016 – Relationship between parental reading enjoyment and average score by language of the school system 45

FIGURE 3.5 PIRLS 2016 – Relationship between attending pre-primary education and average score 48

FIGURE 3.6 PIRLS 2016 – Relationship between homework frequency and reading achievement 50

FIGURE 3.7 PIRLS 2016 – Proportion of teachers by highest level of education completed 54

FIGURE 3.8 PIRLS 2016 – Proportion of teachers by time spent on professional development activities related to reading in the past two years 55

FIGURE 3.9 PIRLS 2016 – Relationship between teacher professional development and reading achievement 55

FIGURE 3.10 PIRLS 2016 – Proportion of teachers by job satisfaction 56

FIGURE 3.11 PIRLS 2016 – School socioeconomic composition and reading achievement 58

FIGURE 3.12 PIRLS 2016 – Relationship between providing free breakfast and reading achievement 60

FIGURE 3.13 ePIRLS 2016 – Proportion of students in schools providing access to digital books 61

FIGURE 3.14 PIRLS 2016 – Proportion of students by schools' emphasis on academic success 63

FIGURE 3.15 PIRLS 2016 – Relationship between school emphasis on academic success and reading achievement 63

FIGURE 3.16 PIRLS 2016 – Relationship between student factors limiting instruction and reading achievement 65
FIGURE 3.17 PIRLS 2016 – Relationship between problems with school discipline and reading achievement 66
FIGURE 3.18 PIRLS 2016 – Relationship between frequency of bullying at school and reading achievement 68

LIST OF TABLES

Introduction 1

TABLE 1 Participation in PIRLS, 2001–2016 2
TABLE 2 Percentages allocated to reading purposes and comprehension processes in PIRLS and ePIRLS 2016 14
TABLE 3 PIRLS 2016 – Main features of the texts used in the assessment 16

1. Canadian Results at the International Benchmarks 21

TABLE 1.1 PIRLS 2016 – Description of the international benchmarks for reading achievement 22
TABLE 1.2 ePIRLS 2016 – Description of the international benchmarks for on-line informational reading achievement 23
TABLE 1.3 PIRLS 2016 – Proportion of students reaching international benchmarks, English-language schools 26
TABLE 1.4 PIRLS 2016 – Proportion of students reaching international benchmarks, French-language schools 26
TABLE 1.5 ePIRLS 2016 – Proportion of students reaching international benchmarks, English-language and French-language schools 27
TABLE 1.6 PIRLS 2016 – Proportion of students reaching international benchmarks by gender 28
TABLE 1.7 ePIRLS 2016 – Proportion of students reaching international benchmarks by gender 28

2. Canadian Achievement Results by Average Score 29

TABLE 2.1 PIRLS 2016 – Comparison of country and provincial results to the Canadian average score 30
TABLE 2.2 ePIRLS 2016 – Comparison of country and provincial results to the Canadian average score 31
TABLE 2.3 PIRLS 2016 – Reading achievement by language of the school system 32
TABLE 2.4 ePIRLS 2016 – Reading achievement by language of the school system 32
TABLE 2.5 PIRLS 2016 – Reading achievement by gender 33
TABLE 2.6 ePIRLS 2016 – Reading achievement by gender 33
TABLE 2.7 PIRLS 2016 – Comparison of results in literary and informational reading 35
TABLE 2.8 Comparison of results in PIRLS and ePIRLS in informational reading 35
TABLE 2.9 PIRLS 2016 – Reading achievement by comprehension process 36
TABLE 2.10 ePIRLS 2016 – Reading achievement by comprehension process 36
TABLE 2.11 PIRLS 2016 – Comparison of results in reading over time 37

3. Exploring Contextual Factors Related to Reading Achievement 39

TABLE 3.1 PIRLS 2016 – Relationship between reading achievement and level of parental involvement in early reading activities by language of the school system 42
TABLE 3.2 PIRLS 2016 – Proportion of parents who like reading 44
TABLE 3.3 PIRLS 2016 – Proportion of students by confidence in reading ability 46
TABLE 3.4 ePIRLS 2016 – Relationship between self-efficacy in computer use and reading achievement 47
TABLE 3.5 PIRLS 2016 – Proportion of students attending pre-primary education 48
TABLE 3.6 PIRLS 2016 – Proportion of students by age when starting Grade 1 49
TABLE 3.7 PIRLS 2016 – Proportion of students by frequency of homework 50
TABLE 3.8 ePIRLS 2016 – Level of access to digital devices in the home and reading achievement 51
TABLE 3.9 ePIRLS 2016 – Availability of digital devices at school and reading achievement 52
TABLE 3.10 PIRLS 2016 – Percentage of Grade 4 teachers by gender, age group, and years of experience 53
TABLE 3.11 PIRLS 2016 – Provision of meals in schools 59
TABLE 3.12 PIRLS 2016 – Proportion of students based on the size of the school library 61
TABLE 3.13 PIRLS 2016 – Proportion of students by level of student factors limiting classroom instruction 64
TABLE 3.14 PIRLS 2016 – Proportion of students stating that they arrive at school feeling tired 66
TABLE 3.15 PIRLS 2016 – Proportion of students bullied at school, 2011 and 2016 67

Appendix A – Exclusion and response rates in Canada 81

TABLE A.1 PIRLS/ePIRLS 2016 exclusion rates by type of exclusion 82
TABLE A.2 PIRLS/ePIRLS 2016 school sample sizes 83
TABLE A.3 PIRLS/ePIRLS 2016 student sample sizes in participating schools 84
TABLE A.4 PIRLS/ePIRLS 2016 participation rates (weighted) 85

Appendix B – Data Tables 87

TABLE B.1.1 Percentage of students reaching the international benchmarks in reading (PIRLS) 87
TABLE B.1.2 Percentage of students reaching the international benchmarks in reading (ePIRLS) 88
TABLE B.1.3 Percentage of students reaching the international benchmarks in reading by language of the school system (PIRLS) 89
TABLE B.1.4 Percentage of students reaching the international benchmarks in reading by language of the school system (ePIRLS) 89
TABLE B.1.5 Percentage of students reaching the international benchmarks in reading by gender (PIRLS) 90
TABLE B.1.6 Percentage of students reaching the international benchmarks in reading by gender (ePIRLS) 90

Table B.2.1 Achievement scores in reading (PIRLS)....91
Table B.2.2 Achievement scores in reading (ePIRLS)....92
Table B.2.3 Achievement scores in reading by language of the school system (PIRLS)....93
Table B.2.4 Achievement scores in reading by language of the school system (ePIRLS)....93
Table B.2.5 Achievement scores in reading by gender (PIRLS)....94
Table B.2.6 Achievement scores in reading by gender (ePIRLS)....95
Table B.2.7 Achievement scores in reading purposes (PIRLS)....96
Table B.2.8 Achievement scores in informational reading purpose (PIRLS/ePIRLS)....97
Table B.2.9 Achievement scores in comprehension processes (PIRLS)....98
Table B.2.10 Achievement scores in comprehension processes (ePIRLS)....99
Table B.2.11 Achievement scores in reading over time, 2001–2016 (PIRLS)....100
Table B.2.12 Comparison of reading performance over time, 2001–2016 (PIRLS)....100
Table B.3.1 Relationship between being born in the country and student achievement in reading (PIRLS)....101
Table B.3.2 Relationship between being born in the country and student achievement in reading (ePIRLS)....101
Table B.3.3 Relationship between speaking the language of the test at home and reading achievement (PIRLS)....102
Table B.3.4 Relationship between speaking the language of the test at home and reading achievement (ePIRLS)....102
Table B.3.5 Relationship between home educational resources and Grade 4 student achievement in reading (PIRLS)....103
Table B.3.6 Relationship between home educational resources and Grade 4 student achievement in reading (ePIRLS)....103
Table B.3.7 Relationship between parental reading enjoyment and reading achievement by language of the school system (PIRLS)....104
Table B.3.7.1 Intra-provincial comparison of reading achievement between anglophone and francophone schools....104
Table B.3.8 Relationship between confidence in reading and student achievement in reading by gender (PIRLS)....105
Table B.3.8.1 Intra-provincial comparison of reading achievement between girls and boys....105
Table B.3.9 Relationship between attendance of pre-primary education and student achievement in reading (PIRLS)....106
Table B.3.10 Relationship between age when starting Grade 1 and student achievement in reading (PIRLS)....107
Table B.3.11 Relationship between frequency of homework and student achievement in reading (PIRLS)....108
Table B.3.12 Percentage of Grade 4 teachers by gender (PIRLS)....109
Table B.3.13 Percentage of Grade 4 teachers by age group (PIRLS)....109
Table B.3.14 Mean years of teaching experience of Grade 4 teachers (PIRLS)....110
Table B.3.15 Relationship between teachers' highest level of formal education and Grade 4 student achievement in reading (PIRLS)....110

Table B.3.16 Relationship between teacher professional development and student achievement in reading (PIRLS) 111
Table B.3.17 Relationship between teacher job satisfaction and student achievement in reading (PIRLS) 112
Table B.3.18 Relationship between school socioeconomic composition and student achievement in reading (PIRLS) 112
Table B.3.19 Relationship between providing a free breakfast and Grade 4 student achievement in reading (PIRLS) 113
Table B.3.20 Relationship between providing a free lunch and Grade 4 student achievement in reading (PIRLS) 113
Table B.3.21 Relationship between a school library and student achievement in reading (PIRLS) 114
Table B.3.22 Relationship between the number of books in a school library and student achievement in reading (PIRLS) 115
Table B.3.23 Relationship between school access to digital books and student achievement in reading (ePIRLS) 116
Table B.3.24 Relationship between school emphasis on academic success and student achievement in reading (PIRLS) 116
Table B.3.25 Relationship between student factors limiting classroom instruction and student achievement in reading (PIRLS) 117
Table B.3.26 Relationship between arriving at school feeling hungry and student achievement in reading (PIRLS) 118
Table B.3.27 Relationship between arriving at school feeling tired and student achievement in reading (PIRLS) 119
Table B.3.28 Relationship between school discipline problems and Grade 4 student achievement in reading (PIRLS) 120
Table B.3.29 Relationship between being bullied and student achievement in reading (PIRLS) 120

INTRODUCTION

What is PIRLS?

The Progress in International Reading Literacy Study (PIRLS) is an international assessment that measures trends in reading achievement of Grade 4 students as well as the impact of policies and practices related to literacy. The study is administered every five years and is carried out by the International Association for the Evaluation of Educational Achievement (IEA), an independent cooperative of research institutions and governmental agencies. IEA was founded in 1959, with a Secretariat based in Amsterdam (the Netherlands), to conduct large-scale comparative studies on the effects of educational policies and practices around the world. IEA's membership has now grown to over 60 countries.

PIRLS is one of the regular research studies of cross-national achievement conducted by IEA, and it relies on collaboration among the research centres responsible for data collection in each country. It is overseen by IEA's TIMSS & PIRLS International Study Center, located at Boston College in Massachusetts. PIRLS provides participating countries with unique information on how well their students can read after four years of elementary school and places this information in an internationally comparative context. Grade 4 was chosen because it represents an important transition point in students' development, the point at which students are expected to have already learned how to read and are now using their reading skills to learn. In each participating country, the student mean age is at least 9.5 years at the time of assessment. In addition to data on reading achievement, PIRLS also collects a significant range of contextual information about home and school supports for literacy via student, home, teacher, and school questionnaires. The data from these questionnaires enable PIRLS to relate students' achievement to curricula, instructional practices, and school environments. Since educational systems vary widely around the world, the study of their variations provides a unique opportunity to gain a deeper understanding of the effects of different policies and practices. The results obtained by PIRLS are used to improve teaching and learning methods in reading in many countries.

The first PIRLS assessment took place in 2001, with 35 countries participating. It was based on a new framework developed as a collaborative effort by all the countries, provinces/states, institutions, and agencies involved in the 2001 administration. Table 1 provides the administration schedule of PIRLS since its inception. It shows the number of participating countries and lists the Canadian provinces that have participated in each cycle. The countries and provinces that participated in the three previous cycles of PIRLS (2001, 2006, and 2011) are now able to identify trends in their students' performance by comparing the results across 15 years. When comparing findings from 2011 and 2016 in Canada,[1] it should be noted that there were some differences in the provinces constituting the Canadian sample in these two years, as shown in Table 1.

[1] Participation levels were high enough in 2011 and 2016 to obtain a Canadian average.

Table 1 Participation in PIRLS, 2001–2016

Year	Number of countries	Participating provinces
2001	35	Ontario, Quebec
2006	40	British Columbia, Alberta, Ontario, Quebec, Nova Scotia
2011	45	British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick (French), Nova Scotia, Newfoundland and Labrador
2016	50	British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Newfoundland and Labrador

In 2016, IEA created a new extension to the PIRLS assessment: ePIRLS, an innovative assessment of on-line reading.[2] With the Internet now a major source of information at home and at school, reading curricula in countries around the world are acknowledging the importance of on-line reading. ePIRLS uses an engaging simulated Internet environment to measure Grade 4 students' achievement in reading for informational purposes. In Canada, students from four provinces participated in ePIRLS 2016: British Columbia, Ontario, Quebec,[3] and Newfoundland and Labrador.

The present document reports PIRLS and ePIRLS 2016 results for Canadian provinces and for Canada overall[4] and compares them to international results.

PIRLS 2016 focused on three aspects of reading literacy:

- the purposes of reading (i.e., reading for literary experience and reading to acquire and use information);
- the processes of comprehension (i.e., focusing on and retrieving explicitly stated information; making straightforward inferences; interpreting and integrating ideas and information; and evaluating and critiquing content and textual elements); and
- reading behaviours and attitudes toward reading.

The ePIRLS component focused on on-line informational reading tasks covering the same comprehension processes as the written PIRLS component.

During the PIRLS test, students were asked to answer a number of multiple-choice and constructed-response questions in two 40-minute sessions and then complete a 30-minute questionnaire about their background, including their personal reading habits. On a separate day, students in those provinces participating in ePIRLS also completed two 40-minute reading tasks on the computer. Parents or guardians, schools, and teachers of students who participated in ePIRLS and/or PIRLS were asked to complete questionnaires about the reading experiences young children have at home and at school. The details of the 2016 test are described in the General Design of the Assessment section below.

In Canada, the results from PIRLS are used for research and policy purposes only. They are not included in a student's academic record and are valid only at the national and provincial levels. In its report on

[2] In this report, "on-line reading" and "digital reading" are used interchangeably when describing the ePIRLS results.
[3] British Columbia, Ontario, and Newfoundland and Labrador oversampled in order to provide reliable provincial results. Quebec sampled at the Canadian level only and, because of the small sample size, results for Quebec are not presented for ePIRLS.
[4] The Canadian average is composed of the weighted aggregated results from students in all participating provinces.

PIRLS, the Canadian Ministers of Education, Canada (CMEC) does not attribute any results to individual students, schools, or school boards, although individual provinces may elect to release results and information differently.

Participation levels in Canada

Since 2001, IEA has established practices for participation in PIRLS. Each country decides on its participation status individually, based on the data needs and resources available, and the decision is coordinated through the IEA Secretariat in Amsterdam. In total, 50 countries participated in PIRLS 2016 (see Appendix B.1.1 for a complete list of participants). Depending on their economic capacity and data needs, some jurisdictions, states, provinces, and geographical or cultural regions of a country may choose to participate in PIRLS at a benchmarking level. There were 11 benchmarking participants in the 2016 assessment. Benchmarking participants can be defined as entities with distinct education systems of their own and representative samples of students, allowing them to be treated as separate countries. Thus, they follow the same procedures and meet the same standards as entities participating at the country level, and their results are reported separately in the international PIRLS report.

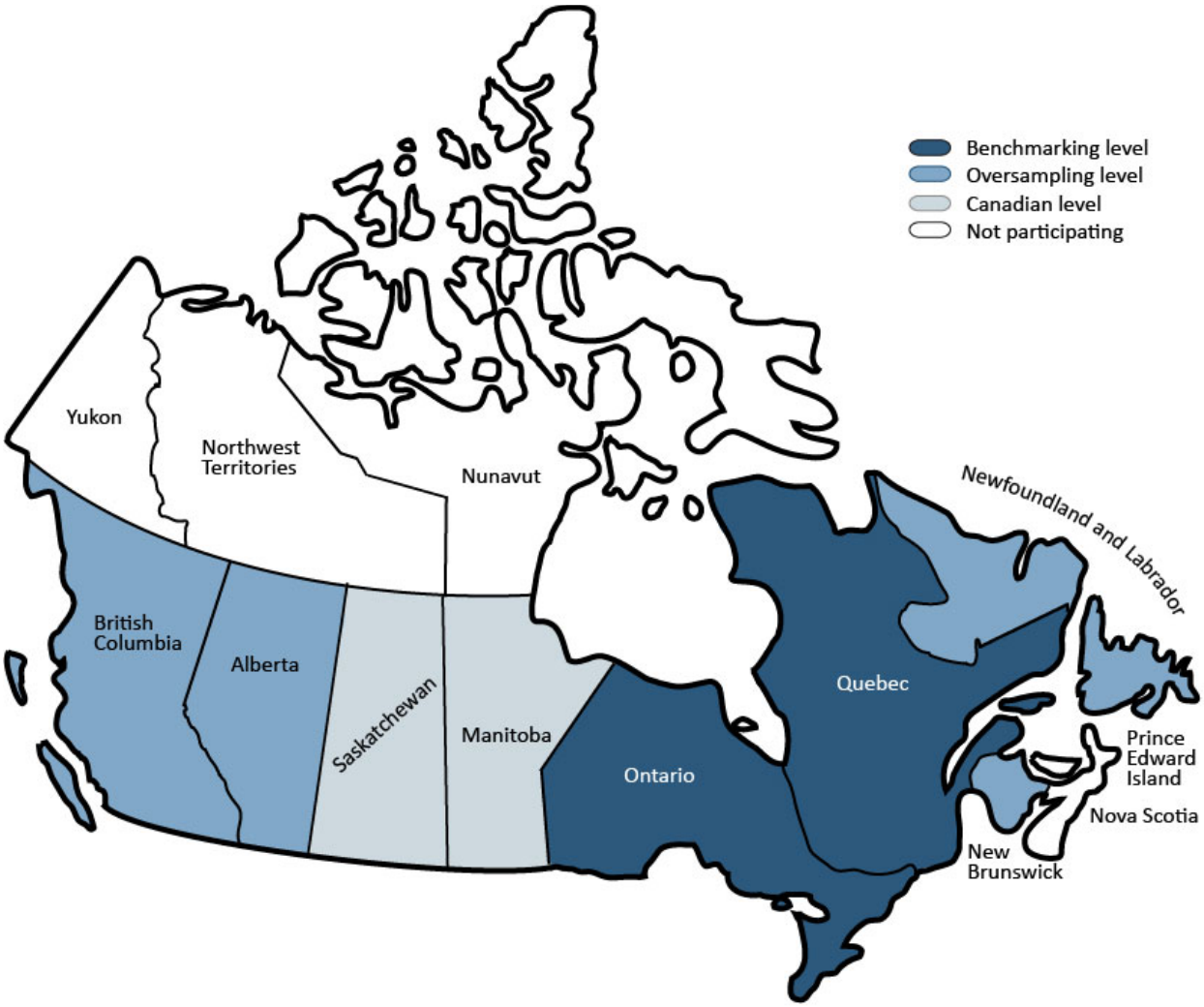
In 2016, in addition to the standard PIRLS assessment, IEA also offered the PIRLS Literacy Assessment, which is equivalent in scope to PIRLS but with less-difficult tasks based on shorter passages. Some countries whose Grade 4 students are still developing fundamental reading skills elected to participate in PIRLS Literacy to gain better insights into the reading skills of their students at the lower end of the PIRLS achievement scale.

As shown in Figure 1, eight Canadian jurisdictions participated in PIRLS 2016 at three levels of participation:

- *Benchmarking level:* Participation at the benchmarking level gave provinces an opportunity to evaluate their programs in an international context and to compare the performance of their students with that of students in participating countries. The results of the benchmarking participants are included in the PIRLS 2016 international report (Mullis, Martin, Foy, & Hooper, 2017b). Two Canadian provinces participated at the benchmarking level: Ontario and Quebec.[5]
- *Oversampling level:* Oversampling can be defined as the selection of a greater number of respondents in a subgroup than their relative size in the population would require. This technique provides reliable estimates, allowing an analysis of each subgroup separately. Oversampling allows Canadian jurisdictions to be compared to each other and to international participants. These results are not included in the PIRLS 2016 international report but are provided in this Canadian report. Four jurisdictions participated at the oversampling level: British Columbia, Alberta, New Brunswick, and Newfoundland and Labrador.
- *Canadian level:* The sample size of the jurisdictions participating at this level was not sufficient to report reliable provincial results, so the data could only be reported collectively, as part of the Canadian average. Two provinces participated at the Canadian level: Saskatchewan and Manitoba.

[5] Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied. However, a non-response bias analysis was not performed to determine the presence of a bias.

FIGURE 1 **PIRLS 2016 – Canadian jurisdictions by participation level**



In this report, the results will be presented:

- individually, for provinces participating at the benchmarking and oversampling levels (six provinces in total); and
- collectively, for Canada as a whole (with results from the eight participating provinces to be aggregated at the Canadian level).

Why did Canada participate in PIRLS 2016?

People's ability to read is essential to the cultural, political, social, and economic growth of a society (UNESCO, 2006). Canada's future prosperity depends heavily on reading literacy, which is the key to all areas of learning and unlocks a wide range of possibilities for personal development. Therefore, it would appear to be very important to have easily accessible information about students' achievement in reading and to measure the success of provincial/territorial and pan-Canadian literacy initiatives for children in the early years.

Although Canadian students are among the most proficient readers in the world (OECD, 2016b) and Canadian Grade 4 students obtained strong results in PIRLS 2011 (Mullis, Martin, Foy, & Drucker, 2012), there remains a significant proportion of youth who do not possess the necessary knowledge and literacy skills to adequately benefit from educational opportunities. Indeed, the PIRLS 2011 results revealed that 14 per cent of Grade 4 students did not reach the *intermediate* international benchmark, although there were significant differences across provinces and by language and gender (Labrecque, Chuy, Brochu, & Houme, 2012). Results from the most recent Pan-Canadian Assessment Program (PCAP) assessment show that 12 per cent of Grade 8/Secondary II students in Canada did not reach Level 2 in reading, the baseline level of reading proficiency or the expected level for their grade in reading (O'Grady, Fung, Servage, & Khan, 2018). Thus, it is of the utmost importance to be able to identify, as quickly as possible, those areas in which students encounter difficulties, so as to enable Canadian parents and educators to intervene early. If Canada is to remain among the most literate countries in the world, several questions need to be answered: What are the home, school, and classroom factors that influence reading in the early years of schooling? What characterizes those students who struggle in reading? What can be done at home to support children in the early years when they transition from learning to read to reading to learn? How can education systems address reading achievement disparities among ethnic, language, and socioeconomic groups? The data collected by PIRLS combined with other data sources may help answer these questions and provide policy-makers, researchers, and practitioners with information that could help determine and remediate any structures limiting children's reading acquisition (Kuger & Klieme, 2016; Schwippert & Lenkeit, 2012).

It is important to note that PIRLS is the only international program that assesses reading achievement of Canadian students in the early years of education. There have been several early elementary assessments in reading at the provincial level in Canada, but there is currently no other systematic large-scale assessment offering international comparisons. Thus, PIRLS represents a unique means for Canadian provinces to obtain data on reading achievement of Grade 4 students and compare them against student achievement in other provinces and countries. Because they are administered on a five-year cycle, PIRLS assessments allow early literacy levels to be tracked over time, enhancing their analytical power. Thus, Ontario and Quebec, the two provinces that have been participating in PIRLS since 2001, will be able to monitor their changes in reading over the past 15 years. Having taken part in PIRLS since 2006, Alberta and British Columbia will be able to track their reading achievement over the past ten years. Since Canada overall and the provinces of New Brunswick (French) and Newfoundland and Labrador were oversampled in PIRLS 2011, they will be able to monitor change over the past five years. For New Brunswick (English), 2016 will constitute its baseline year.

With the majority of provinces[6] in Canada participating in PIRLS 2016, CMEC is now able to publish pan-Canadian indicators of early literacy for elementary students. This information can be used by Canadian provinces to inform the evaluation of changes implemented in their education systems and to consider them in a pan-Canadian and an international context as well. Indeed, a much better sense of how effectively Canada's education systems are working can be gained by putting the results into an international context than by studying them independent of comparable data from other countries (Porter & Gamoran, 2002).

[6] No data were collected in the three territories or in First Nations schools. Further information on sampling procedures and response rates for Canada can be found in Appendix A.

With the exponential growth of use of information technologies as a tool for learning, even in the early years, the introduction of ePIRLS in 2016 provides a unique opportunity to study the relationship between achievement in print reading and digital reading. In 2012 and more recently in 2015, the Programme for International Student Assessment (PISA) established this link and confirmed that Canadian 15-year-olds are strong not only in print reading but also in computer-based reading (Brochu, Deussing, Houme, & Chuy, 2013; O'Grady, Deussing, Scerbina, Fung, & Muhe, 2016). The pervasive use of computers in society necessitates that our education systems monitor how well our students are prepared to function in both types of reading environments throughout their educational path.

Many factors related to the curriculum, the learning environment, and teacher preparation and professional development are amenable to policy intervention (Wagemaker, 2012). Canadian provinces and territories invest significant public resources in elementary education, and the results obtained by PIRLS should help channel spending to those areas of early education in which it is most needed and which can have the strongest impact on student literacy skills.

Conceptual framework: assessing reading literacy in PIRLS and ePIRLS 2016

Definition of reading literacy

To convey a broad notion of what the ability to read means, PIRLS joins two terms: *reading* and *literacy*. This view is increasingly prevalent in international large-scale assessments as well as in language arts curricula across Canada (CMEC, 2016). Combining the terms connects the ability to reflect on what is read with the ability to use reading as a tool for attaining individual and societal goals (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2009). The term *reading literacy* has been employed by IEA since its 1991 reading literacy study (Elley, 1992, 1994; Wolf, 1995), which served as a basis for establishing the assessment framework used by PIRLS. The framework has been regularly updated and improved since that time, as reflected in the subsequent cycles of the PIRLS assessment (Campbell, Kelly, Mullis, Martin, & Sainsbury, 2001; Mullis, Kennedy, Martin, & Sainsbury, 2006; Mullis et al., 2009; Mullis, Martin, & Sainsbury, 2016).

The PIRLS 2016 Assessment Framework provides the following definition of reading literacy:

> For PIRLS, reading literacy is defined as the ability to understand and use those written language forms required by society and/or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment (Mullis et al., 2016, p. 12).

This definition of reading literacy relies on theories that consider reading as a constructive and interactive process (Alexander & Jetton, 2000; Anderson & Pearson, 1984; Chall, 1983; Ruddell & Unrau, 2004; Walter, 1999). Readers actively construct meaning using a repertoire of linguistic skills, cognitive and metacognitive strategies, and their background knowledge. Literate readers are those who enjoy reading but also learn from it, acquiring knowledge of the world and of themselves. They gain information from many forms of texts (e.g., books, newspapers, and digital forms such as e-mail, text messaging, and Internet Web sites) and in a variety of contexts (e.g., the classroom, the school library, reading communities in and out of school). Reading to learn is essential for children, since it enables them to engage in lifelong learning and

prepare for their future careers. It is generally accepted that the transition from learning to read to reading to learn is usually made around Grade 4 (Mullis et al., 2006, 2009, 2016).

It is important to note the similarities that exist between the definitions of reading in PIRLS, PISA, PCAP, and the Programme for the International Assessment of Adult Competencies (PIAAC). Although these programs target four different populations (Grade 4 for PIRLS, Grade 8/Secondary II for PCAP, 15-year-old students for PISA, and adults from 16 to 65 years old for PIAAC), all of them emphasize the constructive and interactive nature of reading. Thus, PCAP, which is based on common elements of curricula across Canada, defines *reading literacy* as "the ability to construct meaning from texts through understanding, interpreting, and responding personally and critically to text content in order to make sense of the world and participate in society" (CMEC, 2016, p. 12). It describes the process of reading as the active interaction of four components: the reader, the text, the reader's purpose, and the context. PISA also uses the term *reading literacy* and defines it as "understanding, using, reflecting on, and engaging with written texts, in order to achieve one's goals, develop one's knowledge and potential, and participate in society" (OECD, 2016a, p. 51). Unsurprisingly, PIAAC's definition of reading is virtually identical to PISA's: "understanding, evaluating, using, and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential" (OECD, 2012, p. 20). Thus, all four programs share similar definitions.

PIRLS and ePIRLS examine three aspects of students' reading literacy:

- purposes for reading;
- processes of comprehension; and
- reading literacy behaviours and attitudes.

These three aspects are interrelated and depend on the contexts in which students live and learn, including home, classroom, school, and community contexts. In order to identify effective procedures and practices for developing children's reading literacy, PIRLS collects information on these contexts through background questionnaires.

In what follows, each aspect of the reading literacy studied by PIRLS will be discussed in detail.

Purposes for reading

The first aspect examined by PIRLS and ePIRLS is directly related to the question "Why do people read?" and, more importantly, "Why do young students read?" PIRLS focuses on two main purposes: reading for literary experience, and reading to acquire and use information. These two purposes are covered equally in the PIRLS assessment, as they account for a significant part of the reading done by young students in and out of school, which is often associated with certain types of text. ePIRLS, on the other hand, focuses solely on the acquisition and use of information obtained on-line.

- *Reading for literary experience*: Fiction is the type of text most often read for the literary experience it provides. It allows the reader to get involved in imagined events, actions, characters, and ideas while enjoying language itself. PIRLS uses mostly narrative fiction (e.g., short stories and novels), which offers children an opportunity to explore and reflect on situations that could be encountered in life.

- *Reading to acquire and use information*: This kind of reading is usually associated with informational texts, allowing readers to understand how the real world works and why things happen the way they do. In PIRLS, these include texts that recount events (e.g., biographies and autobiographies), procedural texts (e.g., recipes and instructions), expository texts (e.g., textbooks and research papers), and persuasive texts (e.g., advertisements). The organization and presentation of information varies, depending on the type of the text. In ePIRLS, the assessment simulates Web sites that Grade 4 students might consult to carry out school-based work.

Although PIRLS distinguishes between the two purposes for reading, the comprehension processes employed by readers for both purposes are more similar than different.

Processes of comprehension

Processes of comprehension relate to the question of "how the reader constructs meaning from a text." PIRLS and ePIRLS focus on four processes of comprehension, incorporating questions that reflect multiple processes in the context of a particular reading passage. The four processes are as follows:

- *Focusing on and retrieving explicitly stated information*: This process requires the reader to be able to understand explicitly stated information and to relate it to the question posed. Little or no inferring is needed, as meaning is evident and clearly stated in the text. However, the relevance of the information or idea should be recognized by the reader. Examples of this type of text processing include tasks such as identifying information that is relevant to the specific reading goal, looking for specific ideas, searching for definitions of words or phrases, identifying the setting of a story (e.g., time, place), and finding the topic sentence or main idea (when explicitly stated).
- *Making straightforward inferences*: This process enables the reader to fill in the "gaps" in meaning by inferring information from the text. Straightforward inferences require very little effort and are usually performed automatically by skilled readers. Examples of the process include tasks such as inferring that one event caused another event, drawing conclusions about what the main point of a series of arguments is, identifying generalizations made in the text, and describing the relationship between two characters.
- *Interpreting and integrating ideas and information*: This process allows the reader to construct a more complete understanding of the text by integrating prior knowledge and the information available in the text. The connections to be made are not only implicit; they may also be open to the reader's interpretation. Since the interpretation and integration of ideas are very much determined by a reader's personal experience, the meaning constructed through this type of processing is likely to vary among readers. Examples of the process include tasks such as discerning the overall message or theme of a text, considering an alternative to the actions of the characters, comparing and contrasting text information, inferring a story's mood or tone, and interpreting a real-world application of text information.
- *Examining and critiquing content and textual elements*: This process enables the reader to stand apart from the text in order to critically consider its elements of text structure and language. When evaluating the content, the reader may compare the writer's representation of the world with his or her own understanding, or with information from other sources. When evaluating the language and textual elements, the reader may reflect on how well the meaning is expressed by drawing on his or her own knowledge of text genre, structure, or language conventions. In any case, this process depends on the reader's familiarity with the topic and language. Examples of the process include tasks such as judging the completeness and clarity of information, evaluating the likelihood that the events described could

really happen, evaluating the likelihood that the author's argument could change people's thoughts or actions, judging how well the title of the text reflects the main theme, describing the effects of language features, and determining an author's perspective on the central topic.

The four processes described above are assessed within each of the two purposes for reading (i.e., reading for literary experience, and reading to acquire and use information).

Overall, the comprehension processes and strategies assessed in PIRLS and ePIRLS are parallel, but the ePIRLS reading tasks take place in a simulated Internet environment. ePIRLS includes a series of interconnected Web pages and different types of visual information and requires that students navigate between pages and sites. It simulates an authentic, but closed, on-line reading experience in support of the completion of a plausible school-based science or social studies project. Importantly, ePIRLS emphasizes reading comprehension skills, not on-line navigation skills, as it provides a brief tutorial on basic on-line abilities required for the assessment. A teacher avatar is also provided to assist students in moving along the reading tasks in the allotted time.

Reading literacy behaviours and attitudes

The ability to realize one's potential requires having not only efficient processes of comprehension, but also behaviours and attitudes that support lifelong reading. For this reason, PIRLS dedicates a substantial proportion of the Student Questionnaire to the following important components:

- *Student reading literacy behaviours*: Recreational reading activities, such as reading books and magazines, browsing for information on the Internet, or visiting a library, play an important role in the development of reading literacy. An analysis of the PIRLS 2011 Canadian data (CMEC, 2013) provided compelling evidence that parental engagement in both early literacy and numeracy activities with their children was related to higher reading achievement. Research also shows that students who read for fun and participate in social aspects of reading by discussing books with family and friends demonstrate higher reading performance (Sainsbury & Schagen, 2004; van der Voort, 2001). On the other hand, students who spend most of their recreational time watching television tend to show lower reading achievement (van der Voort, 2001). Thus, out-of-school behaviours and social interactions can be considered significant factors affecting reading literacy.
- *Attitudes toward reading and motivation to read*: Positive attitudes toward reading are among the most important prerequisites for lifelong readers. Indeed, research indicates that good readers are typically those who enjoy reading and demonstrate a positive attitude toward different reading activities (Mullis, Martin, Kennedy, & Foy, 2007). Moreover, a meta-analysis by Petscher (2010) showed that the positive relationship between attitudes toward reading and reading achievement is stronger for elementary-school students than for older students. As noted by Mullis et al. (2016), both intrinsic and extrinsic motivation to read play a role in fostering positive learning behaviours and higher reading achievement.
- *Student readiness to learn*: Before engaging with learning content, students must be in positive physiological dispositions, free of nutritional problems (Taras, 2005) or sleep deprivation (Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010). Yet PIRLS 2011 found that Canadian teachers felt that their instruction was limited by students' lack of sleep *to some extent* or *a lot* for two-thirds of their students and by lack of basic nutrition for one-third of students (Labrecque et al., 2012). Although these proportions are lower than the international averages, they are still surprisingly high for a country at a higher than average socioeconomic level. Readiness to learn is also related to positive psychological

dispositions such as feelings of belonging in school or an environment free of bullying (Konishi, Hymel, Zumbo, & Li, 2010) or cyberbullying (Tokunaga, 2010). The PIRLS 2011 data provided evidence that Grade 4 students in all participating provinces who said they were bullied at school *about weekly* had much lower reading achievement than those who said they were *almost never* bullied (Labrecque et al., 2012).

- *Attitudes toward learning to read*: Motivation to learn to read involves the value that reading has for the student, his or her interest in what is read, and, most important, the feeling that he or she can succeed. Thus, it is essential for students to have a strong self-concept and self-esteem with respect to their own reading skills in order to be able to attain higher levels of reading literacy (Quirk, Schwanenflugel, & Webb, 2009). Fluent and successful readers enjoy challenging reading, which goes beyond simple decoding and word recognition and involves personal interest in what is read.

Learning contexts: home, classroom, school, and community

Students' achievement in reading literacy as well as their reading behaviours and attitudes toward reading are the results of learning and life experiences accumulated through a variety of contexts. PIRLS collects extensive information on the national (and provincial), home, and school (including classroom) contexts through its questionnaires.

- *National context*: A large number of macro-level contextual factors can influence how learning in general and reading instruction in particular take place. Through a Curriculum Questionnaire, which is completed by all provinces, PIRLS collects important information on topics such as the language teaching and learning systems, population characteristics (e.g., economic resources, demographics, geographic regions), the organization and structure of the educational systems, educational pathways in the early years (e.g., pre-primary education, age of entry, grade retention, ability grouping), characteristics of the language arts and reading curriculum at the primary level, teacher education and characteristics of the teaching workforce, and curriculum monitoring systems. In a country like Canada, where education is decentralized, collecting information on these factors at the provincial level is essential for a thorough understanding of the broader context in which Grade 4 students learn to read.
- *Home context*: IEA studies conducted over the past two decades have shown a strong positive relationship between the reading achievement of elementary school students and a supportive environment at home (see the PIRLS 2011 International and Canadian reports[7]). In order to further investigate this relationship, the Learning to Read Survey (Home Questionnaire) was used to collect data from parents or caregivers on home resources for learning, language(s) spoken at home, parental educational expectations and beliefs about learning in general and reading in particular, early literacy and numeracy activities in the home, and home support for reading.
- *Classroom context*: The classroom is where most formal learning takes place. Since young students spend several hours each day with their teacher(s) and other students in the classroom, PIRLS focuses on a number of factors that can influence classroom instruction, including teacher education and experience, classroom resources, how reading instruction is integrated in the overall instruction time, homework (content, frequency, duration), student engagement, instruction related to on-line reading, and classroom assessment practices.

[7] Mullis et al., 2012; Labrecque et al., 2012.

- *School context*: Because resources available and policies established at the school level often set the tone for the structure and environment at the classroom level, PIRLS pays special attention to school factors, including school characteristics (e.g., location, composition by student background), the extent to which instruction is affected by resource shortages or school climate, teacher working conditions and job satisfaction (as perceived by principals), principal leadership, school emphasis on academic success, and school safety and order.

In summary, PIRLS collects information about the home, school, and classroom contexts by means of background questionnaires that are completed by the students being assessed, their parents or caregivers, their school principals, and their teachers. In addition, information about the national and provincial contexts is collected through a Curriculum Questionnaire completed by the national research coordinators in each country. Based on the responses to the Curriculum Questionnaire, the results from each jurisdiction participating in PIRLS are compiled and presented in the Canada chapter in the *PIRLS Encyclopedia* (Mullis, Martin, Goh, & Prendergast, 2017), summarizing the structure of its education system; the reading curriculum and reading instruction in primary school; teacher-education requirements; and assessment and examination practices.

Sampling features of PIRLS 2016

Target population

PIRLS is designed to assess reading achievement at the same grade across different countries. This grade corresponds to the fourth year of formal schooling, which typically represents an important transition point in reading development: the point at which students are expected to have learned how to read and are now using reading to learn. It is also the point at which many countries start having separate classes for different subjects (e.g., mathematics, science). Below is the definition of the target population, as published in the PIRLS 2016 Assessment Framework:

> The PIRLS target population is the grade that represents four years of schooling, counting from the first year of ISCED [International Standard Classification of Education] Level 1, which corresponds to the fourth grade in most countries. To better match the assessment to the achievement level of students, countries have the option of administering PIRLS or PIRLS Literacy at the fifth or sixth grade.[8]

ISCED Level 1 corresponds to primary education, indicating the beginning of systematic apprenticeship in reading, writing, and mathematics (UNESCO Institute for Statistics, 2012). Thus, the PIRLS target grade would be the fourth year from the time this systematic apprenticeship started, which is Grade 4 in most countries, including in all Canadian provinces and territories.

The age of entry to primary school varies significantly across the world: most countries report policies requiring children to begin school at age six, but there are also countries where students enter school at age five (e.g., England, New Zealand, Trinidad and Tobago) or at age seven (e.g., most Eastern European countries). Because age is a fundamental factor to be considered in any assessment carried out in the early years, IEA established a policy stating that children should be at least nine years old before being asked

[8] From the IEA website, at http://www.iea.nl/pirls

to participate in PIRLS. The aim of such a policy is to ensure a level playing field so that students do not fall under the minimum average age of 9.5 years at the time of testing. For countries where children enter school early, and the average age of Grade 4 students at the time of testing would be less than 9.5 years, PIRLS recommends assessing the next higher grade (i.e., Grade 5). Also, in order to meet the needs of developing countries for which the assessment in Grade 4 is too difficult, PIRLS offers PIRLS Literacy (a less difficult and shorter reading assessment). This assessment contains reading passages and questions that are common with those of PIRLS, which allows reporting PIRLS Literacy on the PIRLS scale of achievement. These considerations means that, in some cases, Grade 4 children may have been assessed using PIRLS Literacy and that PIRLS may have been administered at Grades 5 or even Grade 6. It is important to note, however, that the international report clearly documents any such deviation from the normal sampling approach for PIRLS when presenting achievement results.

The age of entry to primary school in Canada varies across provinces, from five to seven years of age (see Mullis et al., 2017c for details on the education systems in Canada). Because the average age of Grade 4 students in Canada was over 9.5 years at the time of the assessment (precisely, the mean was 9.9 years), PIRLS 2016 was administered to Grade 4 students in all Canadian provinces.

General sampling approach

The general approach in PIRLS was to sample from 100 per cent of the international desired target population, which includes all students enrolled in the target grade (Grade 4 in most countries, including Canada). Occasionally, a country could exclude some portion of the population, based on geographic or linguistic constraints.

In order to enhance the precision of the survey results, sample stratification was employed in PIRLS 2016. Stratification variables could include a number of characteristics of the population. In Canada, the sample was stratified by region (i.e., by province); school type or source of funding (i.e., public or private); language of instruction (English or French); level of urbanization (i.e., whether the school was in a urban or rural area); and school size (small or large).

A two-stage, stratified cluster design was used: the first stage consisted of a stratified random sample of schools, and the second stage consisted of a random sample of intact classrooms from the target grade in the sampled schools. In order to avoid sample size losses—which can occur if the originally sampled school refuses to participate—two replacement schools were identified and held in reserve for each sampled school.[9] These replacement schools shared similar school characteristics with the original sample.

In Canada, the target sample consisted of all schools with Grade 4 students in the participating provinces. Some schools were *de facto* excluded from the target population. These included the following:

- schools in non-participating provinces and territories (Nova Scotia, Prince Edward Island, Yukon, Northwest Territories, and Nunavut);
- schools under federal jurisdiction (e.g., band-operated schools, schools in federal detention centres); and
- schools that were geographically remote or that had very few students (i.e., four or fewer students in the target grade), or schools that offered a grade structure or curriculum radically different from the

[9] For further details on sampling, please see the TIMSS and PIRLS Web site: https://timssandpirls.bc.edu/publications/pirls/2016-methods.html

mainstream provincial education system, or that provided instruction solely to students with special needs.

In addition, student-level exclusions could be implemented in participating countries. The decision to exclude students from the PIRLS assessment was taken at the local (school) level but was based on strict criteria established by the PIRLS international curriculum. These criteria meant that the following students could be excluded:

- students with functional disabilities (e.g., students with a visual impairment, as PIRLS did not offer an adapted format for these students);
- students with intellectual disabilities (e.g., students deemed emotionally or mentally unable to follow the instructions for the test);
- students who were non-native language speakers (e.g., students who were unable to read or speak the test language. Typically, students with less than one year of instruction in the test language were to be excluded).

In order to keep the exclusion rates to a minimum, two rules were established by the PIRLS International Study Center:

- When combined, school-level and student-level exclusions should not exceed 5 per cent of the national target population of students in a country.
- The number of students excluded because they attended very small schools could not exceed 2 per cent of the national target population of students.

Details on school and student exclusion and participation in Canada can be found in Appendix A.

Quality assurance

As indicated in the PIRLS 2016 methods and procedures document, the student sampling for PIRLS 2016 was conducted with careful attention to quality and comparability (Martin, Mullis, & Hooper, 2017). Indeed, "the PIRLS program employs rigorous school and classroom sampling techniques so that achievement in the student population as a whole may be estimated accurately by assessing just a sample of students from a sample of schools" (LaRoche, Joncas, & Foy, 2017, p. 3.1). Statistics Canada as well as the IEA Data Processing and Research Center participated in all phases of the sampling procedures. High-quality standards were maintained, with the sampling and participation requirements successfully met in a large majority of countries. The quality and comparability of the data were ensured through careful planning, documentation, standardized procedures, and cooperation among participating countries.

Student and school participation in PIRLS 2016

Overall, participation in PIRLS 2016 was high:

- In total, approximately 340,000 students from 50 countries and 11 benchmarking participants were involved in PIRLS 2016.
- At the international level, in each country representative samples of approximately 4,000 students from 150 schools participated in PIRLS 2016.

- At the Canadian level, over 18,000 students from more than 920 schools participated in PIRLS 2016. About 12,000 students wrote the test in English, and 6,000 students wrote the test in French. The Canadian sample was the largest by far of all participating countries, both in terms of the number of students and the number of schools. Appendix A contains further information on the exclusion and response rates in Canada. Close to 9,000 students in British Columbia, Ontario, Quebec, and Newfoundland and Labrador participated in both PIRLS and ePIRLS, while students in the other participating provinces (Alberta, Saskatchewan, Manitoba, and New Brunswick) completed only the PIRLS test.

General design of the assessment

The goal of the PIRLS assessment is to provide internationally comparative data on how well children read by assessing students' reading achievement and by collecting considerable background information on how education systems provide educational opportunities to their students, as well as the factors that influence how students use these opportunities. The texts and accompanying items used in PIRLS 2016 were selected based on the conceptual framework, which targeted two reading purposes and four comprehension processes, as described in previous sections. In the case of PIRLS, the assessment was split evenly between *reading for literary experience* (50 per cent) and *reading to acquire and use information* (50 per cent). Because most on-line reading is done for the purpose of acquiring information, ePIRLS focused specifically on *reading to acquire and use information* (100 per cent).

For both PIRLS and ePIRLS, four processes of comprehension were measured. PIRLS measured the processes of comprehension with respect to both purposes for reading; ePIRLS measured these processes only in terms of reading to acquire and use information. Table 2 summarizes the percentages devoted to reading purposes and comprehension processes in PIRLS and ePIRLS.

TABLE 2 Percentages allocated to reading purposes and comprehension processes in PIRLS and ePIRLS 2016

Purposes for Reading	
PIRLS	
For literary experience	50%
To acquire and use information	50%
ePIRLS	
To acquire and use information	100%
Processes of Comprehension	
Focus on and retrieve explicitly stated information	20%
Make straightforward inferences	30%
Interpret and integrate ideas and information	30%
Evaluate and critique content and textual elements	20%

Selecting PIRLS 2016 reading passages

The PIRLS reading selections and ePIRLS on-line reading texts were reviewed and adapted by an international group of reading experts based on submissions from participating countries.

The complete PIRLS 2016 assessment included 10 reading passages: 5 for the "literary experience" purpose and 5 for the "acquisition and use of information" purpose. Each passage was accompanied by 13 to 16 questions (also called "items"). The items were divided almost equally between multiple-choice questions and constructed-response questions. Constructed-response questions were worth one, two, or three points depending on the depth of understanding and the extent of textual support required. As with every PIRLS assessment, the IEA has made available samples of several passages and questions.[10]

In order to link the data from various assessment years and to provide a foundation for measuring both trends and new items, a number of passages and questions were retained from previous assessments; others were newly developed and used for the first time in the 2016 assessment.

Hundreds of passages and on-line reading texts were reviewed in order to select those that would satisfy the following PIRLS requirements:

- Passages had to be suitable for Grade 4 students in content, level of interest, and readability.
- Passages had to be well written and sufficient in terms of depth and complexity to allow for an appropriate number of questions.
- Passages had to avoid cultural bias and be equally familiar or unfamiliar to all students.

Other criteria that guided item selection included freedom from bias related to gender, race, ethnicity, and religion; the nature and level of linguistic characteristics (such as readability and translatability); and interest for students.

Table 3 summarizes the main features of the texts selected for the PIRLS 2016 assessment.

[10] See https://timssandpirls.bc.edu/pirls2016/framework.html

TABLE 3 PIRLS 2016 – Main features of the texts used in the assessment

	PIRLS literary texts	PIRLS informational texts	ePIRLS informational texts
Type of texts	Complete short stories or passages (contemporary and traditional)	Continuous and non-continuous informational passages (covering scientific, ethnographic, biographical, historical, and practical information and ideas)	Closed Internet environment related to a science or social studies topic reflecting school-based work
Number and length of texts	Five passages of approximately 800 words each	Five passages of 600 to 900 words each	Five to ten webpages totalling about 1,000 words
Visuals	Supportive, colourful illustrations	Presentational features such as diagrams, maps, illustrations, photographs, or tables	Photos, graphs, tables, maps, and dynamic features such as videos, animations, links, and pop-up windows
Structure	A few main characters and a plot with one or two central events in each story	Various structures, including structure by logic, argument, chronology, and topic	About three different Web sites linked by a common theme and including a variety of web navigation approaches
Other features	A range of styles and language features, such as first-person narration, humour, dialogue, and some figurative language	A range of organizational features, such as subheadings, text boxes, and/or lists	Brief on-line directions and a teacher avatar to guide students (emphasis is on reading comprehension rather than navigation skills)

Question types and scoring procedures

Comprehension questions accompanying each passage were in one of two formats:

- *Multiple choice*: This question format included four response options, which were written in a concise manner to minimize the reading load. Only one of the four options was correct; the other incorrect options were plausible, but not deceptive. Although any comprehension processes could be assessed with multiple-choice questions, this format was mostly used for processes that do not rely on complex evaluations and interpretations. Each multiple-choice question was worth one point.
- *Constructed response*: This question format required students to construct a written response, and was meant to illicit an interaction between the reader, the text, and the context. The constructed-response items could be either short or extended. They were used to assess any of the four comprehension processes but were especially suited for interpretation processes calling for students' background knowledge and experiences. Constructed-response questions were worth one, two, or three points (depending on the depth of the understanding or the extent of textual support required).

Although constructed-response items usually provide more informative measures of achievement than multiple-choice items, they are time consuming to respond to, and the quality of the data derived from them depends largely on the ability of coders to score them reliably. Therefore, it was essential to develop clear and efficient scoring guides for constructed-response items that would ensure high reliability within and across countries. PIRLS 2016 scoring guides described the essential features of appropriate and complete responses. They focused on evidence of the comprehension process that a particular question

assessed by distinguishing partial understanding from extensive/complete understanding. It is important to note that the focus of the scoring guides was solely on students' understanding of the text, and not on their writing ability. Sample questions and scoring guides will be provided in a forthcoming issue of *Assessment Matters!*, a publication available on the CMEC Web site.

Test design

The PIRLS Reading Development Group estimated that completing all items for 10 passages would take more than six hours. Of course, such a long testing period would not be possible for Grade 4 students, owing to the loss of concentration and fatigue. For this reason, a booklet rotation procedure was used, allowing each student to be presented with only part of the PIRLS 2016 assessment. More particularly, the passages and accompanying items were divided into 10 blocks, 40 minutes each, and then they were systematically distributed across 16 booklets. Six of the 10 blocks were from previous PIRLS assessments (2001, 2006, or 2011), and four blocks were new to 2016. Each booklet included two 40-minute blocks of passages and items, along with the 15- to 30-minute Student Questionnaire. At least one informational and one literary passage were included in each booklet. Booklets were assigned to students in a given classroom using a randomized procedure.

Similarly, ePIRLS used a matrix design, albeit a less complex one, with only 4 tasks being rotated across 12 combinations. Each informational task took 40 minutes to complete, in addition to a five-minute on-line questionnaire. Because 2016 is the first year that ePIRLS was administered, all tasks were newly developed. Two of these tasks have been released to the public, and another 10 tasks are being kept secure for use in future years.[11]

Background questionnaires

In order to collect information on community, school, home, and student factors that affect learning, PIRLS 2016 administered the following questionnaires:

- *Student Questionnaire*: This questionnaire was included in the PIRLS assessment booklets and had to be completed by each participating student. It asked about aspects of students' home and school lives, notably demographic and socioeconomic information, home environment, school climate for learning, out-of-school reading behaviours, and attitudes toward learning. In Canada, data from over 18,200 students were collected through this questionnaire. For students who participated in the ePIRLS assessment, an additional five-minute questionnaire focused on students' perceptions of their competency and experience using computers and finding information on the Internet.
- *Home Questionnaire (PIRLS Learning to Read Survey)*: This questionnaire was addressed to the parents or primary caregivers of each participating student. It asked about language spoken at home, preschool literacy- and numeracy-centred experiences, homework activities, parents' perception of their child's school, reading resources at home, parent education and occupation, parents' reading habits and attitudes toward reading, the child's reading readiness at the beginning of primary school, and so on. The Home Questionnaire required 10 to 15 minutes to complete. In Canada, an impressive total of close to 15,000 parents or guardians responded to this survey, a more than 80 per cent response rate.

[11] The released tasks can be found under Take the ePIRLS Assessment, at https://timssandpirls.bc.edu/pirls2016/index.html

- *Teacher Questionnaire*: This questionnaire was addressed to the reading teacher of each participating Grade 4 class. It asked about the teacher's background and education, the school climate for learning, attitudes toward teaching, professional development activities, career satisfaction, classroom characteristics, student engagement, instructional approaches, and so on. The Teacher Questionnaire required about 35 minutes to complete. In Canada, more than 1,060 teachers responded to this questionnaire, a 95 per cent response rate.
- *School Questionnaire*: This questionnaire had to be completed by the principal of each participating school or his or her designate. It asked about school characteristics, instructional time, availability of school resources and technology, parental involvement, school climate for learning, teaching staff, the role of the principal, and so on. The School Questionnaire required about 30 minutes to complete. In Canada, close to 900 schools responded to this questionnaire, a 95 per cent response rate.
- *Curriculum Questionnaire*: Internationally, this questionnaire was completed by the national research centre of each participating country. In Canada, ministries and departments of education from all the participating provinces completed the questionnaire. It asked about the jurisdiction's reading curriculum, including national/provincial policy on reading, goals and standards for reading instruction, time specified for reading, and information on pre-primary education and teacher education policies.

In Canada, the responses of ministries and departments of education from all participating provinces to the Curriculum Questionnaire provided input into the chapter on Canada in the *PIRLS Encyclopedia*.[12] The *Encyclopedia* provides a profile of the education systems of each participating country, including aspects such as reading education at the primary level, languages of instruction, teacher education, organization of the school system, and assessment policies. Responses to the Curriculum Questionnaire and the information provided for the Canada chapter in the *Encyclopedia* were aggregated by CMEC at the Canadian level, taking into account commonalities and differences between provincial education systems.

Objectives and organization of this report

This report presents the Canadian results of the Progress in International Reading Literacy Study 2016. It provides information on the reading skills for Grade 4 students and describes home and school supports for literacy in Canada. Results are reported at both Canadian and international levels, with comparisons across participating Canadian provinces, as well as with participating countries. The report includes three content chapters, a conclusion, and a number of appendices.

Chapter 1 provides a general picture of reading achievement in Canada, situating it in an international context when relevant. It describes the skills demonstrated by students at the four international benchmarks (*advanced*, *high*, *intermediate*, and *low*) for both PIRLS and ePIRLS. It presents percentages of students reaching each of the four benchmarks in Canada, with subsequent comparisons by province, language of the school system, and gender.

Chapter 2 presents the distribution of PIRLS and ePIRLS achievement scores for Canada as a whole and for participating provinces, including the results by language of the school system, by gender, and by reading purpose and process of comprehension. In addition, change in performance over time is examined

[12] Available at http://timssandpirls.bc.edu/pirls2016/encyclopedia/. The *PRILS Encyclopedia* contains separate chapters for Canada and the two benchmarking provinces (Ontario and Quebec).

for Canada overall and for the provinces that participated in one or more previous cycles of PIRLS (British Columbia, Alberta, Ontario, Quebec, New Brunswick [French], and Newfoundland and Labrador).

Chapter 3 provides contextual data from the Home Questionnaire (the Learning to Read Survey), the Student Questionnaire, the Teacher Questionnaire, and the School Questionnaire. For each variable of interest, descriptive statistics for Canada and participating provinces are presented, followed, where pertinent, by an analysis of the relationship between the variable in question and student reading achievement based on PIRLS and/or ePIRLS. Although the questionnaires cover many relevant areas, only a select number of results are presented here for illustrative purposes. More detailed analysis of these questionnaires will be presented in other reports and publications from CMEC in the future.

The first section of Chapter 3 explores the home context, with reference to both the Home Questionnaire and the Student Questionnaire. It discusses results related to student reading activities at home. Several areas of interest for Canada are explored: languages spoken at home; parents' reading engagement with their child; students' resources at home; parents' reading habits and attitudes; student confidence in their reading ability and self-efficacy in computer use; whether students attended pre-primary education and the age at which they entered primary school; frequency of homework; and students' access to digital devices. It also presents the results that relate to students' attitudes toward reading, their reading behaviours, and their out-of-school activities.

The next section of this chapter presents the Teacher Questionnaire data to explore variables related to teachers and their teaching of reading, with a particular focus on the background of the Grade 4 teachers who were involved with the study. This section also describes teacher characteristics, some working conditions, the classroom environment, and classroom resources and activities.

Next, the School Questionnaire data are examined to explore variables related the school context. Among the aspects examined in this section are school composition, the availability of computers for instruction, school emphasis on academic success, school discipline and safety, and bullying.

The Conclusion of this report summarizes the main Canadian results of the PIRLS and ePIRLS 2016 assessment. Finally, detailed data tables for a number of key variables are presented in the appendices.

Statistical Terminology Used in the Charts and Tables

Differences

In this report, the terms "difference" or "different," used in the context of achievement levels, benchmarks, and percentages, refer in a technical sense to a **statistically significant difference**. A difference is statistically different when there is no overlap of **confidence intervals** between different measurements being compared. Throughout this report, average scores that are significantly different from the Canadian average score are indicated in bold face.

Confidence intervals

For PIRLS 2016, a random sample of Grade 4 students was selected to participate in the assessment. The average scores were computed based on the students' responses. Since the purpose of this study is to report results on the Grade 4 student population (and not individual average scores), the reported achievement scores provide estimates of the achievement results that would have been demonstrated if all students in the population had participated in this assessment. However, this process introduces what is known in statistical terms as a **sampling error**. In addition, a degree of error is associated with the scores describing student reading skills because these scores are estimated, based on student responses to test items. This error is called the **error of measurement**. Because an estimate that is based on a sample is rarely exact, and because the error of measurement exists, a **standard error** (S.E.) is computed based on these two sources of error. In large-scale assessments such as PIRLS, it is a common practice when reporting mean scores to provide a range of scores within which the "true" achievement level might fall. This range of scores expressed for each average score is called a **confidence interval**. A 95 per cent confidence interval is used in this report to represent the high- and low-end points between which the actual average score should fall 95 per cent of the time (and is computed as ± 1.96 S.E.). In other words, one can be confident that the actual achievement level of all students would fall somewhere in the established range 19 times out of 20, if the assessment were repeated with different samples randomly drawn from the same student population.

It is important to consider the standard error when comparing the results among groups in order to determine if the scores are statistically different from one another. In the charts in this report, confidence intervals are represented by the symbol  . An additional test of significance (the t-test) was conducted when the confidence intervals overlapped slightly in order to verify if the difference was statistically significant. In case of multiple t-tests in a single table or chart, no corrections were made to reduce the false positive, or Type-I, error rate.

When comparing results over time, the standard error does not include a *linking error* to account for the fact that different cohorts of students have been tested over time with a test that also varied slightly over time.

When there is a discrepancy between international averages in the PIRLS 2016 almanac and the international report due to data suppression, the data from the almanac were used in this report.

1. CANADIAN RESULTS AT THE INTERNATIONAL BENCHMARKS

This chapter presents results of the PIRLS and ePIRLS 2016 assessment in reading at the Grade 4 level. After describing the assessment criteria, it provides a picture of students' reading skills for Canada overall and for each participating province, comparing achievement with international results. Achievement in Canada and participating provinces is then presented by language of the school system and by gender.

In PIRLS 2016, as in previous cycles, four international benchmarks are used to show the range of students' performance: *advanced* (625 points), *high* (550 points), *intermediate* (475 points), and *low* (400 points). It should be noted that those students not reaching a score of 400 are not deemed to possess "no reading ability"; however, questions from this PIRLS assessment cannot measure their reading performance accurately. Table 1.1 describes the criteria for the four international benchmarks for PIRLS 2016.[13] Descriptors for the international benchmarks for ePIRLS, which vary slightly from those for PIRLS, are presented in Table 1.2.

[13] It is assumed that those students classified at a given level (benchmark) can perform the tasks at that level as well as those at the lower level(s). Further information on how the benchmarks were developed can be obtained in the PIRLS 2016 international report (Mullis et al., 2017b).

TABLE 1.1 PIRLS 2016 – Description of the international benchmarks for reading achievement

Advanced international benchmark (625 points)

When reading *literary texts*, students can:

- begin to evaluate the effect on the reader of the author's language and style choices
- interpret story events and character actions to describe reasons, motivations, feelings, and character development with full text-based support

When reading *informational texts*, students can:

- distinguish and interpret complex information from different parts of text and provide full text-based support
- integrate information across a text to explain relationships and sequence activities
- begin to evaluate visual and textual elements to consider the author's point of view

High international benchmark (550 points)

When reading *literary texts*, students can:

- locate and distinguish significant actions and details embedded across the text
- make inferences to explain relationships between intentions, actions, events, and feelings, and give text-based support
- interpret and integrate story events and character actions, traits, and feelings as they develop across the text
- recognize the use of some language features (e.g., metaphor, tone, imagery)

When reading *informational texts*, students can:

- locate and distinguish relevant information within a dense text or a complex table
- make inferences about logical connections to provide explanations and reasons
- integrate textual and visual information to interpret the relationship between ideas
- evaluate and make generalizations about content and textual elements

Intermediate international benchmark (475 points)

When reading *literary texts*, students can:

- independently locate, recognize, and reproduce explicitly stated actions, events, and feelings
- make straightforward inferences about the attributes, feelings, and motivations of main characters
- interpret obvious reasons and causes, recognize evidence, and give examples
- begin to recognize language choices

When reading *informational texts*, students can:

- locate and reproduce two or three pieces of information from text
- make straightforward inferences to provide factual explanations
- begin to interpret and integrate information to order events

Low international benchmark (400 points)

When reading *literary texts*, students can:

- locate and retrieve explicitly stated information, actions, or ideas
- make straightforward inferences about events and reasons for actions
- begin to interpret story events and central ideas

When reading *informational texts*, students can:

- locate and reproduce explicitly stated information from text and other formats (e.g., graphs, diagrams)
- begin to make straightforward inferences about explanations, actions, and descriptions

Source: Mullis et al., 2017b, pp. 52–53.

TABLE 1.2 ePIRLS 2016 – Description of the international benchmarks for on-line informational reading achievement

Advanced international benchmark (625 points)
When reading and viewing *on-line informational texts*, students can:
• make inferences from complex information to support an explanation
• interpret and integrate information from within and across web pages with interactive features to explain relationships, and show thorough understanding
• evaluate the effects of textual, visual, and interactive elements and begin to consider the writer's point of view
High international benchmark (550 points)
When reading and viewing *on-line informational texts*, students can:
• make inferences to distinguish relevant information and provide comparisons
• interpret and integrate information within and across web pages with interactive features to provide examples and make contrasts
• evaluate how graphic elements and language choices support content
Intermediate international benchmark (475 points)
When reading and viewing *on-line informational texts*, students can:
• locate and reproduce information presented in various forms, including independent use of navigation features
• make straightforward inferences to recognize reasons and actions
• interpret and integrate information across a web page to recognize causes, comparisons, and explanations
• begin to evaluate the use of interactive features to convey information
Low international benchmark (400 points)
When reading and viewing *on-line informational texts*, students can:
• locate and reproduce explicitly stated information from web pages that contain text and a variety of dynamic, navigable features (e.g., timelines, pop-up boxes)
• begin to make straightforward inferences about descriptions

Source: Mullis et al., 2017b, p. 29.

Students' reading performance at the international benchmarks

Figure 1.1 presents results showing percentages of students reaching each international benchmark in Canada overall and in each of the six provinces participating in PIRLS 2016 at the benchmarking or oversampling level. In Canada, 13 per cent of the students reached the highest level, the *advanced* international benchmark. This percentage is above the international median of 10 per cent but less than half of that of the highest achieving country (Singapore, at 29 per cent). Within Canada, the percentage of students reaching this benchmark ranged from 8 per cent in New Brunswick to 16 per cent in British Columbia (Appendix B.1.1).

Fifty per cent of Canadian students reached the *high* international benchmark, a proportion that is above the international median of 47 per cent. It is important to note that most countries performing significantly better than Canada in reading also have a higher percentage of students reaching the *high* international benchmark, with the Russian Federation having 70 per cent of their students at that level or above. The same pattern is repeated in Canada, where provinces with the highest average scores also have

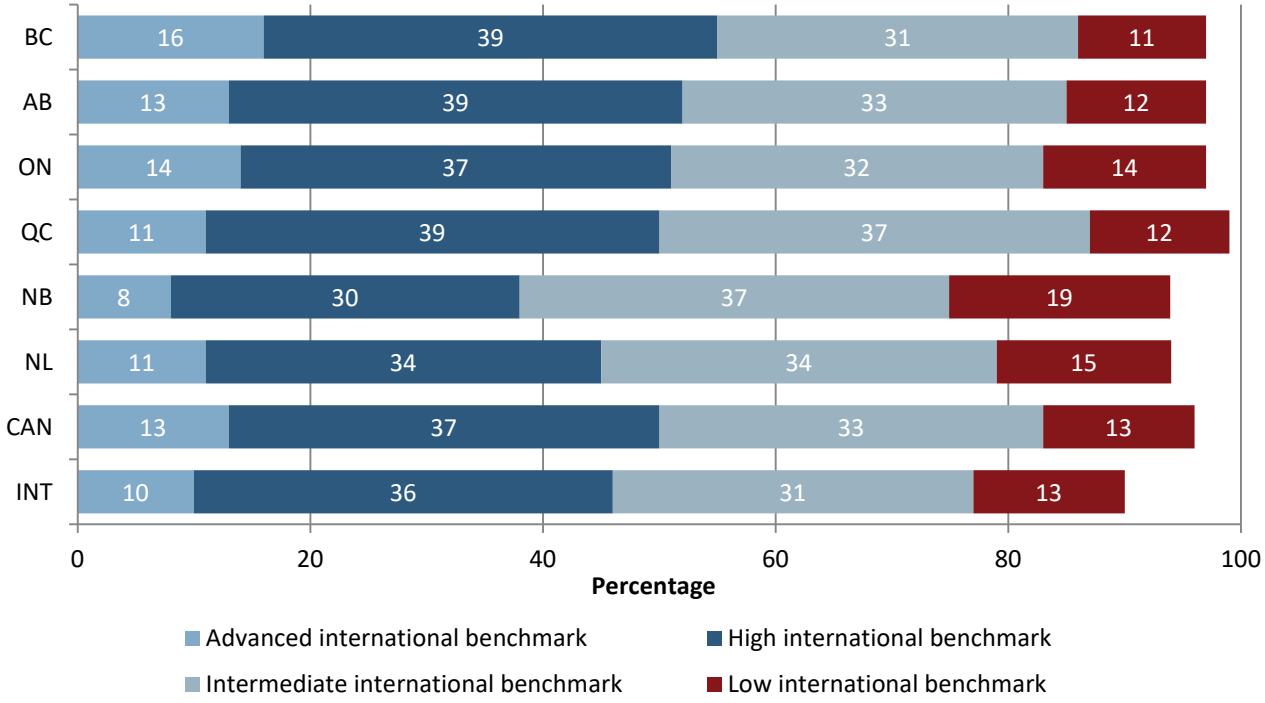
the highest percentages of students at or above the *high* level. The percentages vary from 38 per cent in New Brunswick to 55 per cent in British Columbia.

In Canada, 83 per cent of the Grade 4 students reached the *intermediate* international benchmark, a figure similar to the international median of 82 per cent. Among all participating countries, six have at least 90 per cent of students at the *intermediate* level: Chinese Taipei, Finland, Hong Kong SAR, Latvia, Norway (Grade 5), and the Russian Federation. Across Canadian provinces, the lowest percentage of students at this level is 75 per cent in New Brunswick, and the highest is 87 per cent in Quebec.

The *low* international benchmark was reached by 96 per cent of Canadian students, which is the same as the international median of 96 per cent. In five countries – Hong Kong SAR, Latvia, the Netherlands, Norway (Grade 5), and the Russian Federation – 99 per cent of students reached this level. In the Canadian provinces, the percentages vary from 93 per cent in Newfoundland and Labrador to 98 per cent in Quebec.

Although few Canadian students did not reach the *low* international benchmark (4 per cent), many countries with lower overall average achievement have a smaller proportion of students who did not reach the *low* benchmark.

FIGURE 1.1 PIRLS 2016 – Proportion of students reaching international benchmarks



Note: Percentages may not add up as expected due to rounding. Students performing below the *low* international benchmark are not shown. Students performing only at the four defined international benchmarks are shown. INT represents the international median. Provincial results are reported as means. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

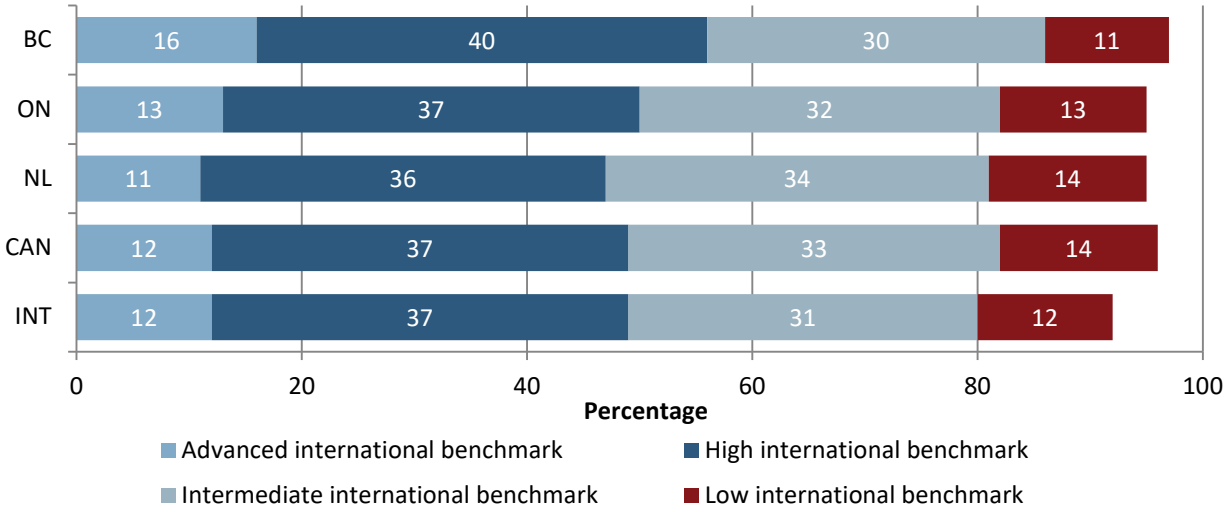
With respect to ePIRLS, in Canada overall, 12 per cent of participating students reached the *advanced* international benchmark. This percentage is the same as the international median of 12 per cent (Figure 1.2). Across participating countries, the proportion of students reaching this level ranges between 34 per cent in Singapore and 1 per cent in Georgia. In the Canadian provinces, the percentages of students at this level range from 11 per cent (Newfoundland and Labrador) to 16 per cent (British Columbia) (Appendix B.1.2).

Close to half (49 per cent) of Canadian students reached the *high* international benchmark, which is similar to the international median of 50 per cent. Over 60 per cent of students in Ireland, Norway (Grade 5), and Singapore reached this level of performance. At the provincial level, the percentages vary from 47 per cent in Newfoundland and Labrador to 56 per cent in British Columbia.

In Canada, 82 per cent of the students reached the *intermediate* international benchmark in ePIRLS, a figure that is close to the international median of 84 per cent. Among the 14 countries that participated in ePIRLS, 3 – Ireland, Norway (Grade 5), and Singapore – had 90 per cent or more of their students score at the *intermediate* level. Across participating Canadian provinces, the lowest percentage at this level is 81 per cent in Newfoundland and Labrador, and the highest is 86 per cent in British Columbia.

Finally, the *low* international benchmark in ePIRLS was reached by 96 per cent of Canadian students, similar to the international median of 97 per cent. In all participating countries except two (Georgia and United Arab Emirates), over 90 per cent of students reached this level. In the three participating Canadian provinces, the percentage of students reaching this level varies only marginally.

FIGURE 1.2 ePIRLS 2016 – Proportion of students reaching international benchmarks



Note: Percentages may not add up as expected due to rounding. Students performing only at the four defined international benchmarks are shown. INT represents the international median. Provincial results are reported as means. Because of the small sample size, results for Quebec are not presented for ePIRLS.

Reading performance at the international benchmarks by language of the school system

Across the participating provinces, students enrolled in majority-language school systems tend to perform better in reading than those enrolled in minority-language school systems. Tables 1.3 and 1.4 show the percentages of anglophone and francophone students reaching the four international benchmarks for PIRLS, by province (Appendix B.1.3).

Generally, in English-language schools, the percentages of students achieving each benchmark in the participating provinces are very close to the percentages for the respective benchmarks in Canada overall. British Columbia had a higher proportion of students at three of the benchmarks, while New Brunswick had a lower proportion at two of the benchmarks, and Newfoundland and Labrador had a lower proportion at the *high* international benchmark.

TABLE 1.3 PIRLS 2016 – Proportion of students reaching international benchmarks, English-language schools

	Advanced international benchmark		High international benchmark		Intermediate international benchmark		Low international benchmark	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	16	1.2	**55**	**1.6**	**86**	**1.2**	**97**	**0.5**
AB	13	1.1	52	2.0	85	1.4	97	0.7
ON	14	1.5	52	1.8	83	1.5	96	0.6
QC	13	1.5	47	2.5	80	2.0	96	1.2
NB	**10**	**1.0**	**45**	**1.8**	80	1.8	95	0.9
NL	11	1.4	**45**	**2.3**	79	2.3	93	1.5
CAN	14	0.8	51	1.2	82	1.0	95	0.5

Note: Numbers in **bold** indicate a statistically significant difference from the Canada English percentage. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Levels of achievement for students enrolled in French-language schools vary remarkably at the provincial level. Most variations can be found at the *high* and *intermediate* international benchmarks. Thus, 47 per cent of francophone students in Canada overall achieved the *high* international benchmark in PIRLS, but within provinces the proportion ranges from 25 per cent in Ontario and New Brunswick to 50 per cent in Quebec. Similar variations can be seen at the *intermediate* benchmark, where 84 per cent of students in Canada overall reached this level compared to 61 per cent in Ontario and 87 per cent in Quebec. In all provinces, less than 70 per cent of the students enrolled in French minority-language school systems reached the *intermediate* level of performance.

When comparing the results of English- and French-language schools at the pan-Canadian level, it can be noted that percentages are rather similar at the lower achievement levels, but there were proportionally fewer students reaching the *high* and *advanced* benchmarks in the French-language schools.

TABLE 1.4 PIRLS 2016 – Proportion of students reaching international benchmarks, French-language schools

	Advanced international benchmark		High international benchmark		Intermediate international benchmark		Low international benchmark	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	**5**	**1.6**	**30**	**2.4**	**69**	**2.4**	**93**	**1.4**
AB	**5**	**1.4**	**27**	**2.9**	**65**	**3.6**	**90**	**2.2**
ON	**3**	**0.6**	**25**	**1.6**	**61**	**2.2**	**87**	**1.4**
QC	11	1.4	50	2.0	**87**	**1.6**	**99**	**0.4**
NB	**3**	**1.0**	**25**	**2.5**	**65**	**2.2**	**92**	**1.0**
CAN	10	1.1	47	1.7	84	1.4	97	0.4

Note: Numbers in **bold** indicate a statistically significant difference from the Canada French percentage. Owing to the small sample size, the percentages for students enrolled in French schools participating in Newfoundland and Labrador are not provided in this table. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied (see Appendix A for further details).

In ePIRLS, the percentages of students enrolled in English- and French-language schools who achieved each benchmark are very consistent in each language group across participating provinces. In English-language schools in these provinces, none of the differences are statistically significant when compared to the percentages for English-language schools in Canada overall. In French-language schools, British Columbia students attained results similar to the Canadian French average for each of the benchmarks, except the *intermediate* benchmark, for which the percentage is significantly lower. The percentages for Ontario were significantly lower than the Canadian French average for all four benchmarks (Table 1.5, Appendix B.1.4).

TABLE 1.5 ePIRLS 2016 – Proportion of students reaching international benchmarks, English-language and French-language schools

	Advanced international benchmark		High international benchmark		Intermediate international benchmark		Low international benchmark	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Anglophone school system								
BC	16	1.3	57	1.7	87	1.4	97	0.7
ON	14	1.3	52	1.9	84	1.5	96	0.6
NL	11	1.3	47	2.4	81	1.8	95	1.0
CAN	14	1.1	53	1.5	84	1.2	96	0.5
Francophone school system								
BC	4	0.8	28	2.4	**69**	**2.2**	95	1.6
ON	**3**	**0.7**	**22**	**2.2**	**61**	**2.3**	**88**	**1.4**
CAN	8	2.2	41	6.1	78	3.6	95	1.1

Note: Numbers in **bold** indicate a statistically significant difference from the Canada English percentage. Because of the small sample size, results for Quebec are not presented for ePIRLS.

Reading performance at the international benchmarks by gender

In PIRLS 2016, girls outperformed boys in reading by 12 points in Canada overall. In order to provide an overall picture of reading skills, the percentages of boys and girls attaining each international benchmark are provided in this section. Table 1.6 presents the percentages by gender for Canada overall. Generally across provinces, a higher proportion of girls achieved the higher benchmark levels. Percentages for the provinces are presented in Appendix B.1.5.

In line with the results in previous years, the percentages of girls are higher than those of boys for each international benchmark. All differences by gender are significant, except at the *low* international benchmark. The largest difference is found at the *high* level, where girls have an advantage of 7 percentage points over boys. It is important to note that, despite a significant gap, at least 80 per cent of boys and girls in Canada overall reached the *intermediate* benchmark.

TABLE 1.6 PIRLS 2016 – Proportion of students reaching international benchmarks by gender

	Advanced international benchmark		High international benchmark		Intermediate international benchmark		Low international benchmark	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Girls	**14**	0.9	**53**	1.3	**85**	1.1	96	0.6
Boys	**11**	0.8	**46**	1.2	**81**	1.0	95	0.4

Note: Numbers in **bold** indicate a statistically significant difference between the results for girls and boys.

With respect to ePIRLS, in Canada overall, results show no significantly differences in the proportion of girls and boys reaching each level of achievement (Table 1.7). Provincial percentages are shown in Appendix B.1.6.

TABLE 1.7 ePIRLS 2016 – Proportion of students reaching international benchmarks by gender

	Advanced international benchmark		High international benchmark		Intermediate international benchmark		Low international benchmark	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Girls	13	1.5	51	2.3	84	1.7	97	0.7
Boys	11	1.1	47	2.6	81	1.8	95	0.6

Sample questions to illustrate the benchmarks

As noted in the Introduction, a number of items from the PIRLS 2016 assessment have been released to the public. Examples of Canadian students' work at each benchmark are available, showing how each international benchmark should be interpreted and illustrating the kinds of questions that PIRLS used to assess reading literacy at the Grade 4 level. Examples are available in the PIRLS international report (Mullis et al., 2017b) and in a forthcoming issue of *Assessment Matters!*, which is available on the CMEC Web site.[14]

Two of the five ePIRLS tasks have been released by the International Study Center ("Mars" and "Elizabeth Blackwell"). On the PIRLS international website,[15] readers can view and respond to the complete international English version of test items from these tasks as they were provided to students and can view the scoring guides.

[14] http://www.cmec.ca/131/Programs-and-Initiatives/Assessment/Overview/index.html
[15] https://timssandpirls.bc.edu/index.html

2. CANADIAN ACHIEVEMENT RESULTS BY AVERAGE SCORE

This chapter presents the PIRLS and ePIRLS 2016 achievement results by average score in reading for all participating countries and Canadian provinces. First, the PIRLS results of Grade 4 students in reading achievement for Canada and participating provinces will be compared to those for other participating countries. The provincial results will also be compared to the Canadian average. In addition, results for Canada and participating provinces will be presented for ePIRLS. Then, provincial results for PIRLS and ePIRLS will be presented by language for the provinces that sampled enough students in both anglophone and francophone school systems. Next, the reading performance of boys and girls across provinces will be reported for both PIRLS and ePIRLS. The next section will describe the PIRLS results for the two main purposes of reading: reading for literary experience and reading to acquire and use information. ePIRLS results will show achievement in reading to acquire and use information, as this was the only purpose assessed in the digital assessment, which included only informational texts. This discussion will be followed by results in both PIRLS and ePIRLS for each of the four processes of comprehension (i.e., focusing on and retrieving explicitly stated information, making straightforward inferences, interpreting and integrating ideas and information, and evaluating and critiquing content and textual elements). Finally, for the provinces that participated in previous PIRLS assessments, results will be reported over time.

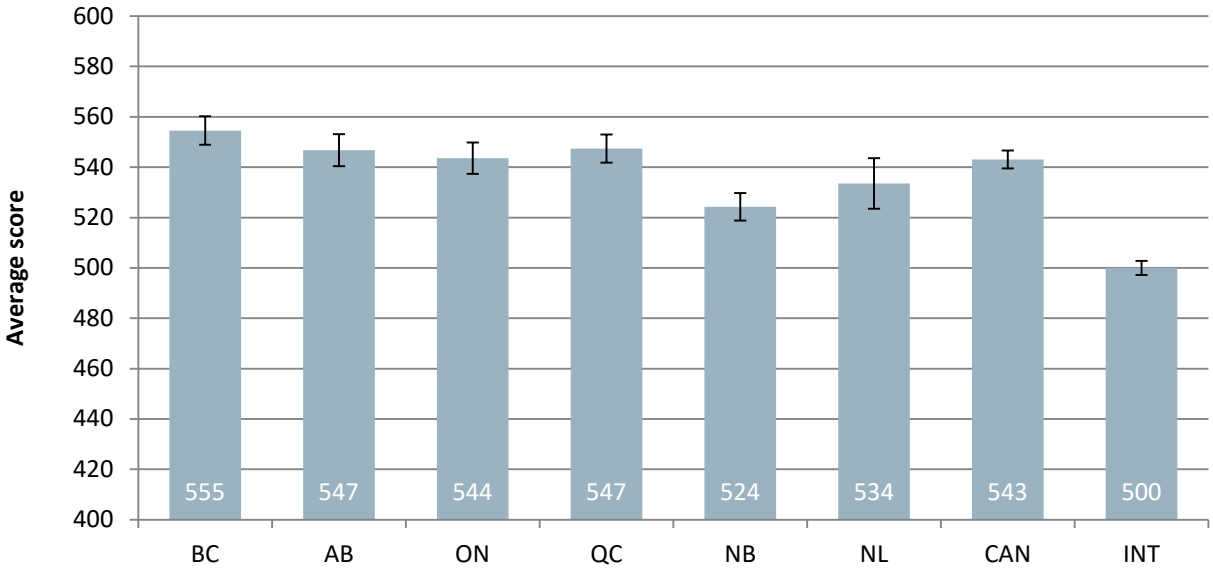
The PIRLS 2016 average scores in reading are reported on the PIRLS scale, which has a range of 0 to 1000. In the first administration in 2001, the international mean was set at 500, with a standard deviation of 100. This has been used as a baseline for the subsequent administrations. In 2016, the centrepoint of the 0 to 1000 scale (i.e., 500) was again used as the international reference point. The centrepoint of the international scale for ePIRLS was also set at 500 in 2016.

It may be misleading to compare and rank students' performance based on the average scores only. When comparing the results, it is important to take into account the sampling error and the error of measurement associated with each average score. Doing so will determine whether the differences in the average scores are statistically significant (see the statistical terminology box in the Introduction for details).

Results in reading for participating countries and Canadian provinces

Figure 2.1 provides the average scores in reading for Grade 4 students for Canada overall and each province participating in PIRLS 2016.

FIGURE 2.1 PIRLS 2016 – Achievement results by average score



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Overall, Canadian students performed well on PIRLS 2016, with higher achievement than many of the other participating countries. Canada had an average score of 543, which is well above the PIRLS scale centrepoint of 500.[16] Among all participating countries in PIRLS 2016, 13 obtained an average score significantly higher than that for Canadian students overall. In addition, 12 countries performed as well as Canada (Table 2.1, Appendix B.2.1).

Most students in Canada performed well in reading, with the average scores for all provinces being above the PIRLS centrepoint of 500. British Columbia performed above the Canadian average, while Alberta, Ontario, Quebec, and Newfoundland and Labrador performed at the Canadian average. The average score for New Brunswick is significantly lower than that for Canada overall.

TABLE 2.1 PIRLS 2016 – Comparison of country and provincial results to the Canadian average score

Better than Canada*	As well as Canada*	Not as well as Canada*
Russian Federation, Singapore, Hong Kong SAR, Ireland, Finland, Poland, Northern Ireland, Norway (Grade 5), Chinese Taipei, England, Latvia, Sweden, **British Columbia**, Hungary	Bulgaria, United States, Lithuania, Italy, Denmark, Macao SAR, **Quebec**, **Alberta**, Netherlands, Australia, **Ontario**, Czech Republic, Slovenia, Austria, Germany, **Newfoundland and Labrador**	Kazakhstan, Slovak Republic, Israel, Portugal, Spain, Belgium (Flemish), New Zealand, France, **New Brunswick**, Belgium (French), Chile, Georgia, Trinidad and Tobago, Republic of Azerbaijan, Malta, United Arab Emirates, Bahrain, Qatar, Saudi Arabia, Islamic Republic of Iran, Oman, Morocco, Kuwait, Egypt, South Africa

* Differences in scores are statistically significant only when confidence intervals do not overlap. If the confidence intervals overlap, an additional test of significance was conducted to determine whether the difference was statistically significant. Countries performing as well as Canada have a confidence interval that overlaps with that of Canada. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

[16] The international centrepoint represented the average score in PIRLS 2001, and it has been set at 500 since then.

Canadian students performed equally well on ePIRLS, with an average score of 543. Of the 14 countries that participated in both PIRLS and ePIRLS, most high-performing countries achieved higher results in ePIRLS than in PIRLS. Six countries had a higher average score than Canada on ePIRLS, while two other countries scored the same as Canada. Across provinces, students in British Columbia performed above the Canadian average in digital literacy, while students in Ontario and Newfoundland and Labrador performed at the Canadian average (Table 2.2, Appendix B.2.2).

TABLE 2.2 ePIRLS 2016 – Comparison of country and provincial results to the Canadian average score

Better than Canada*	As well as Canada*	Not as well as Canada*
Singapore, Norway (Grade 5), Ireland, Sweden, Denmark, United States, **British Columbia**	Chinese Taipei, **Ontario**, **Newfoundland and Labrador**, Israel	Italy, Slovenia, Portugal, Georgia, United Arab Emirates

* Differences in scores are statistically significant only when confidence intervals do not overlap. If the confidence intervals overlap, an additional test of significance was conducted to determine whether the difference was statistically significant. Countries performing as well as Canada have a confidence interval that overlaps with that of Canada. Because of the small sample size, results for Quebec are not presented for ePIRLS.

Canadian results in reading by language of the school system

This section highlights the performance in PIRLS and ePIRLS 2016 of Canadian students in participating provinces by the language of the school system. In PIRLS, only Newfoundland and Labrador did not oversample by language separately in order to examine the difference between the performance of students in the English- and French-language systems.

Tables 2.3 and 2.4 present the average scores and differences in the reading performance in PIRLS and ePIRLS for students enrolled in English- and French-language school systems (Appendix B.2.3 and B.2.4).

In PIRLS, students in the anglophone school system in British Columbia, Alberta, Ontario, and New Brunswick performed significantly better than those in the francophone school system in the same province, with differences between 34 and 53 points. In Canada overall and in Quebec, there is no significant difference between the two language systems. A comparison of students in the two language systems across provinces shows that there is less interprovincial difference among English-language schools (20 points or less) than among French-language schools (55 points or less).

TABLE 2.3 PIRLS 2016 – Reading achievement by language of the school system

	Anglophone school system		Francophone school system		Difference between systems	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	555	2.9	511	3.7	**44**	4.6
AB	547	3.3	502	6.7	**46**	7.3
ON	547	3.4	493	3.8	**53**	5.1
QC	540	4.4	548	3.1	-8	5.4
NB	535	3.8	501	3.6	**34**	5.3
NL	534	5.1	–	–	–	–
CAN	544	2.2	541	2.6	3	3.4

Note: Numbers in **bold** indicate a statistically significant difference across languages by province. Although Newfoundland and Labrador did not oversample students by language, the results for this province are included in this table, so that they can be compared with the Canadian English average score. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

In ePIRLS, only two provinces (British Columbia and Ontario) oversampled the anglophone and francophone student populations separately. In both cases, students enrolled in English-language school systems performed better than those in French-language school systems. Table 2.4 shows results for ePIRLS by language. Even though Newfoundland and Labrador did not oversample by language, results are also presented for this province, so that they can be compared with the Canadian average for anglophone systems.

TABLE 2.4 ePIRLS 2016 – Reading achievement by language of the school system

	Anglophone school system		Francophone school system		Difference between systems	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	556	3.2	509	4.0	**47**	**5.3**
ON	547	3.3	493	3.9	**54**	**5.2**
NL	538	3.9	–	–	–	–
CAN	548	2.7	529	8.5	**19**	**9.0**

Note: Numbers in **bold** indicate a statistically significant difference across languages by province. Because of the small sample size, results for Quebec are not presented for ePIRLS.

Canadian results in reading by gender

Results obtained from multiple studies have shown that girls usually perform better than boys in reading. This was the case in PISA 2015 (O'Grady et al., 2016) and PCAP 2016 (O'Grady et al., 2018), and such differences were found in all Canadian provinces. However, findings are somewhat different when it comes to digital reading. PISA 2012 (Brochu et al., 2013) provided an opportunity to compare the reading achievement of 15-year-olds in print reading and digital reading. That assessment found that the gender gap in reading was narrower in digital reading than in print reading.

The PIRLS 2016 results demonstrate that girls continue to perform better than boys in reading. This finding is consistent across Canadian provinces and with other assessments of reading (e.g., PIRLS 2011, PISA 2015, PCAP 2016). In Canada overall, girls are outperforming boys by 12 points, although that is less than the international average gender gap of 19 points (Table 2.5). This pattern is consistent across all participating countries except two: there was no gender gap in Macao SAR and Portugal (Appendix B.2.5). With respect to the Canadian provinces, the difference in the average scores between girls and boys is statistically significant in all provinces except Newfoundland and Labrador. Outside of that province, the gap ranges from 11 points in Alberta and Quebec to 20 points in New Brunswick.

TABLE 2.5 PIRLS 2016 – Reading achievement by gender

	Girls		Boys		Difference between genders	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	563	3.3	547	3.0	**16**	2.8
AB	553	3.8	541	3.8	**11**	4.3
ON	550	3.6	538	3.8	**12**	3.6
QC	552	3.3	542	3.1	**11**	3.1
NB	534	2.9	514	3.6	**20**	3.6
NL	536	6.3	532	4.8	4	4.3
CAN	549	2.2	537	2.1	**12**	2.2
INT	520	0.4	501	0.5	**19**	0.5

Note: Numbers in **bold** indicate a statistically significant difference. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

With respect to ePIRLS, there is no gender difference in reading in 3 of the 14 participating countries: Denmark, Italy, and Portugal. In the remaining countries, differences in favour of girls range between 6 and 29 points, with the 8-point difference in Canada comparable to the international average of 12 points (Appendix B.2.6). As shown in Table 2.6, there was no gender difference in digital reading in Newfoundland and Labrador, while girls performed better than boys by 9 points in Ontario and by 11 points in British Columbia.

TABLE 2.6 ePIRLS 2016 – Reading achievement by gender

	Girls		Boys		Difference between genders	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	561	3.3	550	3.7	**11**	3.2
ON	548	3.5	540	4.0	**9**	4.2
NL	540	4.6	536	4.2	4	4.2
CAN	547	3.7	539	3.7	**8**	3.8
INT	545	0.8	533	0.8	**12**	0.9

Note: Numbers in **bold** indicate a statistical significant difference. Because of the small sample size, results for Quebec are not presented for ePIRLS. Score difference may be different than expected due to rounding.

Canadian results for reading purposes and comprehension processes

This section focuses on two of the key aspects of students' reading literacy described in the Introduction – reading purpose and comprehension processes. For the first aspect, reading purpose, PIRLS focuses on two scales, literary reading and informational reading, while ePIRLS covered only informational reading. For the second aspect, PIRLS and ePIRLS assessed four major comprehension processes: focusing on and retrieving explicitly stated information; making straightforward inferences; interpreting and integrating ideas and information; and evaluating and critiquing content and textual elements. As was the case in PIRLS 2011, owing to the low number of test items on each process, results have been aggregated into two combined process scales:

- *retrieving and straightforward inferencing*: this scale combines "focusing on and retrieving explicitly stated information" and "making straightforward inferences";
- *interpreting, integrating, and evaluating*: this scale combines "interpreting and integrating ideas and information" and "evaluating and critiquing content and textual elements."

Previous PIRLS assessments have shown that, with respect to reading purpose, most countries tend to perform better in either "literary reading" or "informational reading." Similarly, with respect to comprehension processes, most countries tend to perform better in either "retrieving and straightforward inferencing" or "interpreting, integrating, and evaluating" (Mullis et al., 2012). In this context, it is useful to examine Canadian results for each aspect and to compare results between different scales. Thus, the following sections report results and differences for the two aspects of reading purpose and comprehension processes and their respective scales, as described above.

Achievement in reading by reading purpose

At the international level, countries with the highest average scores for reading overall also obtained the highest average scores in both literary and informational reading, compared to other countries. Yet, several countries obtained a relatively higher average score in either literary reading or informational reading. For example, the Russian Federation, Hong Kong SAR, and Finland, among other countries, performed better in informational reading than in literary reading. Conversely, Ireland and Northern Ireland performed better in literary reading than in informational reading (Appendix B.2.7). Overall, at the international level, the number of countries that performed better in literary reading was almost the same as the number that performed better in informational reading.

Results for Canada overall show that students achieved higher scores in literary than informational reading. Higher scores were obtain in literary reading in British Columbia, Alberta, Ontario, New Brunswick, and Newfoundland and Labrador, while no significant difference was found between the two reading purposes in Quebec (Table 2.7).

TABLE 2.7 PIRLS 2016 – Comparison of results in literary and informational reading

	Literary reading		Informational reading		Difference between reading purposes	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	559	2.9	552	3.0	**7**	1.1
AB	550	3.3	545	3.4	**6**	1.5
ON	549	3.2	539	3.4	**9**	1.3
QC	550	2.9	547	3.0	3	1.7
NB	529	2.9	520	3.3	**9**	2.0
NL	540	5.3	528	4.9	**11**	1.8
CAN	547	1.9	540	1.9	**7**	1.0
INT	510	0.4	511	0.4	-1	0.2

Note: Numbers in **bold** indicate a statistically significant difference. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

As noted previously, ePIRLS assessed informational reading only, and it is possible to compare performance in informational reading in PIRLS and ePIRLS for countries that participated in both assessments. Internationally, there were slightly more countries where students performed better in digital informational reading (ePIRLS) than in paper-based informational reading (PIRLS). In Canada overall and in British Columbia, there are no significant difference in informational reading between PIRLS and ePIRLS, whereas students in Ontario and Newfoundland and Labrador performed better in digital reading than in paper-based reading (Table 2.8, Appendix B.2.8).

TABLE 2.8 Comparison of results in PIRLS and ePIRLS in informational reading

	PIRLS		ePIRLS		Difference between PIRLS and ePIRLS	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	554	3.1	555	3.1	-2	1.5
ON	540	3.4	544	3.1	**-4**	1.7
NL	530	4.8	538	3.9	**-8**	2.2
CAN	540	3.2	543	3.2	-3	1.4
INT	539	0.7	539	0.7	0	0.4

Note: Numbers in **bold** indicate a statistically significant difference. The results for PIRLS given in this table may differ slightly from those in Figure 2.1, as this table includes only those students who wrote both PIRLS and ePIRLS. Because of the small sample size, results for Quebec are not presented for ePIRLS.

Achievement in reading by comprehension process

Internationally, most of the top-performing countries performed equally well in the combined scales of retrieving and straightforward inferencing, and interpreting, integrating, and evaluating. For instance, in twelve countries there was less than a three-point difference between the two processes (Appendix B.2.9). As presented Table 2.9, there are significant differences between the two scales for comprehension processes

in Canada overall and in the provinces, with students performing better in interpreting, integrating, and evaluating than in retrieving and straightforward inferencing. However, the opposite is true in Quebec, where students performed better in retrieving and straightforward inferencing (Appendix B.2.9).

TABLE 2.9 PIRLS 2016 – Reading achievement by comprehension process

	Retrieving and straightforward inferencing		Interpreting, integrating, and evaluating		Difference between processes	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	554	3.2	557	3.3	**-3**	0.9
AB	545	3.2	548	3.2	**-4**	0.9
ON	539	3.3	548	3.2	**-9**	1.0
QC	551	3.0	545	3.0	**6**	0.7
NB	523	2.8	526	2.8	**-3**	0.7
NL	531	4.9	536	5.2	**-5**	1.2
CAN	541	1.8	545	1.8	**-4**	0.5
INT	511	0.4	510	0.4	**2**	0.2

Note: Numbers in **bold** indicate a statistically significant difference. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

With respect to ePIRLS, there are significant differences between the two comprehension processes in most countries, including in Canada overall. In British Columbia and Ontario, students perform better in interpreting, integrating, and evaluating than in retrieving and straightforward inferencing (Table 2.10, Appendix B.2.10).

TABLE 2.10 ePIRLS 2016 – Reading achievement by comprehension process

	Retrieving and straightforward inferencing		Interpreting, integrating, and evaluating		Difference between processes	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
BC	552	3.5	558	3.3	**-6**	2.1
ON	541	3.2	547	3.3	**-6**	1.1
NL	536	4.5	536	4.0	-1	3.5
CAN	541	3.0	545	3.2	**-4**	0.6
INT	540	0.7	538	0.7	**3**	0.3

Note: Numbers in **bold** indicate a statistically significant difference. Because of the small sample size, results for Quebec are not presented for ePIRLS.

Trends in reading achievement

Canadian participation in large-scale assessments allows meaningful comparisons with other countries. It also provides provincial education authorities with valuable information about important features of our education systems. Ministries and departments of education consider results from these assessments and

other contextual information when making political decisions aimed at improving their education system. Because many of the decisions and changes that are implemented (e.g., changes to the curriculum) are based in part on the results of large-scale assessments, it is important to monitor system-level results over time. In this section, trends in reading achievement are reported for those provinces that participated in previous PIRLS assessments (PIRLS 2001, PIRLS 2006, and/or PIRLS 2011). Of those provinces that participated in PIRLS 2016, Ontario and Quebec have had the longest involvement in PIRLS, as both started their participation in 2001; British Columbia and Alberta joined PIRLS in 2006; New Brunswick (French) and Newfoundland and Labrador participated in PIRLS for the first time in 2011, as did Canada overall.

Table 2.11 compares the results in reading for PIRLS 2001, 2006, 2011, and 2016 for Canada overall and for the provinces. In 2016, the results for students in Canada overall decreased significantly, by 5 points compared to the baseline year of 2011. Ontario's performance decreased in 2016 compared to 2011 and 2006 but is statistically comparable to its performance in 2001. Results in Quebec significantly increased in 2016 compared to the previous three cycles. In British Columbia, PIRLS results remained stable in the three cycles in which the province participated (2006, 2011, and 2016). In Alberta, results in 2016 were lower than in 2006 but comparable to those in 2011. Finally, results in New Brunswick (French) and in Newfoundland and Labrador decreased between 2011 and 2016 (Appendix B.2.11 and B.2.12).

TABLE 2.11 PIRLS 2016 – Comparison of results in reading over time

	2001		2006		2011		2016		Difference		
	Average score	S.E.	Average score	S.E.	Average score	S.E.	Average score	S.E.	2001–16	2006–16	2011–16
BC	–	–	558	2.6	556	3.1	555	2.9	–	-3	-1
AB	–	–	560	2.4	548	2.9	547	3.2	–	**-13**	-1
ON	548	3.3	555	2.9	552	2.6	544	3.2	-4	**-12**	**-8**
QC	537	3.0	533	2.7	538	2.2	547	2.8	**10**	**15**	**10**
NB (Fr)	–	–	–	–	514	3.0	501	3.6	–	–	**-13**
NL	–	–	–	–	546	2.7	534	5.1	–	–	**-12**
CAN	–	–	–	–	548	1.6	543	1.8	–	–	**-5**

Note: Numbers in **bold** indicate a statistically significant difference. When comparing findings from 2011 and 2016 in Canada, it should be noted that there were some differences in the provinces constituting the Canadian sample in these two years.

3. EXPLORING CONTEXTUAL FACTORS RELATED TO READING ACHIEVEMENT

Since its inception in 2001, PIRLS has published reliable comparative data on the reading achievement of Grade 4 students in an international context. In addition, PIRLS has been collecting extensive data about the school and home contexts in which students learn to read. The analysis of these data assists participating countries in orienting policy-making to improve student achievement.

As discussed in the Introduction, PIRLS relies on several different instruments to collect contextual information, including a Home Questionnaire, a School Questionnaire, a Teacher Questionnaire, and a Student Questionnaire. This chapter presents selected results from these four questionnaires to illustrate possible areas of interest for educational policy-makers and researchers. This report will focus on selected context variables, demonstrating the types of analysis that are possible from the wealth of data provided by PIRLS. Over the coming months, further analysis will be published by CMEC on specific factors of interest.

The home context

The home environment plays a pivotal role in creating a climate that prepares students to become effective readers before they start school and a supporting role while in school (CMEC, 2013). Not only can parents provide an environment that is conducive to learning, with stimulating reading resources, but, through their own beliefs and behaviour, they can also encourage children to become more engaged with reading.

As was the case in past PIRLS cycles (2001, 2006, and 2011), PIRLS 2016 looked at the home environment of Grade 4 students using the Learning to Read Survey (Home Questionnaire) as well as the Student Questionnaire. These questionnaires covered a number of home-related factors expected to influence reading achievement, such as the immigration background of the student and languages spoken at home; the economic, social, and educational resources available at home, including digital resources; parental behaviours and attitudes toward reading and literacy development; students' attendance in pre-primary education; computer use at home; and homework.

As seen in the PIRLS 2011 Canadian report (Labrecque et al., 2012), responses to several items from these questionnaires correlated closely with students' reading performance.[17] The following areas have been selected for analysis: the immigration background of students and the languages spoken at home; the parents' reading engagement with their child; students' resources at home, including reading-related resources; parents' reading habits and attitudes toward reading; student confidence in their reading ability; self-efficacy with respect to computer use; whether students attended pre-primary education; the age of students when they started primary school; the frequency of homework; and students' access to digital devices. For each area, the variables of interest are presented, followed by descriptive statistics for Canada and participating provinces. The relationship between these variables and reading achievement based on PIRLS and/or ePIRLS 2016 is highlighted, where pertinent.

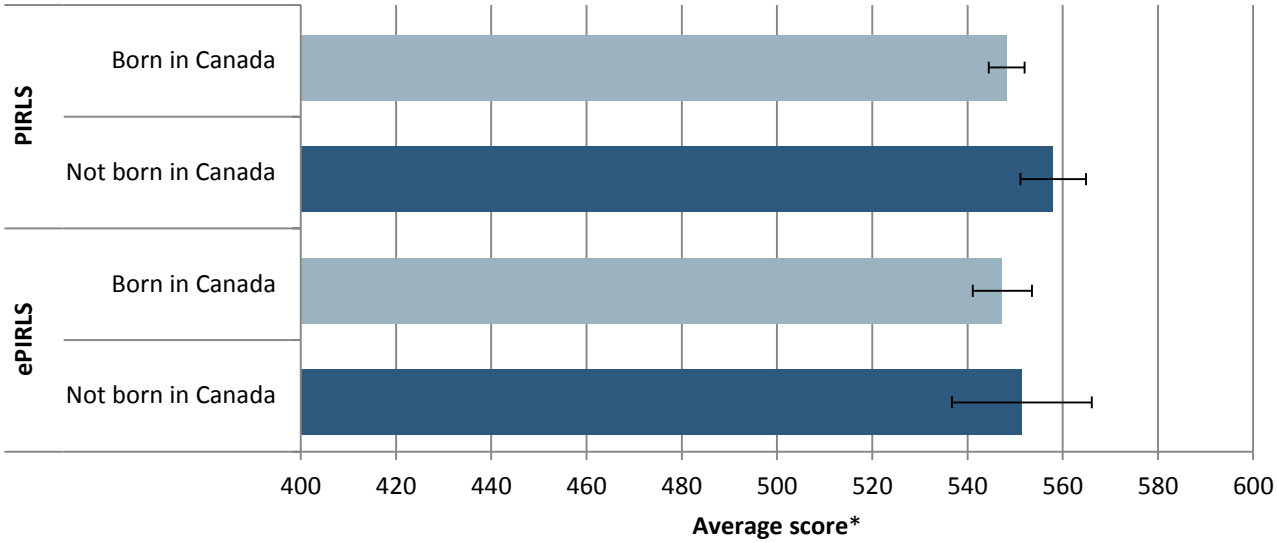
[17] When comparing findings from 2011 and 2016 in Canada, it should be noted that there were some differences in the provinces constituting the Canadian sample in these two years.

Immigration background and languages spoken at home

In 2015, Canada welcomed more than 270,000 immigrants, of whom approximately 20 per cent were younger than 15 years old (Immigration, Refugees and Citizenship Canada, 2015). Based on the most recent results from the Programme for International Student Assessment (PISA) (OECD, 2016b), as many as 30 per cent of Canadian 15-year-old students are either first- or second-generation immigrants.

Through the Home Questionnaire, PIRLS 2016 asked whether students were born in Canada or not. Overall, 89 per cent of parents of Grade 4 students indicated that their child was born in this country. As can be expected, the proportion of students not born in the country varied greatly between provinces, with 10 per cent or more in British Columbia, Alberta, Ontario, and Quebec and 5 per cent or less in New Brunswick and Newfoundland and Labrador (Appendix B.3.1 and B.3.2). In terms of reading performance in Canada overall, students not born in the country performed better than those born in Canada in PIRLS 2016, but did not perform significantly differently in ePIRLS 2016 (Figure 3.1, Appendix B.3.1 and B.3.2).

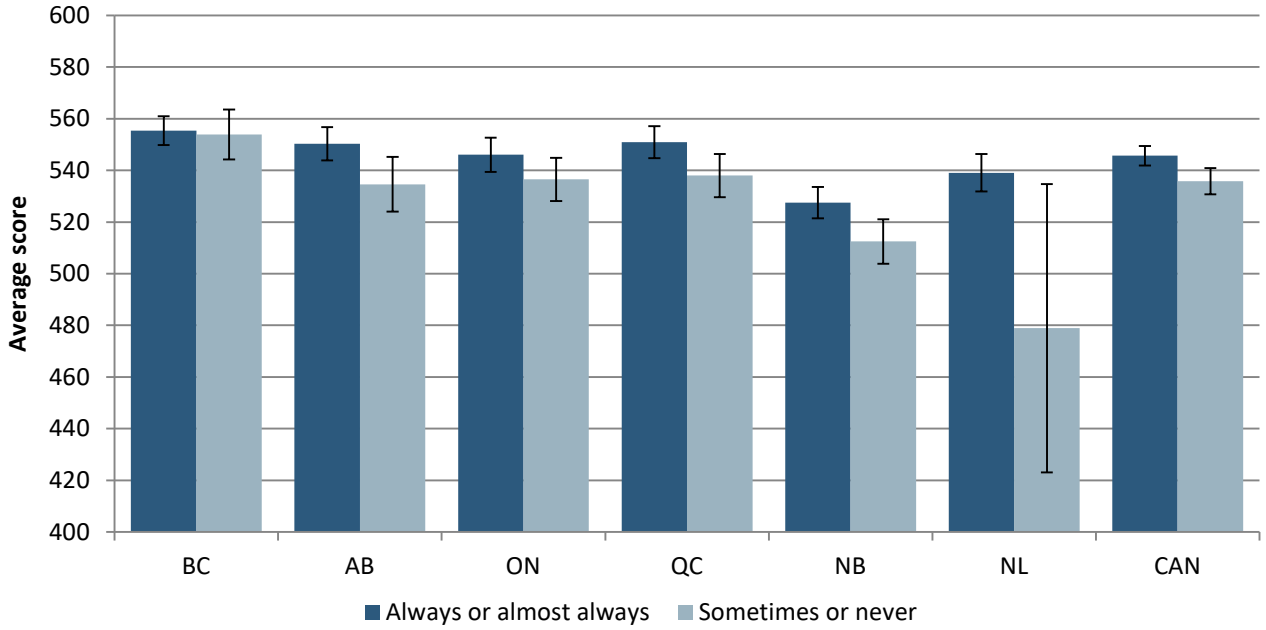
FIGURE 3.1 PIRLS and ePIRLS 2016 – Reading achievement for students by immigration status



* Based on students who wrote both PIRLS and ePIRLS

In Canada, it is expected that all students will speak English, French, or both when studying at school. However, with such a high proportion of Canadian students being of immigrant background, many students may not speak the language of the test (or the language of instruction) at home. Based on the PIRLS 2016 Canadian data, 78 per cent of Canadian Grade 4 students *always or almost always* speak the language of the test (English or French) at home, while 22 per cent *sometimes or never* speak the test language at home. Across provinces, percentages of students *always or almost always* speaking the language of the test at home range from 75 per cent in Quebec to 92 per cent in Newfoundland and Labrador. As shown in Figure 3.2, students speaking the language of the test at home *always or almost always* perform better in reading than students who *sometimes or never* speak the test language at home, with an advantage of 10 points in Canada overall. The difference is statistically significant in all jurisdictions except British Columbia (Appendix B.3.3). The results in digital reading (ePIRLS) tend to be similar to those in PIRLS (Appendix B.3.4).

FIGURE 3.2 PIRLS 2016 – Relationship between speaking the language of the test at home and reading achievement



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Reading engagement of parents

The PIRLS 2011 Canadian report provided compelling evidence that Grade 4 students whose parents read to them *often* before they enrolled in school performed much better in reading than those whose parents read to them *sometimes, almost never, or never* (CMEC, 2013; Labrecque et al., 2012). The present report takes the analysis a step further by looking at the relationship of parental engagement with reading achievement by language of the school system. Table 3.1 shows the average scores for students whose parents said they were *often* involved in early literacy activities before their child started primary school and compares them to results for students whose parents said they were *sometimes, almost never, or never* involved in such activities. In Canada overall, as well as in all provinces across both languages, the differences between these two groups of students are statistically significant, except in Alberta francophone schools, where the difference is not significant. The differences tend to be greater in English schools than in French ones in Alberta and New Brunswick, suggesting that students whose parents were more involved with early reading activities obtain higher scores in reading in English-language school systems than do students with equally engaged parents in French-language school systems (CMEC, 2013).

TABLE 3.1 PIRLS 2016 – Relationship between reading achievement and level of parental involvement in early reading activities by language of the school system

	Often				Sometimes, almost never, or never			
	%	S.E.	Average score	S.E.	%	S.E.	Average score	S.E.
Anglophone school system								
BC	53	1.5	570	3.3	47	1.5	550	4.0
AB	48	1.6	566	4.2	52	1.6	544	3.8
ON	55	1.5	564	3.6	45	1.5	540	3.9
QC	44	2.3	559	5.7	56	2.3	537	5.3
NB	57	1.5	553	3.6	43	1.5	522	4.4
NL	65	1.2	550	4.8	35	1.2	524	5.8
CAN	53	0.9	562	2.4	47	0.9	538	2.9
Francophone school system								
BC	52	2.9	532	6.4	48	2.9	512	4.5
AB	40	3.2	523	8.1	60	3.2	509	7.9
ON	49	1.7	515	4.7	51	1.7	489	3.8
QC	41	1.3	563	3.5	59	1.3	543	3.1
NB	52	1.6	515	4.3	48	1.6	497	4.7
NL	–	–	–	–	–	–	–	–
CAN	42	1.2	556	3.1	58	1.2	537	2.8

Note: Owing to the small sample size, the percentages and scores for students enrolled in French schools participating in Newfoundland and Labrador are not provided in this table. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

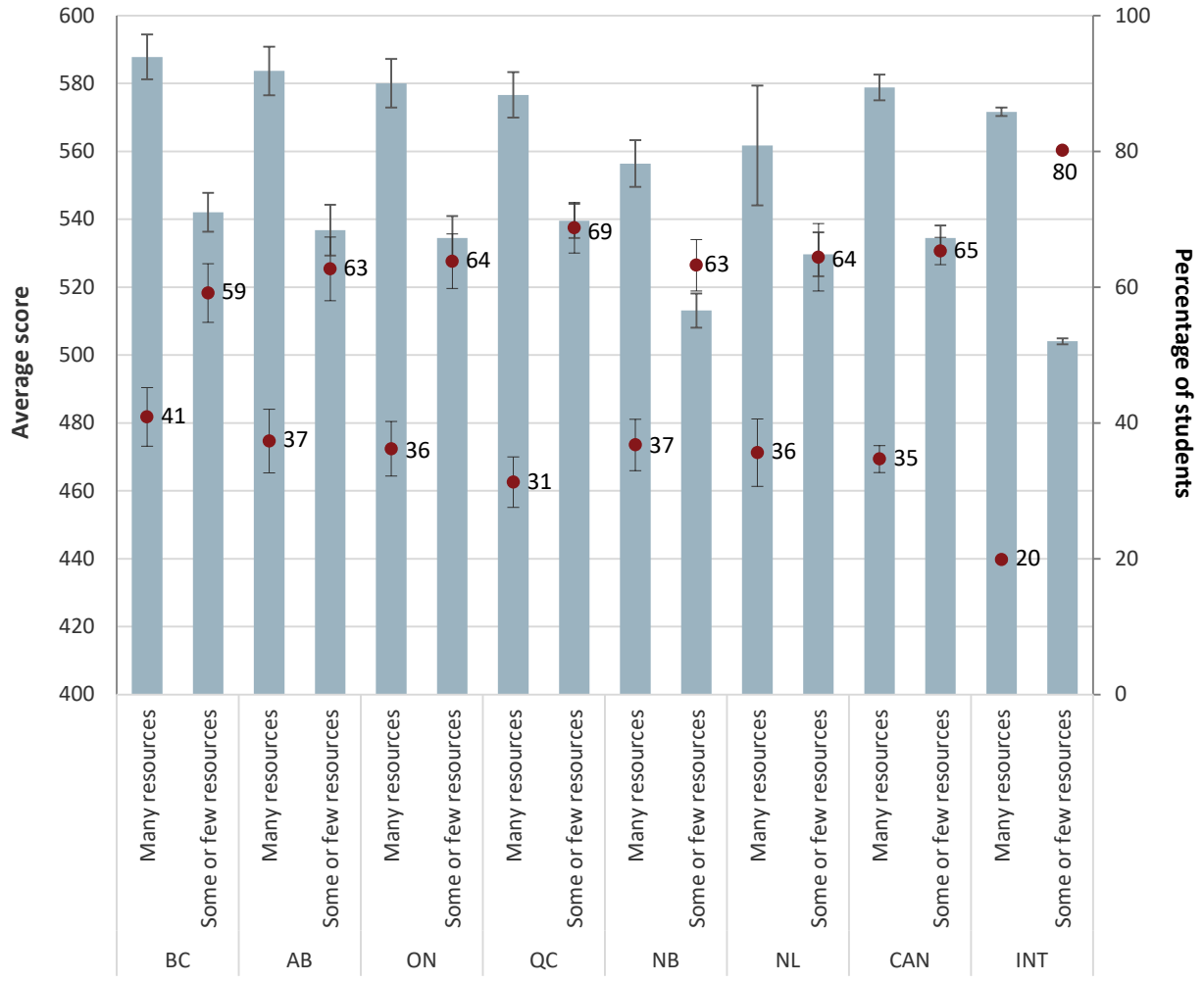
Students' resources at home

As demonstrated by a number of international studies, the socioeconomic background of students is not as strong a predictor of achievement in Canada as it is in many other countries (Campbell, Zeichner, Lieberman, & Osmond-Johnson, 2017). Nonetheless, it remains one of the strongest indicators of achievement. As was the case in previous cycles, PIRLS 2016 created an Index of Home Resources for Learning based on five variables collected from the Student and Home Questionnaires: the number of books in the home, the number of children's books in the home, the number of home-study supports (i.e., an Internet connection, a student having his or her own room to study in), the highest level of education of the parents or guardians, and the level of occupation of the parents or guardians. The international average for the index was established at 10.0 in 2001. In 2016, countries' index values ranged between 6.9 (Morocco) to 11.6 (Australia), with Canada at 11.2 (Mullis et al., 2017b).

Figure 3.3 shows the relationship between home resources for learning and reading achievement in PIRLS. Across provinces, the proportion of students with *many* resources for learning varies between 41 per cent in British Columbia and 31 per cent in Quebec (Appendix B.3.5). The proportion of students with *some or few* resources also varies between provinces, from 59 per cent in British Columbia to 69 per cent in

Quebec, compared to the international figure of 80 per cent. The difference in PIRLS achievement between those students with *many* and *some or few* resources is 44 points in Canada; similar differences are found in all provinces except Newfoundland and Labrador, where the gap is narrowest. The gap in achievement is 54 points internationally, confirming that the relationship between home resources for learning and reading achievement is weaker in Canada. For those provinces that participated in ePIRLS, such differences in achievement are slightly smaller than in PIRLS (Appendix B.3.6).

FIGURE 3.3 PIRLS 2016 – Relationship between home resources for learning and reading achievement



Note: Because there are almost no students in Canada with *few* home resources, the categories *some resources* and *few resources* were combined, although they remain separate in the international category. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied (see Appendix A for further details).

Parents' reading habits and attitudes

The PIRLS 2011 Canadian report provided evidence of a strong relationship between parental enjoyment of reading and student reading achievement (Labrecque et al., 2012). That report noted significant differences across provinces in the proportion of parents who enjoyed reading, but the strength of the relationship was consistent across Canada. Based on the 2016 data, 40 per cent of Canadian parents like

reading *very much*. This is higher than the international average of 32 per cent (Mullis et al., 2017b). However, the difference by language of the school system is quite sizeable, with 13 per cent fewer parents of students in the French-language school systems enjoying reading *very much* compared to those in the English-language school systems in Canada overall (Table 3.2). There are also marked differences between the two languages within provinces in the proportion of parents enjoying reading, and these differences tend to be representative of the difference in reading achievement measured by the language of the school systems.

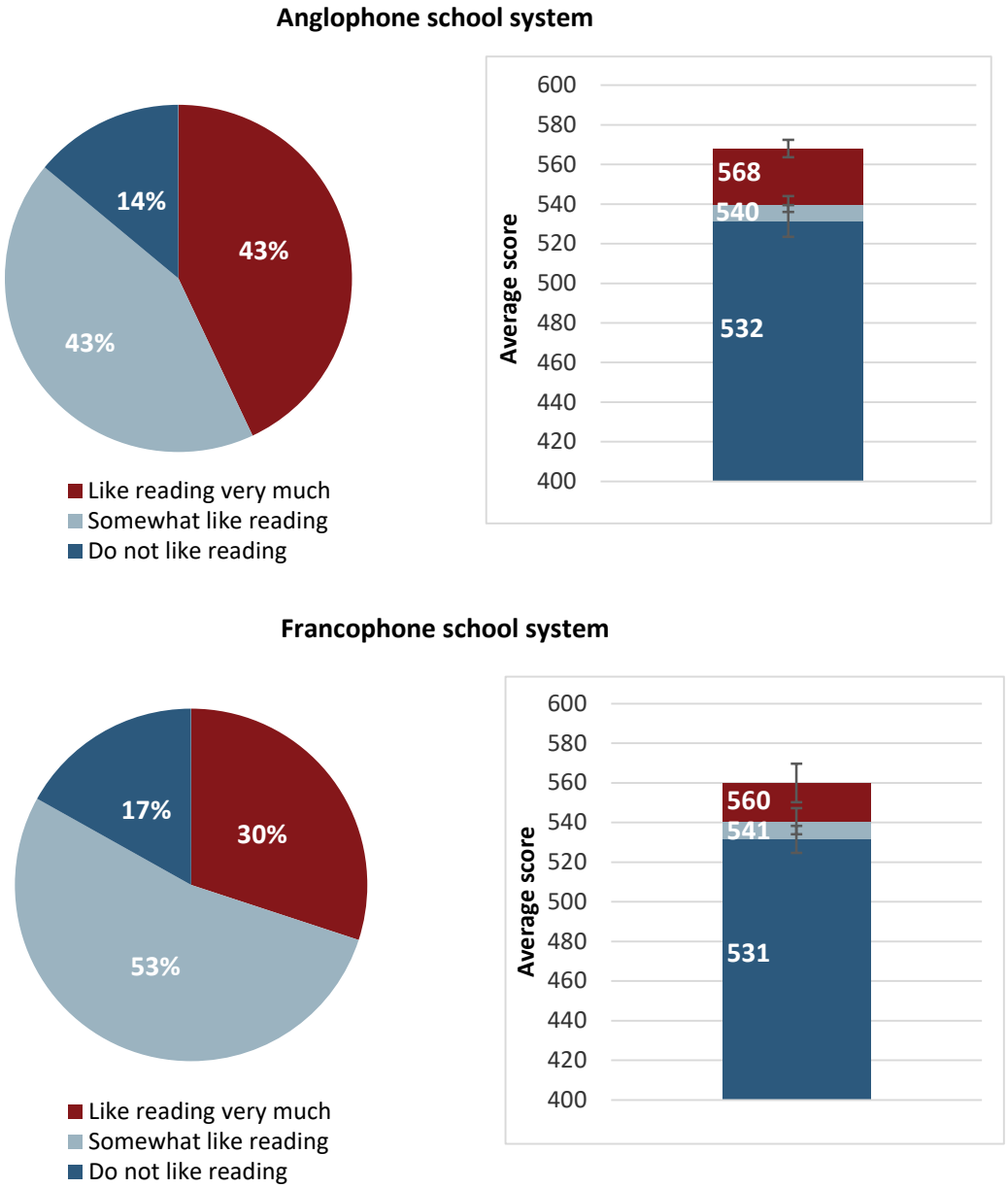
TABLE 3.2 PIRLS 2016 – Proportion of parents who like reading

	Like reading very much		Somewhat like reading		Do not like reading	
	%	S.E.	%	S.E.	%	S.E.
Anglophone school system						
BC	46	(1.8)	43	(1.6)	12	(0.9)
AB	45	(1.5)	41	(1.3)	14	(1.1)
ON	43	(1.3)	44	(1.0)	13	(0.9)
QC	44	(2.1)	39	(1.8)	17	(1.6)
NB	46	(1.9)	37	(1.6)	17	(1.0)
NL	44	(2.1)	43	(1.6)	14	(0.9)
CAN	43	(0.9)	43	(0.8)	14	(0.6)
Francophone school system						
BC	42	(3.0)	52	(3.0)	7	(1.5)
AB	33	(1.7)	57	(1.9)	9	(1.2)
ON	30	(1.9)	54	(1.8)	17	(1.4)
QC	30	(1.4)	53	(1.3)	17	(1.1)
NB	24	(2.3)	54	(2.3)	22	(1.5)
NL	–		–		–	
CAN	30	(1.3)	53	(1.1)	17	(1.0)

Note: Owing to the small sample size, the percentages for students enrolled in French schools participating in Newfoundland and Labrador are not provided in this table. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

The gain in reading achievement between students whose parents *do not like* reading and those who *like reading very much* is greater in English than in French (36 points and 28 points, respectively) (Figure 3.4, Appendix B.3.7). This is consistent with the trend seen with respect to parental engagement with early reading activities.

FIGURE 3.4 PIRLS 2016 – Relationship between parental reading enjoyment and average score by language of the school system



Student confidence in their reading ability

Self-efficacy, or one's belief in one's ability to succeed, has been shown to play a major role in how students approach learning and how they achieve. While academic self-efficacy definitely influences how one learns, it operates differently by gender and age group (Huang, 2013). A number of large-scale studies have shown the relationship between self-efficacy and mathematics and science achievement, but few have focused on reading in the early years. Although many measures of reading self-efficacy have been developed over the past twenty-five years (Piercey, 2013), PIRLS 2011 improved the measure of students' self-concept with respect to reading and concluded that there was a clear relationship between students' expressed confidence in their reading ability and their achievement (Mullis et al., 2012).

In 2016, the Index of Student Confidence in Reading was developed based on student responses to six statements, and an international average scale score of 10 was established.[18] Internationally, 45 per cent of students stated that they were *very confident* in their reading ability, 35 per cent were *somewhat confident,* and 21 per cent *not confident*. In two countries (Sweden and Finland), 60 per cent or more of Grade 4 students rated themselves as *very confident*. Canadian students showed levels close to the international averages for each category, with 51 per cent, 32 per cent, and 17 per cent, respectively (Mullis et al., 2017b).

In Canada, a significantly higher proportion of girls than boys declared themselves to be *very confident* in their reading ability (Table 3.3). However, the relationship between confidence in reading ability and reading achievement seems to be the same regardless of gender, with a difference of 92 points for girls and 90 points for boys between those students classified as *very confident* and those classified as *not confident* (Appendix B.3.8). These results suggest that Canadian Grade 4 students of both genders have views of their reading ability that are very consistent with their actual reading achievement.

TABLE 3.3 PIRLS 2016 – Proportion of students by confidence in reading ability

	Very confident				Somewhat confident				Not confident			
	Girls		Boys		Girls		Boys		Girls		Boys	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	59	1.7	55	1.7	29	1.5	31	1.7	12	1.2	14	1.1
AB	57	1.9	55	1.8	29	1.6	33	1.7	14	1.2	13	1.3
ON	**54**	**1.6**	**49**	**1.6**	30	1.1	32	1.8	15	1.2	19	2.2
QC	46	1.9	43	1.5	35	1.8	36	1.4	18	1.4	21	1.2
NB	**55**	**1.4**	**47**	**1.2**	31	1.1	34	1.3	**13**	**1.1**	**19**	**1.2**
NL	63	2.5	58	1.9	**22**	**1.5**	**29**	**1.8**	15	1.5	14	1.3
CAN	**54**	**0.9**	**49**	**0.8**	31	0.7	33	0.9	**15**	**0.7**	**18**	**1.0**

Note: Numbers in **bold** indicate a statistically significant difference between genders across categories. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Student self-efficacy in computer use

Because of the design of the study, PIRLS 2016 provides a unique opportunity to look at the relationship between student self-efficacy in computer use (i.e., how students perceive their own ability in using computers) and digital and paper-based reading achievement. In the four provinces participating in ePIRLS, students completed both the PIRLS and ePIRLS assessments and responded to the Student Questionnaire, which included a series of three statements about their ease in using computers.[19] An analysis of these items in the questionnaire reveals that Canadian students rated their self-efficacy in using computers as one of the lowest among the 14 countries that participated in both PIRLS and ePIRLS. With 39 per cent of Canadian students rating their self-efficacy level as *high*, only students in Chinese Taipei

[18] These statements were: *I usually do well in reading*; *Reading is easy for me*; *I have trouble reading stories with difficult words*; *Reading is harder for me than for many of my classmates*; *Reading is harder for me than any other subjects*; and *I am just not good at reading*.
[19] These statements were: *I am good at using a computer*; *I am good at typing*; and *It is easy for me to find information on the Internet*.

reported lower levels. In contrast, 60 per cent of students in three countries (Israel, Portugal, and Slovenia) reported *high* self-efficacy (Mullis et al., 2017a). Results across participating provinces showed that students in Newfoundland and Labrador had the highest levels of self-efficacy in computer use, and students in British Columbia the lowest (Table 3.4).

The relationship between self-efficacy in computer use and reading achievement is similar across provinces and for Canada overall. Students with higher levels of self-efficacy performed better in both PIRLS and ePIRLS, but there is almost no difference in achievement between *high* and *medium* levels of self-efficacy. Students with *low* levels of self-efficacy performed less well in both PIRLS and ePIRLS. The difference in achievement between *high* and *low* levels of self-efficacy is slightly larger for ePIRLS than for PIRLS, which is consistent with the fact that the construct of digital literacy includes a component of computer use.

TABLE 3.4 ePIRLS 2016 – Relationship between self-efficacy in computer use and reading achievement

	High				Medium				Low			
	%	S.E.	Average score	S.E.	%	S.E.	Average score	S.E.	%	S.E.	Average score	S.E.
BC	32	1.4	560	3.7	59	1.3	564	3.3	9	0.6	544	6.9
ON	38	1.1	553	3.1	53	1.2	547	3.4	9	1.1	536	9.9
NL	46	1.4	554	4.2	48	1.5	539	4.9	7	0.9	492	9.9
CAN	39	0.8	550	3.5	52	0.9	547	3.7	9	0.9	523	8.4

Attending pre-primary education

There is a relative scarcity of research on the long-term benefits of attending pre-school on reading achievement in the Canadian context, but an on-going study by Pelletier (2017) suggests that, in the Ontario context, full-day Kindergarten, which is a two-year program, provides lasting benefits in reading, writing, and number knowledge.

In the PIRLS 2016 Home Questionnaire, parents were asked whether their child had attended pre-primary education and, if so, for how along. In 32 of the 47 countries for which data are available, less than 11 per cent of children had not attended pre-primary education. Based on parental reports, the figure for Canada is 16 per cent. In addition, compared to the international average (59 per cent), a lower proportion of Canadian students (43 per cent) attended pre-primary education *for 3 years or more*.

There are marked differences in pre-primary education attendance across provinces (Table 3.5). For example, one in five Grade 4 students in Ontario had not attended pre-primary education,[20] while in British Columbia the proportion was less than one in ten. At the other end of the spectrum, 58 per cent of students in Quebec attended pre-primary education *for 3 years or more*, which is 25 percentage points higher than the proportion in Alberta.

[20] In Ontario, the full-day Kindergarten initiative was announced in September 2010, with gradual implementation. See https://files.ontario.ca/books/kindergarten-program-en.pdf for more details.

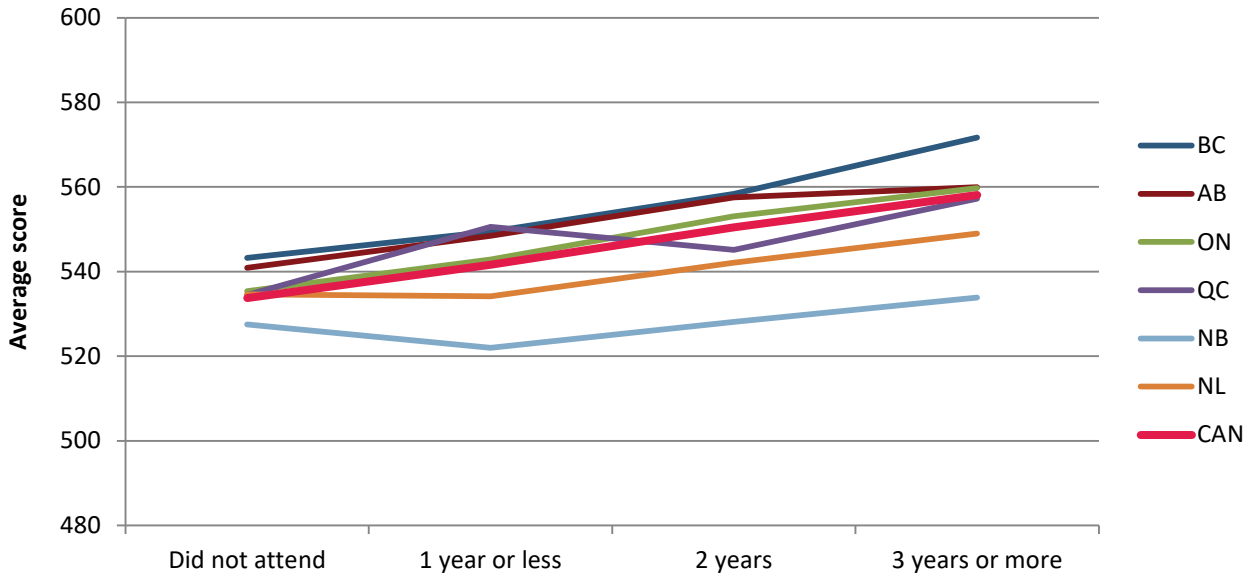
TABLE 3.5 PIRLS 2016 – Proportion of students attending pre-primary education

	Did not attend		1 year or less		2 years		3 years or more	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	9	0.8	19	1.1	34	1.2	38	1.5
AB	12	1.1	24	1.3	31	1.2	33	1.7
ON	20	1.3	13	0.8	28	1.0	39	1.6
QC	17	1.1	11	0.7	14	0.9	58	1.3
NB	15	0.8	25	1.0	22	0.9	39	1.2
NL	18	1.2	28	1.3	20	1.4	35	1.6
CAN	16	0.6	15	0.5	25	0.7	43	0.8
INT	11	0.1	12	0.1	18	0.1	59	0.2

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

The relationship between attending pre-primary education and reading achievement is slightly positive and relatively stable across provinces (Figure 3.5, Appendix B.3.9).

FIGURE 3.5 PIRLS 2016 – Relationship between attending pre-primary education and average score



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Age at the beginning of the primary grades

As shown in the previous section, the number of years students attended pre-primary education, as reported by parents in the Home Questionnaire, varied substantially across jurisdictions participating in PIRLS. Related to this variable is the age at which students began Grade 1 or primary school. In Canada, provincial

policies regarding the age of attendance vary between five and seven years old, as described in the PIRLS international report and the *PIRLS 2016 Encyclopedia* (Mullis et al., 2017b, 2017c).

There are very large differences between countries in the age at which children enter the primary grades. In New Zealand, 97 per cent of students start Grade 1 at age five or younger, but this proportion is 1 per cent or less in many other countries, including the Russian Federation, Finland, the Czech Republic, Bulgaria, Latvia, Hungary, the Slovak Republic, and Iran. In Canada, 37 per cent of children are five years of age or younger when entering the primary grades, a figure that is almost double the international average (20 per cent). Across provinces, the proportion of children who begin primary school at age five or younger varies between 29 per cent in Quebec and 48 per cent in New Brunswick (Table 3.6). Overall, students who began primary school at age six had higher achievement in reading than those who began at age five or younger (Appendix B.3.10).

TABLE 3.6 PIRLS 2016 – Proportion of students by age when starting Grade 1

	5 years old or younger		6 years old		7 years old or older	
	%	SE	%	SE	%	SE
BC	40	1.2	58	1.2	2	0.4
AB	38	1.2	59	1.3	2	0.4
ON	40	1.4	57	1.3	3	0.5
QC	29	1.3	68	1.3	4	0.5
NB	48	1.2	51	1.2	–	–
NL	40	1.4	59	1.4	–	–
CAN	37	0.7	61	0.7	3	0.3

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Homework

PIRLS 2011 was an important source of information for an issue of *Assessment Matters!* dedicated to homework across school grades (CMEC, 2014). Based on results from recent national and international large-scale assessments, that issue concluded that older students benefit more from homework than younger students do. More specifically, PIRLS 2011 data revealed that, in the early grades, there is an inverse relationship between reading achievement and the amount of time spent on homework (Labrecque et al., 2012).

In PIRLS 2016, parents of Grade 4 students were asked to indicate how often their child was doing homework. In Canada, 22 per cent of students did *no homework* or did homework *less than once a week*. This contrasts markedly with an international average of 6 per cent for these two categories; indeed, only two other countries (Denmark and the Netherlands) have 20 per cent or more of students in those two categories (Mullis et al., 2017b). This suggests that, internationally, Grade 4 students tend to do more homework than do students in Canada.

Based on parents' reports, the frequency of homework varies across provinces: in Newfoundland and Labrador, New Brunswick, and Quebec, very few students do *no homework*, while in Alberta and British Columbia more than 10 per cent of students fall into this category (Table 3.7). Internationally, 81 per cent of Grade 4 students do homework *three or four times a week or more* compared to 50 per cent of students in Canada (Mullis et al., 2017b).

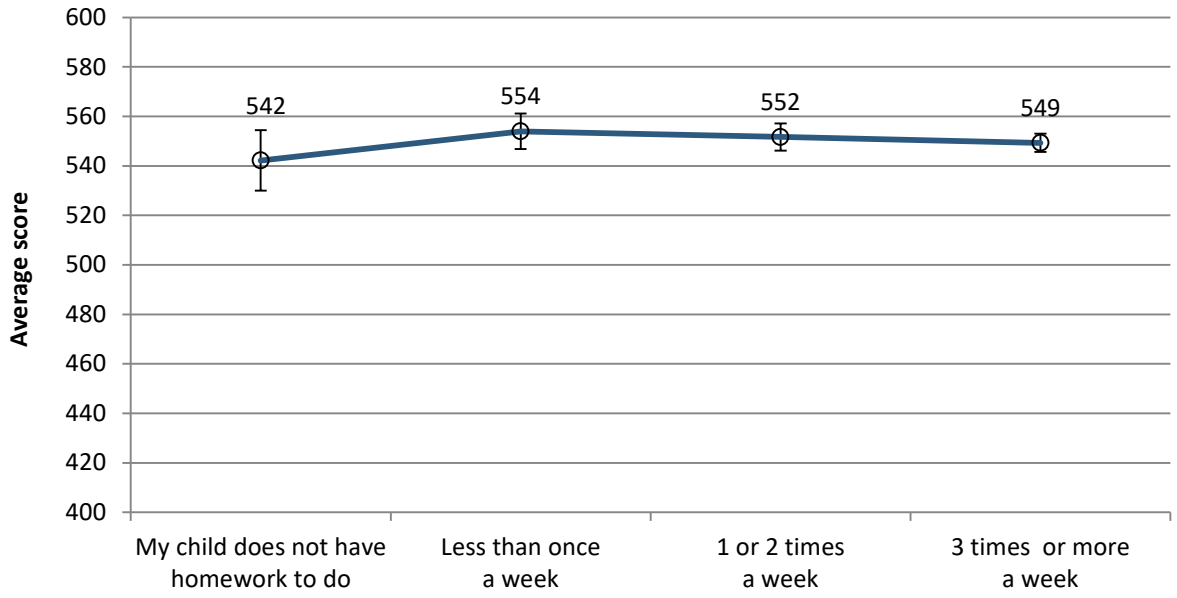
TABLE 3.7 PIRLS 2016 – Proportion of students by frequency of homework

	No homework		Less than once a week		1 or 2 times a week		3 or 4 times a week or more	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	12	2.0	16	1.3	28	1.6	43	2.7
AB	13	1.4	23	1.7	28	1.8	37	2.7
ON	8	0.9	17	1.4	33	1.7	43	2.3
QC	1	0.3	2	0.3	20	1.4	76	1.6
NB	5	0.8	5	0.7	22	1.1	68	1.7
NL	4	1.1	10	1.9	27	1.9	59	2.8
CAN	8	0.7	14	0.7	28	0.9	50	1.1

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Figure 3.6 shows the relationship between the frequency of homework assignment based on reports from Canadian parents/guardians and reading achievement from the PIRLS 2016 data (Appendix B.3.11). Generally, these results are consistent with past analyses of Canadian data (e.g., CMEC, 2014) that show that, in the early grades, students who do some homework may have only marginally higher reading achievement compared to students who do no homework.

FIGURE 3.6 PIRLS 2016 – Relationship between homework frequency and reading achievement



Digital devices

The ePIRLS assessment provides a unique opportunity to look at the relationship between access to digital devices in the home and on-line reading achievement. In the Student Questionnaire, students were asked whether they had digital devices such as a computer and/or a tablet and whether their home had an Internet connection. In addition, parents/guardians were asked about the number of digital information devices in the home and whether these were available only to parents, to students, or to both. Based on these responses, a Digital Devices in the Home Scale was created with three categories – *high access, medium access,* and *low access.* Based on ePIRLS data, participating counties were grouped as follows: those with *high access* (Norway [Grade 5], Denmark, and Sweden), where over 40 per cent of Grade 4 students had *high access* to digital devices at home; those with *medium access* (Canada, United Arab Emirates, Ireland, Singapore, Israel, and Portugal), where between 20 and 30 per cent of students had *high access* to devices; those with *low access* (Italy, Slovenia, Chinese Taipei, and Georgia), where less than 15 per cent of students had *high access* to devices (Mullis et al., 2017b). In Canada, the 27 per cent of students with *high access* performed better on ePIRLS by 22 points compared to the 72 per cent of students with *medium access* (virtually no students in Canada had *low access*) (Table 3.8). This difference in achievement is consistent with the international average.

Student access to digital devices in the home is quite variable across provinces. The proportion of students with *high access* ranges between 29 per cent in British Columbia and 41 per cent in Newfoundland and Labrador. The relationship between digital reading achievement (ePIRLS) and *high* and *medium access* to digital devices is also greater in British Columbia (a difference of 16 points) and smaller in Newfoundland and Labrador (a difference of 11 points), suggesting that access to digital devices in the home plays a role in digital reading achievement (Table 3.8).

TABLE 3.8 ePIRLS 2016 – Level of access to digital devices in the home and reading achievement

	High access				Medium access			
	%	S.E.	Average score	S.E.	%	S.E.	Average score	S.E.
BC	29	1.6	573	4.2	70	1.6	557	3.7
ON	32	1.0	562	3.7	68	1.0	548	3.5
NL	41	2.0	550	4.9	59	2.0	539	3.8
CAN	27	1.2	564	3.5	72	1.2	542	3.3

Note: Because of the small sample size, results for Quebec are not presented for ePIRLS.

The availability of digital devices at school follows a pattern across provinces that is similar to the level of access to digital devices in the home: the proportion of students with digital devices available at school ranges between 49 per cent in British Columbia and 71 per cent in Newfoundland and Labrador. However, unlike the positive association observed between access to digital devices in the home and digital reading achievement, there is no relationship between digital reading achievement of students (ePIRLS) and the availability of digital devices at school in Canada and across provinces (Table 3.9).

TABLE 3.9 ePIRLS 2016 – Availability of digital devices at school and reading achievement

	Yes				No			
	%	S.E.	Average score	S.E.	%	S.E.	Average score	S.E.
BC	49	4.7	557	3.7	51	4.7	555	4.8
ON	62	4.5	542	4.1	38	4.5	548	4.8
NL	71	5.0	535	4.0	29	5.0	543	8.8
CAN	56	5.3	542	4.4	44	5.3	544	4.2

Note: Because of the small sample size, results for Quebec are not presented for ePIRLS.

The school context

As demonstrated in the preceding discussion, many facets of the home context contribute significantly to a child's learning. Of course, what happens in the classroom and within the school more generally greatly influences the quality of the learning experience for children as well as their achievement. Bascia (2014) suggests that three aspects should be considered when looking at the school context: classroom features (e.g., teacher expectations, student-teacher relationships, the disciplinary climate), teacher communities (e.g., professional development opportunities, teacher collaboration, preparation time), and schools themselves (e.g., school policies, school environment, school resources). Applying this model leads to a better understanding of the school context, which can enable educators, parents, students, and policy-makers to consider the possibilities for school improvement.

PIRLS 2016 covers a wide range of factors related to the school context. For illustrative purposes, the following variables have been selected for analysis: teacher characteristics (demographics, education level, involvement in professional development activities, and job satisfaction) and school characteristics (the socioeconomic level of the school, the condition of school libraries, the emphasis on academic success, student factors limiting instruction, student readiness to learn, school discipline and safety, and student bullying).

Teacher characteristics

This section discusses a number of teacher characteristics, with a focus on describing the background of those Grade 4 teachers who were involved in PIRLS 2016. Although the sample of schools and students who participated in PIRLS was drawn randomly in a two-stage design, as described in the Introduction, classrooms and teachers were sampled to optimize student participation. In some schools, one classroom was selected, while in others, two or more classrooms participated. However, the participation rate of teachers cannot be determined, as we do not know the actual number of teachers at the target grade level in participating schools. Given this approach, care must be taken when interpreting and generalizing data from the Teacher Questionnaire, as they are not representative of the entire population of teachers. Therefore, any findings presented in this report on the percentage of teachers with certain characteristics should rather be interpreted as the percentage of students with teachers possessing such characteristics.

Teacher demographics

Based on the PIRLS 2016 data, 24 per cent of teachers at the Grade 4 level in Canada are male (Table 3.10, Appendix B.3.12). The distribution by age group shows that 17 per cent of Grade 4 teachers were below 30 years old, and 24 per cent were 50 years old or older (Table 3.10, Appendix B.3.13). On average, Canadian teachers had just over 14 years of teaching experience. Table 3.10 presents the proportion of teachers by sex, age group, and years of experience at the provincial, Canadian, and international levels. There are some interprovincial differences worth noting. The proportion of female teachers is much higher in Quebec (93 per cent) than in the other provinces. Proportionally, there are more older teachers (50 years old or older) in British Columbia (33 per cent) than in the other provinces. On average, teachers in Quebec and Newfoundland and Labrador have more years of experience than the Canadian average (Appendix B.3.14).

TABLE 3.10 PIRLS 2016 – Percentage of Grade 4 teachers by gender, age group, and years of experience

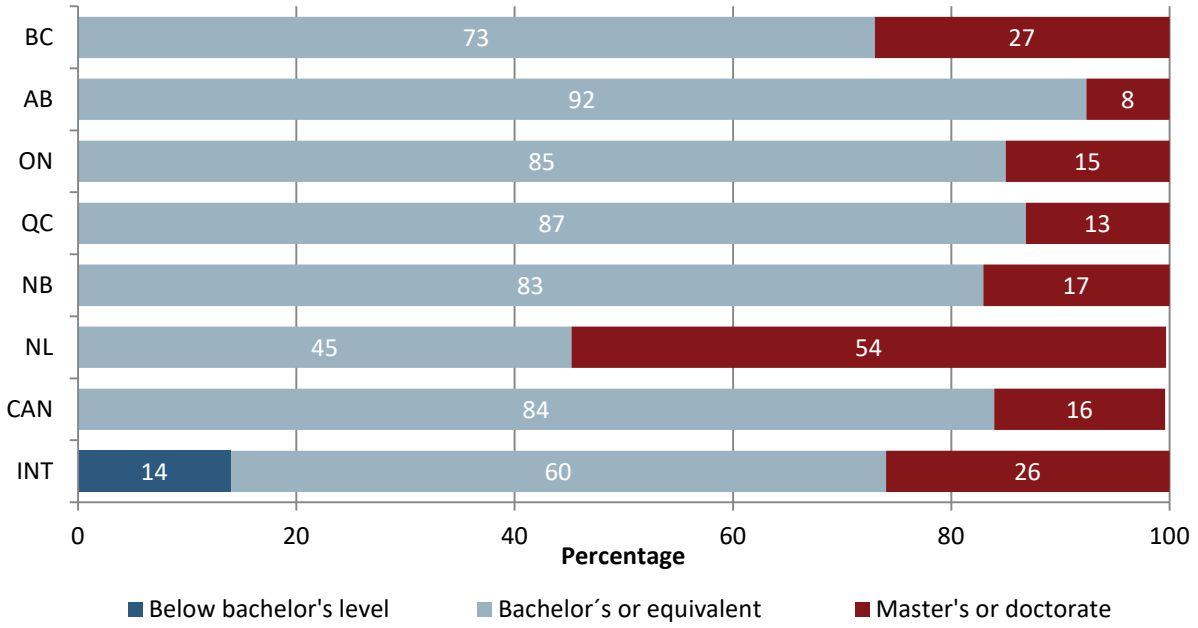
	Gender		Age group				Years of experience
	Female	Male	Under 30	30–39	40–49	50 or more	
BC	82	18	8	24	35	33	15
AB	74	26	25	33	16	26	13
ON	66	34	21	26	31	23	14
QC	93	U	13	32	32	24	16
NB	88	12	12	36	34	18	14
NL	84	16	U	35	30	27	17
CAN	76	24	17	29	30	24	14
INT	84	16	13	28	32	28	17

Note: Percentages may not add up to 100 due to rounding. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.
U The estimate's coefficient of variance is too high to be published.

Teacher education level

Consistent with the findings in the PIRLS 2011 Canadian report (Labrecque, 2012), virtually all Grade 4 teachers in the 2016 sample have, at a minimum, a bachelor's degree or the equivalent. This is also the case in most participating countries, with a few notable exceptions: in Austria, Azerbaijan, Slovenia, Chile, Italy, Morocco, Trinidad and Tobago, and Iran, a quarter or more of teachers have less than a bachelor's degree (Mullis et al., 2017b). With respect to more advanced degrees, only 16 per cent of Grade 4 teachers in Canada have a master's degree or doctorate (or equivalent), compared to an international average of 26 per cent. Interestingly, in five countries, at least 90 per cent of Grade 4 teachers have graduate-level education: Poland, the Slovak Republic, Germany, Finland, and the Czech Republic. In Canada, there are significant interprovincial variations in the level of education of Grade 4 teachers: over 50 per cent of such teachers in Newfoundland and Labrador had a master's or doctoral degree compared to less than 10 per cent in Alberta (Figure 3.7). In Canada and across the provinces, the relationship between the teacher's level of education and student reading achievement is not statistically significant (Appendix B.3.15).

FIGURE 3.7 PIRLS 2016 – Proportion of teachers by highest level of education completed



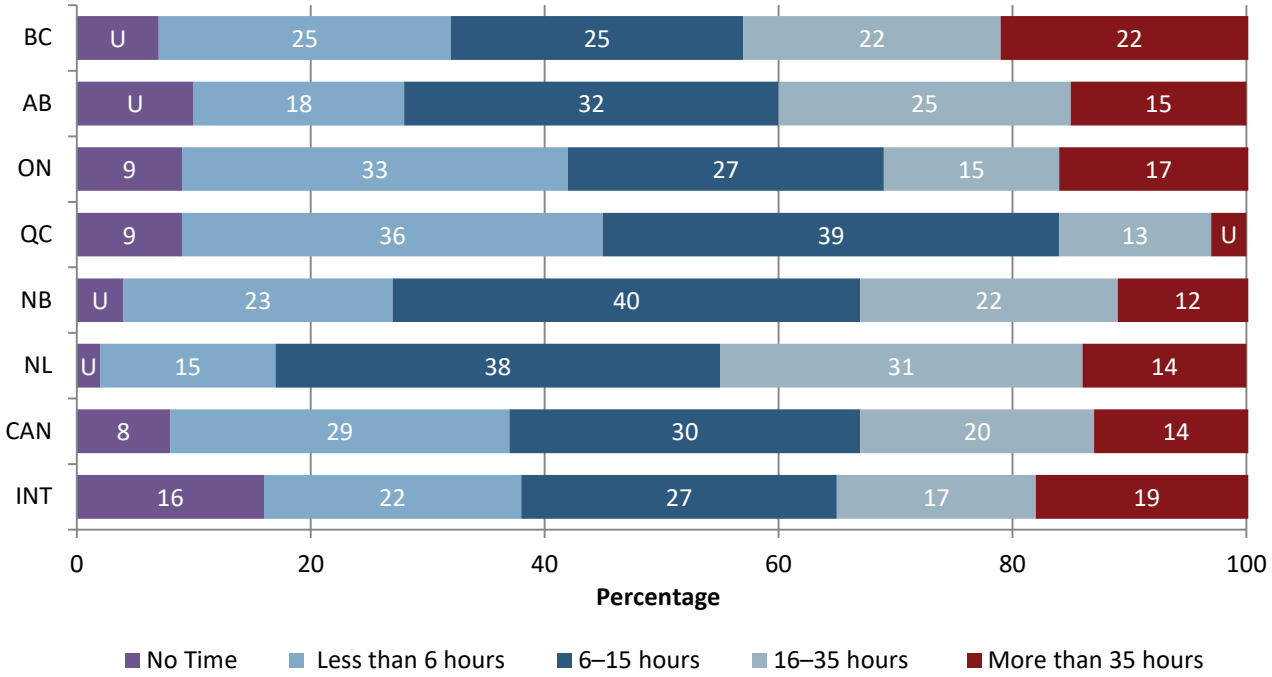
Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Teacher professional development

The relationship between teachers' professional development and student achievement is difficult to investigate because surveys of teachers such as those from the OECD's Programme for International Student Assessment (PISA) or the Teaching and Learning International Survey (TALIS) do not directly link teacher responses with student outcomes. Even in cases when this link has been analyzed, some results suggest a positive relationship but are not conclusive (Yoon, Duncan, Lee, Scarloss, & Sharpley, 2007). While Darling-Hammond (2014–15) argues that high-achieving countries tend to place a relatively high value on professional development, Opfer and Pedder (2011) point to the relative lack of evidence connecting such development to student outcomes.

PIRLS 2016 asked participating teachers to quantify the number of hours they had spent in formal professional development directly related to reading or to the teaching of reading in the previous two years. Internationally, 16 per cent of teachers had not participated in any professional development; however, in close to half the participating countries, including Canada, less than 10 per cent of teachers had not participated in such development. In six countries (the Russian Federation, Azerbaijan, Kazakhstan, Georgia, Macao, and Israel), over one-third of Grade 4 teachers had spent 35 hours or more engaged in professional development, compared to the international average of 19 per cent (Mullis et al., 2017b). In the Canadian provinces, teachers in British Columbia spent the most time on professional development (Figure 3.8, Appendix B.3.16).

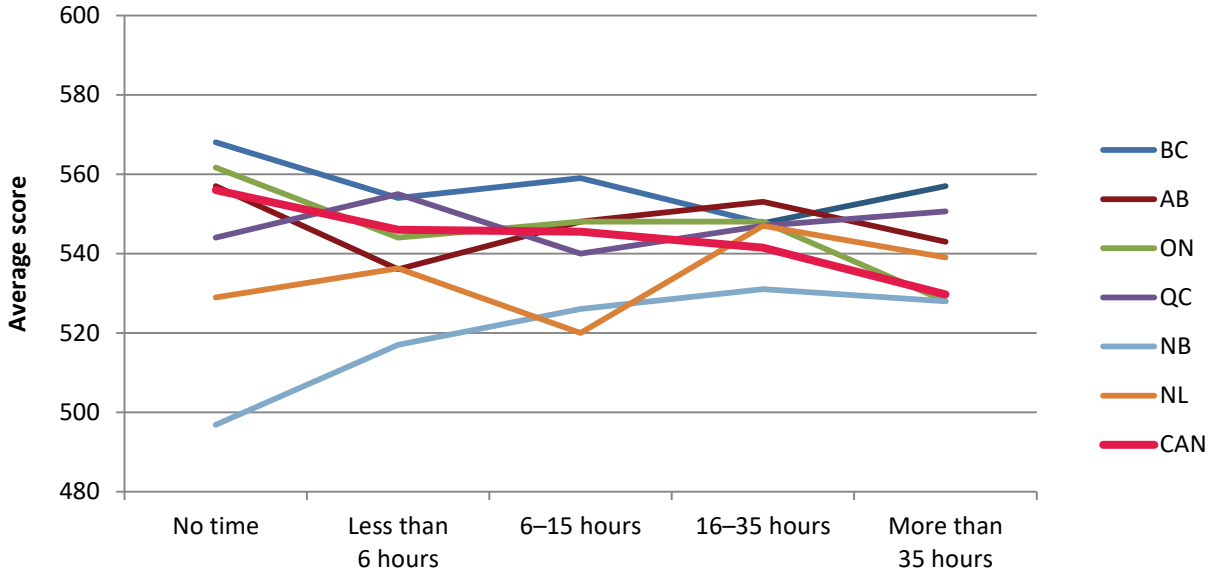
FIGURE 3.8 PIRLS 2016 – Proportion of teachers by time spent on professional development activities related to reading in the past two years



Note: Percentages may not add up to 100 due to rounding. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.
U The estimate's coefficient of variance is too high to be published.

Among participating countries and provinces, the relationship between professional development and reading achievement is not conclusive, but, as seen in Figure 3.9, it is negative in Canada overall and in Ontario, positive in New Brunswick, and not significant in the other provinces (Appendix B.3.16).

FIGURE 3.9 PIRLS 2016 – Relationship between teacher professional development and reading achievement

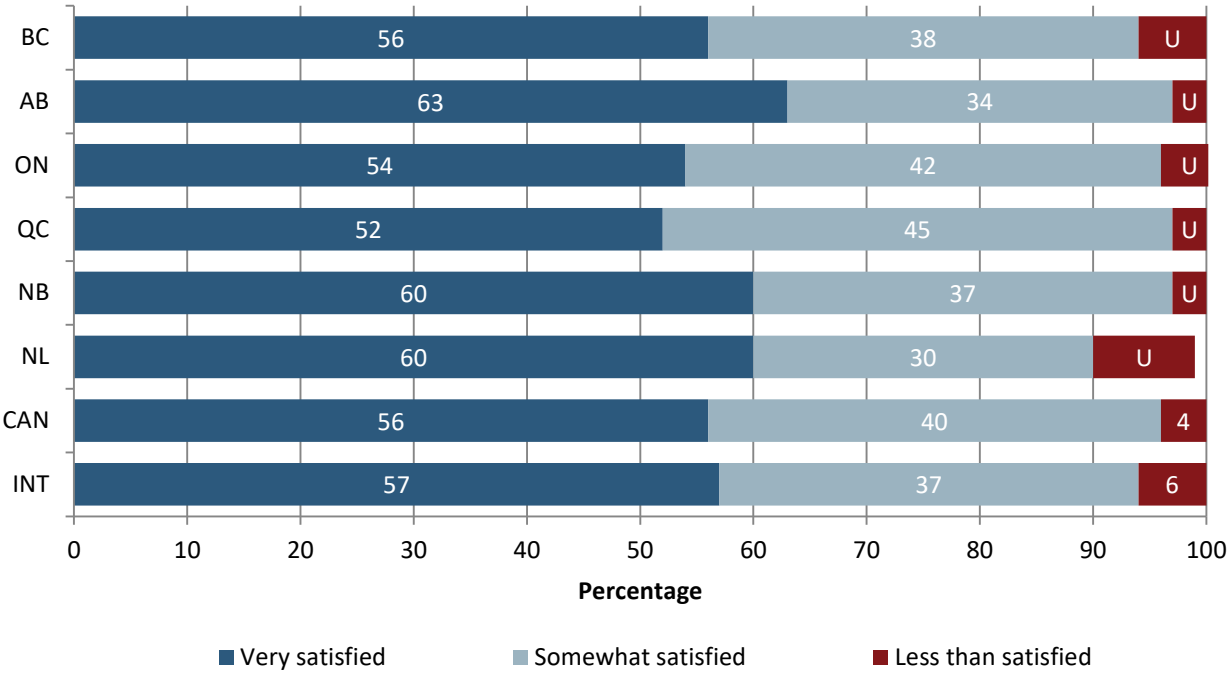


Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Teacher job satisfaction

PIRLS 2016 also investigated teachers' job satisfaction, using their responses to a series of five statements to create a Teacher Job Satisfaction Scale.[21] Based on this scale, 57 per cent of teachers internationally were classified as *very satisfied*, 37 per cent as *somewhat satisfied*, and 6 per cent as *less than satisfied* with their jobs. In Canada, these proportions were very similar, at 56 per cent, 40 per cent, and 4 per cent, respectively, and with little interprovincial variation (Figure 3.10).

FIGURE 3.10 PIRLS 2016 – Proportion of teachers by job satisfaction



Note: Percentages may not add up to 100 due to rounding. Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.
U The estimate's coefficient of variance is too high to be published.

Contrary to findings by Johnson, Kraft, and Papay (2012), PIRLS 2016 reveals no significant relationship between teachers' job satisfaction and student reading achievement at the Canadian or provincial level (Appendix B.3.17).

[21] These statement were: *I am content with my profession as a teacher*; *I find my work full of meaning and purpose*; *I am enthusiastic about my job*; *My work inspires me*; and *I am proud of the work I do*.

School characteristics

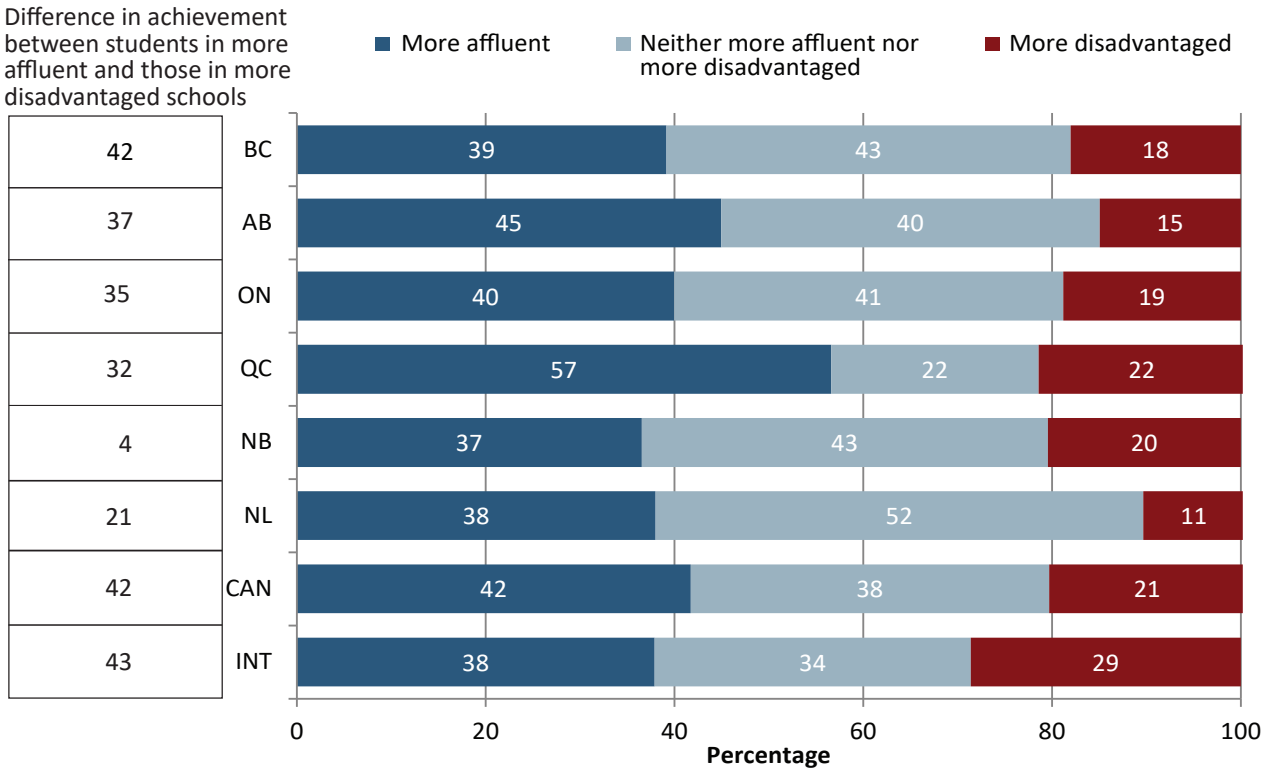
Socioeconomic level of the school

In his meta-analysis of studies between 1990 and 2000, Sirin (2005) concluded that there was a strong relationship between the socioeconomic level of a school and student achievement, suggesting that the socioeconomic environment of both the home and the school can affect student achievement.

Based on principals' responses to the School Questionnaire, PIRLS 2016 divided schools into three categories: *more affluent* schools (where more than 25 per cent of students come from economically affluent homes and no more than 25 per cent come from economically disadvantaged homes); *more disadvantaged* schools (where more than 25 per cent of students come from economically disadvantaged homes and not more than 25 per cent come from economically affluent homes); and *neither more affluent nor more disadvantaged* schools. Internationally, 38 per cent of students were in *more affluent* schools, 29 per cent were in *more disadvantaged* schools, and 33 per cent were in neither of these categories. In Canada, these proportions were 42 per cent, 21 per cent, and 38 per cent, respectively. The difference in reading achievement between students in *more affluent* schools and those in *more disadvantaged* schools is 43 points internationally, which is almost one-half of a standard deviation on the PIRLS scale. As noted, compared to the overall international figures, there are more Canadian students in *more affluent* schools and fewer in *more disadvantaged* schools, but the difference in achievement between the two groups is the same in Canada as internationally. Among participating countries, there are some with very large differences in achievement between these two types of schools. For instance, South Africa and the Slovak Republic show over a 100-point difference between students in these two categories. On the other hand, some countries show no difference or even a negative relationship. For instance, in Macao and Hong Kong, students in *more disadvantaged* schools perform as well or better than those in *more affluent* schools.

Across provinces, there were proportionally more students in *more affluent* schools in Quebec and fewer students in *more disadvantaged* schools in Newfoundland and Labrador. There was no significant difference in achievement between students in *more affluent* schools compared to those in *more disadvantaged* schools in New Brunswick and Newfoundland and Labrador compared to other provinces, where the difference ranges between 32 and 42 points (Figure 3.11, Appendix B.3.18).

FIGURE 3.11 PIRLS 2016 – School socioeconomic composition and reading achievement



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Another indicator of the socioeconomic environment of the school is whether it provides meals to students. PIRLS 2016 asked principals to indicate whether their schools were providing free breakfast or lunch *for all students*, *for some students*, or *not at all*. For instance, all students in Latvia are provided with both breakfast and lunch, while almost all students in Sweden and Finland are provided with free lunches. In the Netherlands, by contrast, schools do not provide breakfast or lunch to any student (Mullis et al., 2017b). In Canada, 13 per cent of students are in schools where breakfast is provided to all students. This is higher than the international average (9 per cent). However compared to the international average, far fewer Canadian students are in schools providing free lunches.

Table 3.11 presents the proportion of students in Canada overall and in the participating provinces who are enrolled in schools that provide breakfast and lunch as well as those in schools where such meals are not provided. The vast majority of students in Quebec are in schools that do not provide either breakfast or lunch to any student. In Newfoundland and Labrador, three-quarters of students are in schools providing breakfast to all students (Appendix B.3.19, B.3.20).

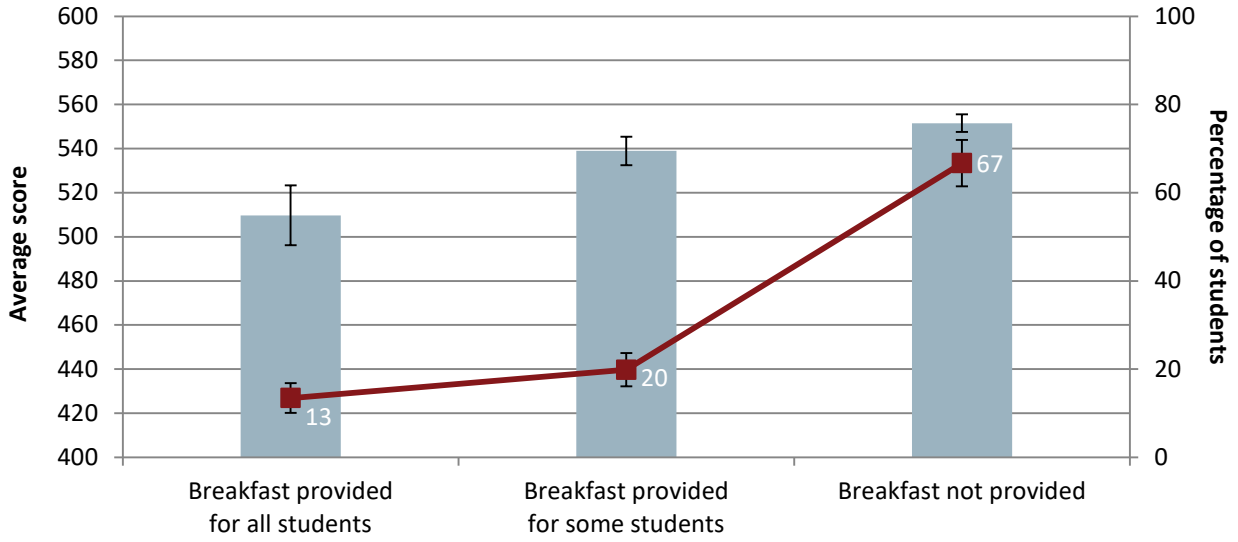
TABLE 3.11 PIRLS 2016 – Provision of meals in schools

	Provided to all students		Provided to some students		Not provided	
	%	S.E.	%	S.E.	%	S.E.
Breakfast						
BC	11	2.6	31	4.5	58	4.5
AB	U	3.0	23	4.3	70	4.6
ON	15	3.2	21	3.5	64	4.7
QC	U	2.0	U	3.0	87	3.6
NB	34	3.8	48	4.0	17	3.3
NL	75	6.0	U	2.8	18	5.3
CAN	13	1.7	20	1.9	67	2.7
Lunch						
BC	U	1.3	50	4.3	48	4.3
AB	U	1.8	37	5.5	61	5.2
ON	U	1.4	27	4.6	71	4.7
QC	–	–	10	2.9	90	2.9
NB	U	1.5	87	2.4	10	2.0
NL	10	2.2	37	6.5	53	6.6
CAN	U	0.7	30	2.2	69	2.2

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.
U The estimate's coefficient of variance is too high to be published.
– No cases reported in this category.

In many countries, there is not much difference in student achievement between schools where breakfast is provided to all students, to some students, or not at all. However, in Canada, students in schools where breakfast is provided to all students perform less well by almost half a standard deviation (42 points) compared to those who are in schools not providing breakfast to any student (Figure 3.12). However, care should be taken in interpreting this finding for policy purposes. This finding does not suggest that providing free meals to students will result in lower achievement. More probably, it demonstrates the strong interplay between the school socioeconomic environment and student achievement: students who receive free meals are likely of lower socioeconomic status, and these students tend to perform less well in reading.

FIGURE 3.12 PIRLS 2016 – Relationship between providing free breakfast and reading achievement



School libraries

Educators would agree that a school library is important in providing young students with formal and informal opportunities to broaden their perspectives about what they read (Mullis et al., 2016). Even though some studies have looked at the relationship between the school library and student achievement, research has focused mostly on library staff rather than the stock of books (e.g., Lonsdale, 2003; Ontario Library Association, 2006; Hammond, 2017). PIRLS 2016 asked principals whether the school had a library and, if so, how large it was.

School libraries are almost universal in Canada (99 per cent of respondent schools reported one) and internationally (87 per cent), with only a few countries below 80 per cent (Mullis et al., 2017b; Appendix B.3.21). Principals were asked to estimate the number of books in their school's library based on a 6-point Likert scale (*250 or fewer, 251–500, 501–2,000, 2,001–5,000, 5,001–10,000, more than 10,000*). In Canada overall, very few students are in schools with very small libraries (*500 books or less*) and over half the students are in schools with libraries with *more than 5,000 books*; internationally, school libraries tend to be smaller on average than those in Canada. Across provinces, over 60 per cent of students in British Columbia and Alberta are in schools with *more than 5,000 books*. In Canada and across provinces, there is no statistical difference in reading achievement based on the presence or the size of a school library (Table 3.12, Appendix B.3.22).

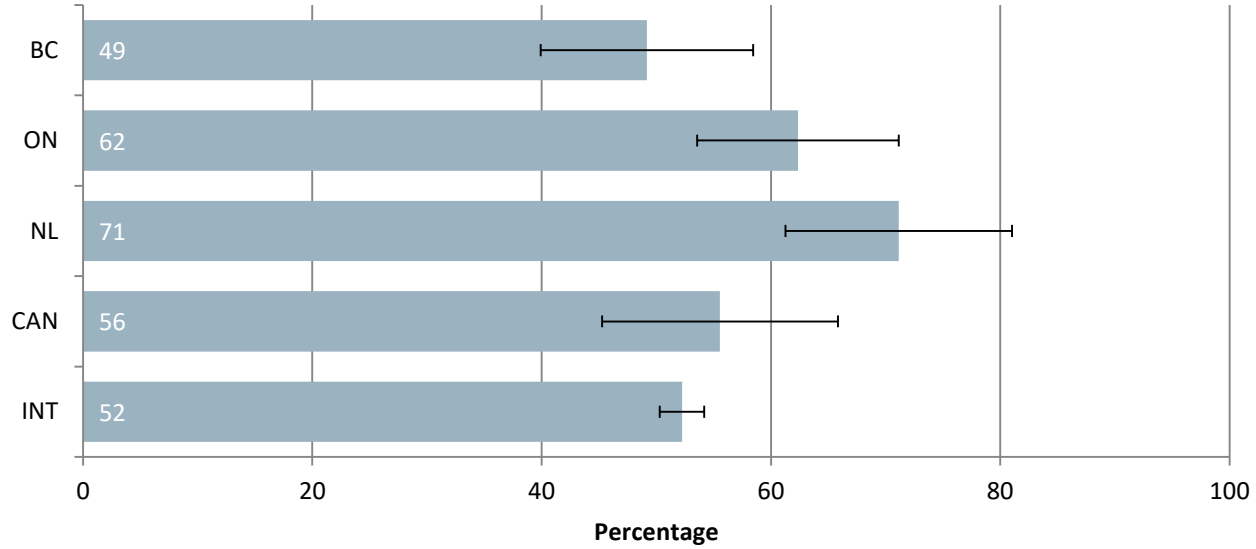
TABLE 3.12 PIRLS 2016 – Proportion of students based on the size of the school library

	501–2,000 books		2,001–5,000 books		More than 5,000 books	
	%	S.E.	%	S.E.	%	S.E.
BC	11	3.1	23	4.0	65	4.6
AB	12	3.5	23	4.0	65	4.4
ON	15	3.3	33	4.4	49	4.9
QC	21	4.8	39	5.5	37	5.0
NB	17	3.1	32	4.4	50	4.9
NL	22	4.5	34	6.7	41	6.9
CAN	15	2.0	31	2.2	52	2.6

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Principals of schools participating in ePIRLS were asked to respond to questions about a relatively new phenomenon—access to digital books in the school. Internationally, 52 per cent of students participating in ePIRLS were in schools that provided access to such resources. However, in Ireland and Italy, less than 20 per cent of students were in schools that provided access to digital books (Mullis et al., 2017b). In Canada overall, 56 per cent of students were in schools that provided access to digital books, with some provincial differences (Figure 3.13). In Canada, as in most participating countries as well as across participating provinces, there is no significant relationship between access to digital books in the school and ePIRLS reading achievement (Appendix B.3.23).

FIGURE 3.13 ePIRLS 2016 – Proportion of students in schools providing access to digital books



Note: Because of the small sample size, results for Quebec are not presented for ePIRLS.

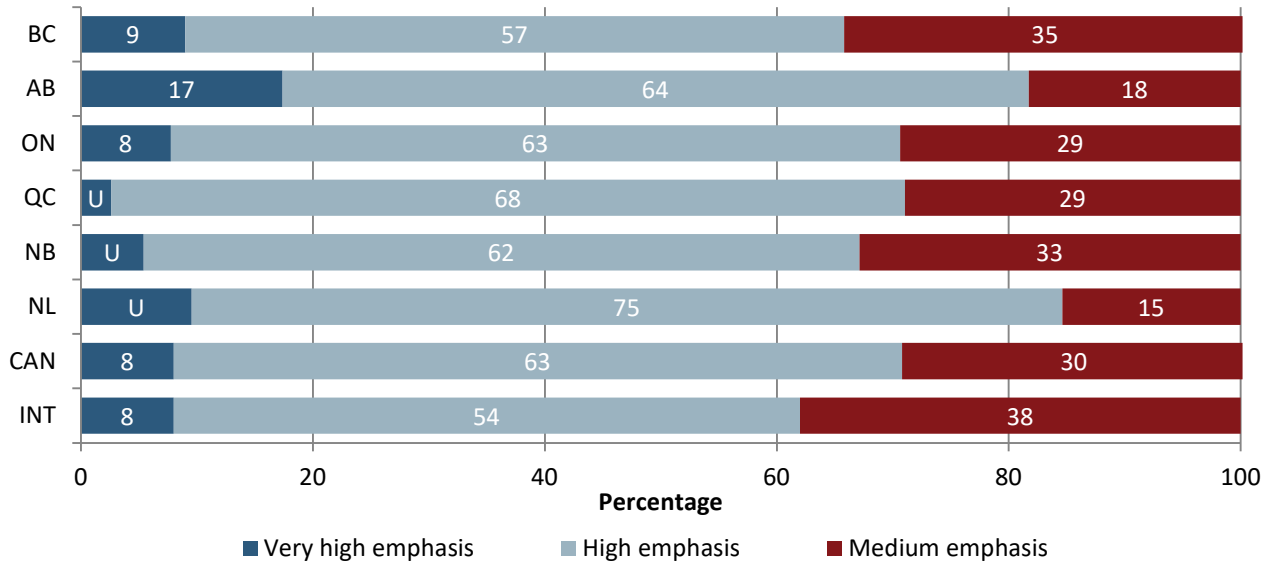
School emphasis on academic success

In their multi-level analysis of the TIMSS and PIRLS 2011 international data, Martin, Foy, Mullis, and O'Dwyer (2013) analyzed several components of their model of effective schools. They found a moderate correlation (over 0.30) between a school's support for academic success and student achievement. For PIRLS 2011, an Index of School Emphasis on Academic Success was derived from principals' and teachers' responses to a series of 12 statements in the School and Teacher Questionnaires. PIRLS 2016 investigated five factors related to this area: teachers' understanding of the curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; and students' desire to do well in school. Based on responses to questions related to these factors, schools were classified as placing *very high emphasis*, *high emphasis*, or *medium emphasis* on academic success. In Canada, the responses of teachers and principals were very similar to each other. Hence, only principals' responses will be used here for illustrative purposes.

The literature on school effectiveness emphasizes the relationship between student success, promoting a culture of high expectations, and supporting the belief that all students can learn, progress, and achieve (Ontario Ministry of Education, 2013). Internationally, 8 per cent of students were in schools where principals perceived a *very high emphasis* on academic success, 54 per cent were in schools placing *high emphasis*, and 38 per cent in schools with *medium emphasis*. In Canada, more principals (63 per cent) reported that their schools placed a *high emphasis* on academic success, with 8 per cent reporting a *very high emphasis* and 30 per cent *medium emphasis*. These results are slightly lower than those observed in 2011.

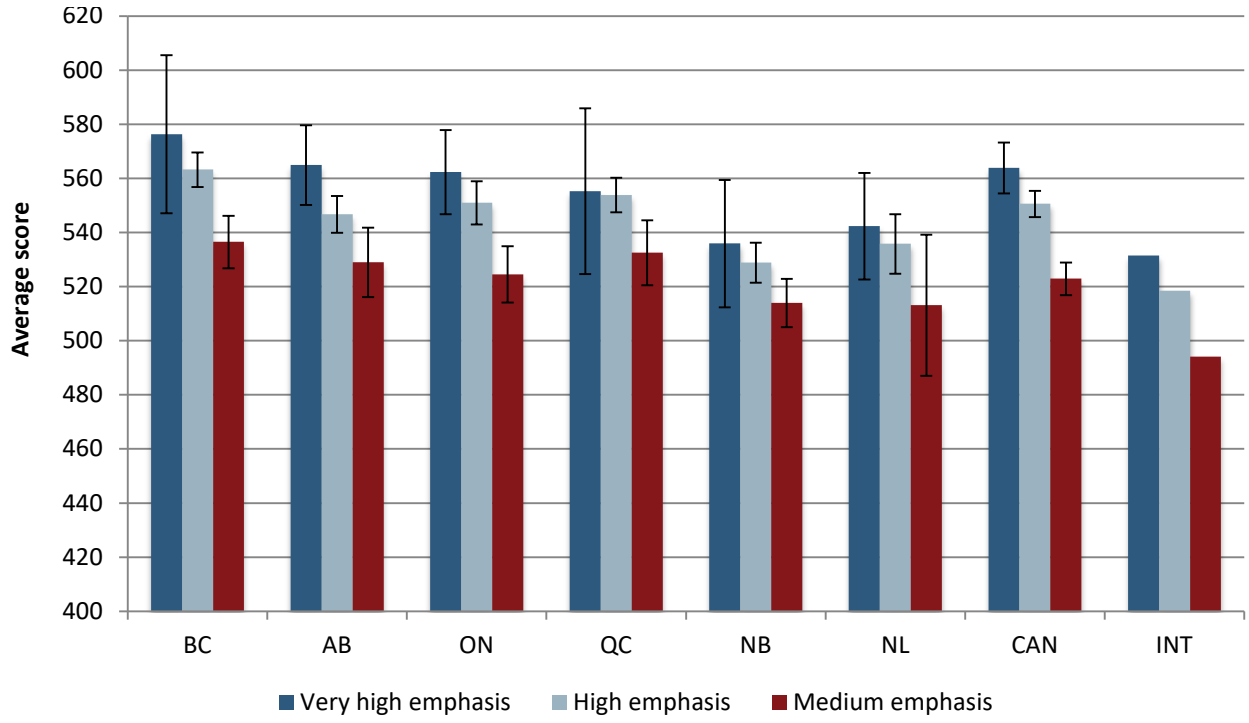
Results reveal large differences across participating countries: in 5 countries, over 20 per cent of students were in schools placing *very high emphasis* on academic success; in another 14 countries, 2 per cent or less of students were in schools in this category (Mullis et al., 2017b). As shown in Figure 3.14, the percentage of students enrolled in schools representing the three categories on the academic success scale varies somewhat across Canada. However, the relationship between reading achievement and emphasis on academic success is similar across Canada, with students in schools placing *very high emphasis* on academic success scoring on average 41 points higher than students in schools placing *medium emphasis* on such success (Figure 3.15, Appendix B.3.24).

FIGURE 3.14 PIRLS 2016 – Proportion of students by schools' emphasis on academic success



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.
U The estimate's coefficient of variance for the percentage data in this category is too high to be published.

FIGURE 3.15 PIRLS 2016 – Relationship between school emphasis on academic success and reading achievement



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied (see Appendix A for further details).

Student factors limiting instruction

A rather unexpected finding from the analysis of the PIRLS 2011 data relates to the proportion of students in classrooms where teachers felt that instruction was limited by a number of student-related factors such as a lack of prerequisite knowledge and skills, lack of basic nutrition, lack of sleep, student absences, disruptive students, uninterested students, and students with mental, emotional, or psychological impairment (Labrecque et al., 2012). Based on the PIRLS 2016 teachers' responses, a Student Factors Limit Classroom Instruction Scale was created with three categories: *very little*, *some*, and *a lot*. Internationally, 34 per cent of students were in schools where teachers felt that their teaching was limited *very little* by these attributes, while in Canada the figure was 20 per cent. This suggests that those factors would affect instruction more in Canada than in other countries, on average. In provinces, proportionally more students were affected *very little* by these factors in Newfoundland and Labrador; New Brunswick had the lowest proportion of students in that category (Table 3.13).

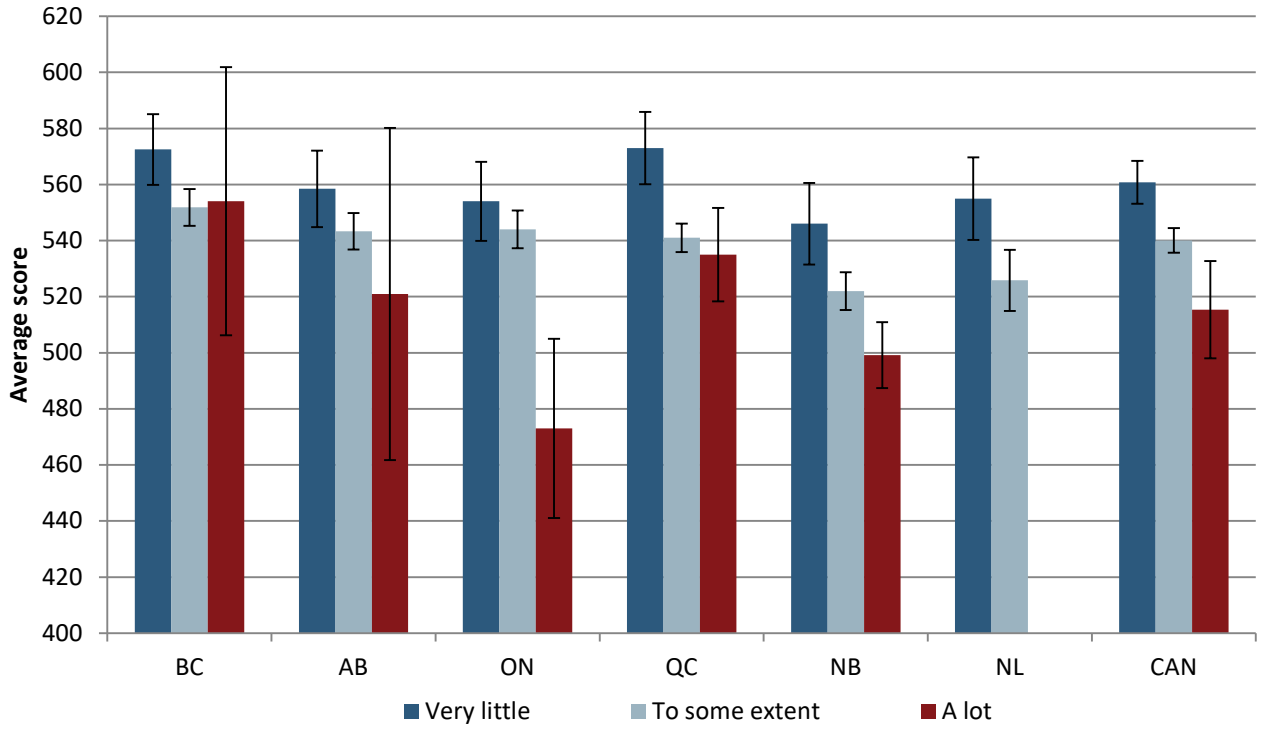
TABLE 3.13 PIRLS 2016 – Proportion of students by level of student factors limiting classroom instruction

	Very little		To some extent		A lot	
	%	S.E.	%	S.E.	%	S.E.
BC	17	3.5	80	3.5	U	1.5
AB	24	4.6	75	4.7	U	0.7
ON	23	4.1	74	4.4	U	1.4
QC	19	4.0	73	4.7	U	2.8
NB	14	3.5	80	3.7	6	1.8
NL	28	6.2	72	6.2	–	–
CAN	20	2.1	76	2.3	4	0.8

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.
U The estimate's coefficient of variance is too high to be published.

As might be expected, the relationship between such factors and reading achievement is statistically significant in Canada, with a difference of 45 points in the scores of students in schools where these factors were limiting instruction *very little* and those where they were limiting instruction *a lot* (Figure 3.16, Appendix B.3.25).

FIGURE 3.16 PIRLS 2016 – Relationship between student factors limiting instruction and reading achievement



Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

Student readiness to learn

Related to these factors limiting instruction is whether students come to school "ready to learn" or whether they arrive feeling tired or hungry. Somewhat unexpectedly, proportionally more Canadian students arrived at school feeling tired or hungry *every day* or *almost every day* than the international average. In Canada, students who arrived at school feeling tired *every day* performed less well in reading on average than those who said that they *never* arrived feeling tired (522 points vs. 538 points). Similarly, students who arrived at school feeling hungry *every day* performed less well than those who *never* arrived feeling hungry (524 points vs. 558 points). There is little difference across provinces in the proportion of students stating that they arrive at school hungry (Appendix B.3.26), but there are significant differences in the proportion of students who stated that they arrive in school tired *every day* (Table 3.14, Appendix B.3.27).

TABLE 3.14 PIRLS 2016 – Proportion of students stating that they arrive at school feeling tired

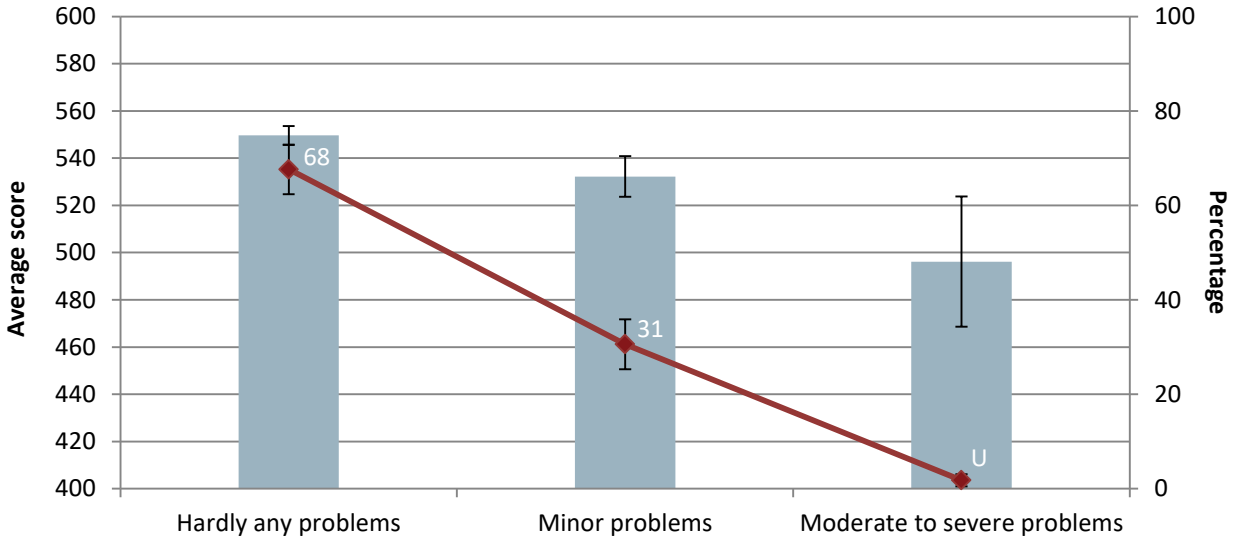
	Every day		Almost every day		Sometimes		Never	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	15	0.9	22	1.0	54	1.1	8	0.8
AB	19	1.1	23	1.2	48	1.5	10	0.8
ON	20	1.0	22	0.9	48	1.1	11	0.8
QC	12	0.7	21	1.1	56	1.4	11	1.0
NB	21	1.2	22	0.7	47	1.3	10	0.5
NL	27	1.1	19	1.2	43	1.3	10	0.7
CAN	18	0.5	22	0.5	50	0.6	11	0.4

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

School discipline and safety

Another aspect of the school environment that is worth exploring is the extent of discipline and safety issues in the school. As was the case in 2011, PIRLS 2016 created an Index of School Discipline and Safety based on principals' views about the frequency of a number of school-related problems: student lateness or absenteeism, classroom disturbances, cheating, profanity, vandalism, theft, student intimidation of other students or of teachers, and physical fights among students. Although this index identified very few schools in Canada and across provinces as having *moderate to severe* disciplinary problems, the relationship with reading achievement is quite strong, suggesting that school systems should consider devoting special attention to such schools (Figure 3.17, Appendix B.3.28).

FIGURE 3.17 PIRLS 2016 – Relationship between problems with school discipline and reading achievement



U The estimate's coefficient of variance for the percentage data in this category is too high to be published.

Student bullying

The last school factor being analyzed relates to student bullying in school. In PIRLS 2011, a surprising finding was that one in five Canadian Grade 4 students stated that they were bullied at school *about weekly* and over one-third *about monthly*. Since that time, a number of initiatives have been adopted across the country to address this important issue. For instance, in 2012, Canadian ministers of education agreed to share information on bullying in schools and on strategies for how best to ensure a safe, inclusive, and accepting environment for all students (CMEC, 2012).

Five years later, student responses to questions related to the Bullied at School Scale suggest that the occurrence of student bullying in schools has decreased to some extent, both internationally and across Canada (Table 3.15). The negative relationship between student bullying and reading achievement remains moderate in Canada, with a difference of 33 points between the scores of student who state that they are bullied *about weekly* and those who report that they are *almost never* bullied (Figure 3.18, Appendix B.3.29).

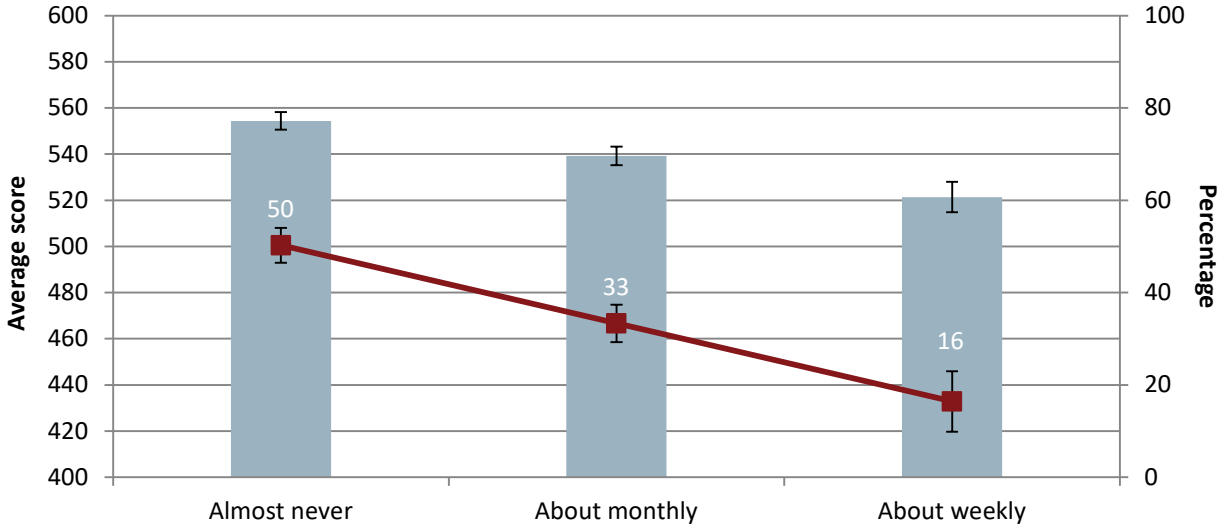
TABLE 3.15 PIRLS 2016 – Proportion of students bullied at school, 2011 and 2016

	Almost never				About monthly				About weekly			
	2016		2011		2016		2011		2016		2011	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
BC	55	1.4	49	1.4	31	1.1	34	1.1	15	1.1	18	1.1
AB	51	1.5	44	1.1	32	1.2	35	1.0	17	1.0	21	0.8
ON	47	1.3	40	1.2	35	1.6	38	1.1	18	1.3	22	1.0
QC	55	1.5	44	1.3	33	1.2	37	1.1	13	0.9	19	1.1
NB *	51	1.6	51	1.9	32	1.1	32	1.4	17	0.8	17	1.4
NL	52	1.5	55	1.6	31	1.2	26	1.3	17	1.1	19	1.2
CAN	50	0.8	44	0.7	33	0.7	36	0.6	16	0.7	20	0.6

Note: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

* Only New Brunswick (French) participated in 2011.

FIGURE 3.18 PIRLS 2016 – Relationship between frequency of bullying at school and reading achievement



CONCLUSION

Overview of results

In the spring of 2016, Canada participated for a second time in the Progress in International Reading Literacy Study (PIRLS), which measures trends in reading literacy among Grade 4 students. In the 2016 cycle, Over 340,000 students from 50 countries participated; in Canada, over 18,000 students took part in the study in either English or French. The Canadian sample was composed of eight provinces, which took part in the assessment based on specific sampling designs: Ontario and Quebec as benchmarking participants; British Columbia, Alberta, New Brunswick, and Newfoundland and Labrador as oversampling jurisdictions; and Saskatchewan and Manitoba as part of the Canadian sample. In 2016, PIRLS was complemented by ePIRLS, a new assessment of digital literacy in which Canada, along with 13 other countries, participated. Students from British Columbia, Ontario, Quebec, and Newfoundland and Labrador took part in ePIRLS. Information about the home, school, and classroom contexts was collected as part of PIRLS by means of background questionnaires that were completed by the students being assessed, their parents or caregivers, their school principals, and their teachers. The data from these questionnaires enable PIRLS to relate students' achievement to various types of curricula, instructional practices, and home and school environments.

PIRLS uses four international benchmarks to show the range of students' performance across countries. From a global perspective, Grade 4 students in Canada performed well in reading. In PIRLS 2016, 50 per cent of Canadian students reached the *high* international benchmark, a proportion that is above the international median of 47 per cent. Across provinces, the proportion reaching this benchmark varies from 38 per cent in New Brunswick to 55 per cent in British Columbia. In digital literacy (ePIRLS), almost half of Canadian students reached the *high* international benchmark, which is close to the international median of 50 per cent. At the provincial level, the percentages vary from 47 per cent in Newfoundland and Labrador to 56 per cent in British Columbia.

In Canada overall, 13 per cent of the students reached the highest level in PIRLS, the *advanced* international benchmark. This percentage is above the international median of 10 per cent but less than half of the highest-achieving country (Singapore, at 29 per cent). Within Canada, the percentage of students attaining this level ranged from 8 per cent in New Brunswick to 16 per cent in British Columbia. In ePIRLS, 12 per cent of the Canadian students reached the *advanced* international benchmark, a figure the same as the international median. Across participating countries, the proportion of students at this level ranges from 34 per cent in Singapore to 1 per cent in Georgia. In the provinces, the percentage of students at this level falls between 11 per cent (Newfoundland and Labrador) and 16 per cent (British Columbia).

Although few Canadian students did not reach the *low* international benchmark (4 per cent) in PIRLS, many countries with lower overall average achievement than Canada have a smaller proportion of students falling below the *low* benchmark.

In addition to reporting by these international benchmarks, PIRLS also reports results by average score, which is based on an international centrepoint of 500 and a standard deviation of 100, as established in

2001, corresponding to the international average of the first cycle of PIRLS, which was conducted that year. According to this measure, most students in Canada are performing well in reading, with the average scores for all provinces being above the PIRLS centrepoint of 500. Canadian students achieved an average score of 543 on this scale. By way of comparison, of the 50 participating countries, 13 had a significantly higher score, 12 had an average score that was not significantly different, and 24 countries had a lower score. Among the participating provinces, British Columbia performed above the Canadian average, while Alberta, Ontario, Quebec, and Newfoundland and Labrador performed at the Canadian average.

Canadian students performed equally well on ePIRLS, with an average score of 543. Of the 14 countries that participated in ePIRLS, most high-performing countries achieve higher results in ePIRLS than in PIRLS, while Canada achieved the same score in both assessments. Six countries had a higher average score than Canada on ePIRLS, and for two countries the differences were non-significant. Across provinces, students in British Columbia performed above the Canadian average in digital literacy, while students in Ontario and Newfoundland and Labrador were at the Canadian average.

Performance by language of the school system

In PIRLS 2016, compared to the Canadian English mean, a significantly higher proportion of English-language students attained the *high* international benchmark in British Columbia and a lower proportion in New Brunswick and Newfoundland and Labrador; all other provinces had similar proportions of student at the Canadian mean. The proportion of students in French-language schools achieving the *high* international benchmark was similar in Quebec and Canada overall, while all other participating provinces had significantly lower proportions of students attaining this level. Results by language of the school system indicate that students in the anglophone school system performed better in PIRLS than did those in the francophone school system in British Columbia, Alberta, Ontario, and New Brunswick, while there was no statistical difference between the two groups in Quebec and in Canada overall.

In ePIRLS, students in the English-language school systems attained the highest average scores in Canada overall and in British Columbia and Ontario. In the digital reading assessment, the percentages of students enrolled in English-language schools achieving each benchmark are very consistent across provinces: none of the differences are statistically significant when compared to the percentages for English-language schools in Canada overall. Results for ePIRLS in French-language schools in Quebec are not reported because of the small size of the samples.

Performance by gender

As is the case in most other countries, girls performed better than boys in both PIRLS and ePIRLS. Girls achieved higher scores than boys in Canada overall and in all provinces except Newfoundland and Labrador, where there was no statistical difference.

Performance by reading purpose and comprehension process

PIRLS reports results based on two reading purposes (literary and informational) and two comprehension processes (retrieving and straightforward inferencing; interpreting, integrating, and evaluating). For Canada overall and at the provincial level, higher scores were obtained in literary reading in all provinces, except Quebec, where no significant difference was found between the two reading purposes.

Students attained higher performance in the interpreting, integrating, and evaluating comprehension process in both PIRLS and ePIRLS in Canada overall and in all participating provinces. The exception is Quebec in PIRLS, where students performed better in the process of retrieving and straightforward inferencing.

Performance comparisons over time

Some Canadian jurisdictions have participated in PIRLS since its inception in 2001, which allows trends in reading achievement to be reported for these jurisdictions. In PIRLS 2016, results for students in Canada overall decreased significantly, by 5 points compared to the baseline year of 2011. Ontario's performance decreased in 2016 compared to 2011 and 2006 but is statistically comparable to that in 2001. In Alberta, results in 2016 were lower than in 2006 but comparable to those in 2011. Finally, results in New Brunswick (French) and in Newfoundland and Labrador decreased between 2011 and 2016.

Contextual factors influencing scores

This report presents selected results from four questionnaires administered as part of PIRLS 2016 to illustrate possible areas of interest for educational policy-makers and researchers. This report focuses on selected context variables, demonstrating the types of analysis that are possible from the wealth of data provided by PIRLS. Over the coming months, further analysis will be published by CMEC on specific factors of interest.

The home environment

PIRLS 2016 looked at the home environment of Grade 4 students, covering a number of home-related factors expected to influence reading achievement. These included the immigration background of the student and languages spoken at home; the economic, social, and educational resources available at home, including digital resources; parental reading behaviours and attitudes toward reading and literacy development; students' attendance in pre-primary education; computer use at home; and homework.

In the Home Questionnaire, 89 per cent of parents of participating Grade 4 students indicated that their child was born in Canada. As can be expected, the proportion of students not born in the country varied greatly among the provinces. In Canada overall, students not born in this country performed significantly better in PIRLS and similarly in ePIRLS compared to those who were born here.

Based on the PIRLS 2016 Canadian data, 78 per cent of Canadian Grade 4 students *always* or *almost always* speak the language of the test (English or French) at home, while 22 per cent *sometimes* or *never* speak the test language at home. Students who speak the language of the test at home performed better in all jurisdictions except in British Columbia, where there was no significant difference between the two groups. In Canada overall, as well as in British Columbia and Ontario, the results in digital reading (ePIRLS) were not significantly different with respect to this variable.

Grade 4 students whose parents read to them *often* before they started school performed much better in reading than those whose parents read to them *sometimes, almost never, or never*. The relationship between such parental engagement and reading achievement varies by language of the school system. Students whose parents were more involved with early reading activities tended to obtain higher scores in reading in

English-language school systems than did students with equally engaged parents in French-language school systems.

Although the socioeconomic background of students is a weaker predictor of achievement in Canada compared to other countries, it is one of the strongest indicators of reading achievement. The difference in PIRLS achievement between those students with *many* and *some or few* resources is 44 points in Canada, compared to a gap of 54 points internationally, with little provincial difference, except in Newfoundland and Labrador, where the gap is narrowest.

There is a strong, positive relationship between parental enjoyment of reading and student reading achievement. The strength of the relationship was consistent across Canada; however, the difference in reading achievement between students whose parents who *do not like* reading and those who *like reading very much* is greater in English-language than in French-language school systems.

Confidence in their reading skills influences students' achievement in reading. In Canada, a significantly higher proportion of girls than boys reported being *very confident* in their reading ability. Canadian Grade 4 students of both genders have views of their reading ability that are very consistent with their actual reading achievement.

ePIRLS 2016 provided a unique opportunity to look at the relationship between student self-efficacy in computer use (i.e., how students perceive their own ability to use computers) and their reading achievement in both digital and paper-based formats. Canadian students rated their self-efficacy in using computers as one of the lowest among the 14 countries participating in ePIRLS, with only 39 per cent of Canadian students rating their self-efficacy level as *high*. Across provinces, students in Newfoundland and Labrador reported the highest levels of self-efficacy in computer use, and students in British Columbia the lowest. Students with a *high* level of self-efficacy performed better in both PIRLS and ePIRLS.

Access to digital devices in the home is quite variable across provinces. Differences in scores in digital reading achievement (ePIRLS) between students with *high* and *medium* access to such devices was greatest in British Columbia (16 points difference) and smallest in Newfoundland and Labrador (11 points difference).

The school context

School-related factors can have a significant influence on the students' learning environment and outcomes. PIRLS results show that Canadian students attending schools that have a greater number of more affluent students perform better than those attending schools that have a greater number of more disadvantaged students. Although student socioeconomic background is a strong predictor of academic success, its impact on reading achievement scores is smaller in Canada than in most countries. An indicator of the socioeconomic environment of the school examined in PIRLS was the provision of meals to students. In Canada, students in schools where breakfast is provided to all students scored lower than students in schools not providing breakfast to any student. This finding may demonstrate the strong interplay between the socioeconomic environment of the school and student achievement.

Other school-related factors that showed a positive relationship with reading achievement in Canada included schools that have a higher emphasis on academic success, that are perceived as safe and orderly, and that have few discipline problems; and classrooms where teachers felt that their teaching was limited *very little* by student-related factors (e.g., lack of knowledge and skills, student absence, disruptive or

uninterested students) and where students came to school "ready to learn" rather than arriving feeling tired or hungry. PIRLS 2016 also covered the relationship between bullying behaviours and reading achievement. Although the occurrence of student bullying in schools has decreased to some extent both internationally and across Canada compared to the results reported in PIRLS 2011, the 2016 results show that, the more students are bullied, the more their performance in reading tends to decrease.

Final statement

The results from the PIRLS 2016 assessment provide a comprehensive picture of Grade 4 students' reading skills at the provincial and pan-Canadian levels and in comparison with other participating countries. They also highlight the different factors in the students' home, classroom, and school environments contributing to their performance in reading. Although Canadian students are performing well in reading, this report helps to identify areas that could be improved. Over the coming months, CMEC, in collaboration with ministries and departments of education, will continue to analyze the results from PIRLS in conjunction with other education indicators to better inform the teaching of reading and related educational policies.

REFERENCES

Alexander, P.A., & Jetton, T.L. (2000). Learning from text: A multidimensional and developmental perspective. In M.L. Kamil, P. Mosenthal, P.D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3) (pp. 285–310). Mahwah, NJ: Lawrence Erlbaum Associates.

Anderson, R.C., & Pearson, P.D. (1984). A schema-theoretic view of basic processes in reading comprehension. In P.D. Pearson (Ed.), *Handbook of reading research* (pp. 255–291). White Plains, NY: Longman.

Bascia, N. (2014). *The school context model: How school environments shape students' opportunities to learn*. Toronto: People for Education.

Bose, J. (2001). Nonresponse bias analyses at the National Center for Education Statistics. In *Proceedings of Statistics Canada symposium 2001. Achieving data quality in a statistical agency: A methodological perspective*. Retrieved from https://nces.ed.gov/FCSM/pdf/IHSNG_StatsCan2_JB.pdf

Brochu, P., Deussing, M.-A., Houme, K., & Chuy, M. (2013). *Measuring up: Canadian results of the OECD PISA study. The performance of Canada's youth in mathematics, reading, and science – 2012. First results for Canadians aged 15*. Toronto: Council of Ministers of Education, Canada.

Campbell, C., Zeichner, K., Lieberman, A., & Osmond-Johnson, P. (2017). *Empowered educators in Canada: How high-performing systems shape teaching quality*. San Francisco: John Wiley and Sons.

Campbell, J.R., Kelly, D.L., Mullis, I.V.S., Martin, M.O., & Sainsbury, M. (2001). *Framework and specifications for PIRLS assessment 2001* (2nd ed.). Chestnut Hill, MA: Boston College.

Chall, J. (1983). *Stages of reading development*. New York: McGraw-Hill.

Council of Ministers of Education, Canada. (2012). *Ministers of education mark a milestone in education cooperation*. Retrieved from https://www.cmec.ca/278/Ministers_of_Education_Mark_a_Milestone_in_Education_Cooperation_.html?id=508

Council of Ministers of Education, Canada. (2013). Parental engagement in early literacy and numeracy activities and student achievement in PIRLS/TIMSS 2011. *Assessment Matters! 3*. Retrieved from http://www.cmec.ca/Publications/Lists/Publications/Attachments/309/AMatters_No3_EN.pdf

Council of Ministers of Education, Canada. (2014). Homework alert: How much is enough? *Assessment Matters! 7*. Retrieved from https://www.cmec.ca/Publications/Lists/Publications/Attachments/338/AMatters_No7_Homework_EN.pdf

Council of Ministers of Education, Canada. (2015). Immigrants in Canada: Does socioeconomic background matter? *Assessment Matters! 9*. Retrieved from https://cmec.ca/Publications/Lists/Publications/Attachments/343/AMatters_No9_EN.pdf

Council of Ministers of Education, Canada. (2016). *PCAP 2016 assessment framework*. Toronto: Author. Retrieved from www.cmec.ca/docs/pcap/pcap2016/PCAP-2016-Assessment-Framework.pdf

Darling-Hammond, L. (2014–15). Want to close the achievement gap? *American Educator*, Winter, 14–18.

Dewald, J.F., Meijer, A.M., Oort, F.J., Kerkhof, G.A., & Bögels, S.M. (2010). The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: A meta-analytic review. *Sleep Medicine Reviews, 14*(3), 179–189.

Elley, W.B. (1992). *How in the world do students read?* The Hague, NL: IEA.

Elley, W.B. (Ed.). (1994). *The IEA study of reading literacy: Achievement and instruction in thirty-two school systems*. Oxford: Elsevier Science.

Hammond, A.J. (2017). The impact of school library programs on student achievement. *The Medium*, Spring. Retrieved from https://www.ssla.ca/uploads/9/5/3/6/95368874/the_impact_of_school_library_programs_on_student_achievement.pdf

Huang, C. (2013). Gender differences in academic self-efficacy: A meta-analysis. *European Journal of Psychology Education, 28*(1), 1–35.

Immigration, Refugees and Citizenship Canada (2015). Canada: Permanent residents by age and source area [table]. Retrieved from http://www.cic.gc.ca/opendata-donneesouvertes/data/IRCC_FFPR_14_E.xls

Johnson, S.M., Kraft, M.A., & Papay, J.P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record*, *114*(10), 1–39.

Konishi, C., Hymel, S., Zumbo, B.D., & Li, Z. (2010). Do school bullying and student–teacher relationships matter for academic achievement? A multilevel analysis. *Journal of School Psychology, 25*(1), 19–39.

Kuger, S. & Klieme, E. (2016). Dimensions of context assessment. In S. Kuger, E. Klieme, N. Jude, & D. Kaplan (Eds.) *Assessing contexts of learning: An international perspective*. Springer International Publishing.

Labrecque, M., Chuy, M., Brochu, P., & Houme, K. (2012). *PIRLS 2011: Canada in context. Canadian results from the Progress in International Reading Literacy Study*. Toronto: Council of Ministers of Education, Canada.

LaRoche, S., Joncas, M., & Foy, P. (2017). Sample design in PIRLS 2016. In M.O. Martin, I.V.S. Mullis, & M. Hooper. (Eds.), *Methods and procedures in PIRLS 2016*. Retrieved from https://timssandpirls.bc.edu/publications/pirls/2016-methods.html

Lonsdale, M. (2003). *Impact of school libraries on student achievement: A review of research*. Victoria, AU: Australian Council for Educational Research.

Martin, M.O., Foy, P., Mullis, I.V.S., & O'Dwyer, L.M. (2013). Effective schools in reading, mathematics, and science at the fourth grade. In M.O. Martin, & I.V.S. Mullis (Eds.) *TIMSS and PIRLS 2011: Relationships among reading, mathematics, and science achievement at the fourth grade. Implications for early learning* (pp. 109–178). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martin, M.O., Mullis, I.V.S., & Hooper, M. (Eds.). (2017). *Methods and procedures in PIRLS 2016*. Chestnut Hill, MA: TIMMS & PIRLS International Study Center, Boston College.

Mullis, I.V.S., Kennedy, A.M., Martin, M.O., Sainsbury, M. (2006). *PIRLS 2006 assessment framework and specifications* (2nd ed.). Chestnut Hill, MA: Boston College.

Mullis, I.V.S., & Martin, M.O. (Eds.). *PIRLS 2016 assessment framework* (2nd ed.). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College. Retrieved from http://timssandpirls.bc.edu/pirls2016/framework.html

Mullis, I.V.S., Martin, M.O., Foy, P. & Drucker, K.T. (2012). *PIRLS 2011 international results in reading*. Chestnut Hill, MA: TIMMS & PIRLS International Study Center, Boston College.

Mullis, I.V.S., Martin, M.O., Foy, P., & Hooper, M. (2017a). *ePIRLS 2016 international results in online informational reading*. Chestnut Hill, MA: TIMMS & PIRLS International Study Center, Boston College.

Mullis, I.V.S., Martin, M.O., Foy, P., & Hooper, M. (2017b). *PIRLS 2016 international results in reading*. Chestnut Hill, MA: TIMMS & PIRLS International Study Center, Boston College.

Mullis, I.V.S., Martin, M.O., Goh, S. & Prendergast, C. (2017c). *PIRLS 2016 encyclopedia*. Chestnut Hill, MA: TIMMS & PIRLS International Study Center, Boston College. Retrieved from http://timssandpirls.bc.edu/pirls2016/encyclopedia/

Mullis, I.V.S., Martin, M.O., Kennedy, A.M., & Foy, P. (2007). *PIRLS 2006 international report: IEA's Progress in International Reading Literacy Study in primary schools in 40 countries*. Chestnut Hill, MA: Boston College.

Mullis, I.V.S., Martin, M.O., Kennedy, A.M., Trong, K.L., & Sainsbury, M. (2009). *PIRLS 2011 assessment framework*. Boston: TIMMS & PIRLS International Study Center, Boston College.

Mullis, I.V.S., Martin, M.O., & Sainsbury, M. (2016). PIRLS 2016 reading framework. In I.V.S. Mullis & M.O. Martin (Eds.). *PIRLS 2016 assessment framework* (2nd ed.) (pp. 11–19). Chestnut Hill, MA: TIMMS & PIRLS International Study Center, Boston College.

OECD (2012). *Literacy, numeracy and problem solving in technology-rich environments: Framework for the OECD Survey of Adult Skills*. Paris: OECD Publishing.

OECD (2016a). *PISA 2015 assessment and analytical framework: Science, reading, mathematic and financial literacy.* Paris: OECD Publishing.

OECD (2016b). *PISA 2015 results: Excellence and equity in education* (Vol. 1). Paris: OECD Publishing.

O'Grady, K., Deussing, M.-A., Scerbina, T., Fung, K., & Muhe, N. (2016). *Measuring up: Canadian results of the OECD PISA study. The performance of Canada's youth in science, reading, and mathematics – 2015. First results for Canadians aged 15*. Toronto: Council of Ministers of Education, Canada.

O'Grady, K., Fung, K., Servage, L., & Khan, G. (2018). *PCAP 2016: Report on the pan-Canadian assessment of reading, mathematics, and science*. Toronto: Council of Ministers of Education, Canada.

O'Grady, K., & Houme, K. (2015). *PCAP 2013: Contextual report on student achievement in science*. Toronto: Council of Ministers of Education, Canada.

Ontario Library Association (2006). *School libraries and student achievement in Ontario: A study by Queen's University and People for Education*. Toronto: Author.

Ontario Ministry of Education (2013). *School effectiveness framework: A support for school improvement and student success*. Toronto: Author.

Opfer, V.D., & Pedder, D. (2011). The lost promise of teacher professional development in England. *European Journal of Teacher Education*, *34*(1), 3–24.

Pelletier, J. (2017). Children gain learning boost from two-year, full-day kindergarten. *The Conversation*, August 2. Retrieved from https://theconversation.com/children-gain-learning-boost-from-two-year-full-day-kindergarten

Petscher, Y. (2010). A meta-analysis of the relationship between student attitudes towards reading and achievement in reading. *Journal of Research in Reading*, *33*(4), 335–355.

Piercey, R.R. (2013). *Reading self-efficacy in early adolescence: Which measure works best?* Unpublished doctoral dissertation, University of Kentucky, Lexington.

Porter, A.C., & Gamoran, A. (2002). Progress and challenges for large-scale studies. In A.C. Porter & A. Gamoran (Eds.), *Methodological advances in large-scale cross-national education surveys* (pp. 3–23). Washington, DC: National Research Council.

Quirk, M., Schwanenflugel, P.J., & Webb, M. (2009). A short-term longitudinal study of the relationship between motivation to read and reading fluency skill in second grade. *Journal of Literacy Research*, *41*, 196–227.

Ruddell, R.B., & Unrau, N.J. (Eds.). (2004). *Theoretical models and processes of reading* (5th ed.). Newark, DE: International Reading Association.

Sainsbury, M., & Schagen, I. (2004). Attitudes to reading at ages nine and eleven. *Journal of Research in Reading*, 27, 373–386.

Schwippert, K., & Lenkeit, J. (Eds.). (2012). *Progress in reading literacy in national and international context: The impact of PIRLS 2006 in 12 countries*. Münster: Waxmann.

Sirin, S.R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, *75*(3), 417–453.

Taras, H. (2005). Nutrition and student performance at school. *Journal of School Health*, *75*(6), 199–213.

Tokunaga, R.S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior*, *26*(3), 277–287.

UNESCO. (2006). *2006 EFA global monitoring report: Literacy for life*. Paris: Author.

UNESCO Institute for Statistics. (2012). *International Standard Classification of Education: ISCED 2011*. Montreal: Author.

van der Voort, T.H.A. (2001). Television's impact on children's leisure time reading and reading skills. In L. Verhoeven & C. Snow (Eds.), *Literacy and motivation: Reading engagement in individuals and groups* (pp. 95–121). Mahwah, NJ: Lawrence Erlbaum.

Wagemaker, H. (2012). International large-scale assessments: From research to policy. In L. Rutkowski, M. von Davier, & D. Rutkowski (Eds.). *Handbook of international large-scale assessment: Background, technical issues, and methods of data analysis* (pp. 11–36). Boca Raton, FL: CRC Press.

Walter, P. (1999). Defining literacy and its consequences in the developing world. *International Journal of Lifelong Education, 18*, 31–48.

Wolf, R.M. (Ed.). (1995). *The IEA reading literacy study: Technical report*. The Hague, NL: IEA.

Yoon, K.S., Duncan, T., Lee, S.W.-Y., Scarloss, B., & Sharpley, K. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (Issues & Answers Report, REL 2007–No. 33). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved from http://ies.ed.gov/ncee/edlabs

Appendix A – EXCLUSION AND RESPONSE RATES IN CANADA

PIRLS is designed to assess reading achievement of students in their fourth year of formal schooling, and ePIRLS extends the assessment to on-line reading to acquire and use information. As with any other large-scale surveys, PIRLS and ePIRLS 2016 endeavoured to ensure the international comparability of results. Therefore, the national target population for PIRLS/ePIRLS 2016 consisted of all students in the fourth grade of primary schooling. However, school-entry age varies across different countries. Therefore, in order to avoid testing very young students, age is also taken into consideration when selecting the target grade. If the average age of fourth grade students at the time of testing would be less than 9.5 years, it is recommended that countries assess the next higher grade (Mullis & Martin, 2015).

All countries participating in PIRLS/ePIRLS 2016 were encouraged to do everything possible to maximize coverage of their national population. In Canada, the national target population did not include all of the PIRLS (97 per cent) and ePIRLS (74 per cent) international target populations. With regard to PIRLS, Nova Scotia, Prince Edward Island, and the three territories did not participate in the study. In two of the participating provinces (Manitoba and Saskatchewan), a minimal number of students participated to ensure adequate national geographic coverage, whereas in the other six provinces (British Columbia, Alberta, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador), students were oversampled to obtain robust provincial results. With regard to ePIRLS, six provinces (Alberta, Saskatchewan, Manitoba, New Brunswick, Nova Scotia, and Prince Edward Island) and the three territories did not participate in the study. PIRLS and ePIRLS were administered over two days of testing to the same oversample of students in the three participating provinces of British Columbia, Ontario, and Newfoundland and Labrador. Only a sub-sample of PIRLS students participated in ePIRLS in Quebec.[22]

The total weighted rate of school-level exclusions in Canada was 2.8 per cent in PIRLS and 2.9 per cent in ePIRLS (Table A.1). These included geographically remote schools, schools having very few students, schools with a radically different grade structure or curriculum, and schools providing instruction solely to students with special needs, as determined by the provincial education authority. At the provincial level, school-level exclusions ranged from 0 per cent in New Brunswick to 3.8 per cent in British Columbia.

The total weighted rate of student-level exclusions in Canada was 4.7 per cent in PIRLS and 3.6 per cent in ePIRLS (Table A.1). These included:

- *Students with functional disabilities.* This category comprised students who had permanent physical disabilities such that they could not perform in the PIRLS/ePIRLS testing situation. Students with physical disabilities who were able to perform on the test had to be included.
- *Students with intellectual disabilities*. This category consisted of students who were considered, in the professional opinion of the school principal or by other qualified staff, to have intellectual disabilities and/or who had been psychologically tested as such. The category included students who were emotionally or mentally unable to follow even the general instructions of the test. It should be noted that students could not be excluded solely because of poor academic performance or normal disciplinary problems. Systematic exclusion of all students with dyslexia, or other such learning disabilities, was not acceptable (students had to be accommodated in the test situation, if possible, rather than excluded).

- *Non-native language speakers*. This category included students who were unable to read or speak the language of the test (English or French) and would be unable to overcome the language barrier in the test situation. Typically, a student who had received less than one year of instruction in the language of the test had to be excluded.

It was the responsibility of individual schools to determine whether a student should be included or excluded from participating in the PIRLS/ePIRLS assessments, based on the international guidelines described above. At the provincial level, student-level exclusions ranged from 1.6 per cent in Quebec to 6.7 per cent in British Columbia.

TABLE A.1 PIRLS/ePIRLS 2016 exclusion rates by type of exclusion

	School-level exclusions (%)	Student-level exclusions (%)	Overall (%)
PIRLS			
British Columbia	3.8	6.7	10.4
Alberta	1.5	4.5	6.0
Ontario	2.3	1.8	4.1
Quebec	3.5	1.6	5.1
New Brunswick (English)	0.0	4.4	4.4
New Brunswick (French)	0.0	5.4	5.4
Newfoundland and Labrador	3.6	6.5	10.1
Canada*	2.8	4.7	7.5
ePIRLS			
British Columbia	3.8	8.5	12.3
Ontario	2.3	3.4	5.7
Quebec	3.5	0.8	4.3
Newfoundland and Labrador	3.6	6.4	10.1
Canada**	2.9	3.6	6.5

* The Canadian PIRLS average comprises schools/students from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador.
** The Canadian ePIRLS average comprises schools/students from British Columbia, Ontario, Quebec, and Newfoundland and Labrador.
Note: Non-participating jurisdictions are taken into account when calculating the exclusion rates for Canada overall.

In order to minimize the potential for non-response bias,[23] PIRLS/ePIRLS quality standards require minimum participation rates for schools, classrooms, and students. At the national level, for a sample to be fully acceptable, it must have either:

- a minimum school participation rate of 85 per cent, based on originally sampled schools, and
- a minimum classroom participation rate of 95 per cent, from originally sampled schools and replacement schools, and
- a minimum student participation rate of 85 per cent, from sampled schools and replacement schools, or
- a minimum combined school, classroom, and student participation rate of 75 per cent, based on originally sampled schools (although classroom and student participation rates may include replacement schools).

Tables A.2 and A.3 show school and student sample sizes, and Table A.4 shows school, class, and student participation rates. The Canadian PIRLS average comprises schools/students from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador. The Canadian ePIRLS average comprises schools/students from British Columbia, Ontario, Quebec, and Newfoundland and Labrador.

In Canada, the overall weighted participation rate (at school, classroom, and student levels) was 86 per cent in PIRLS and 79 per cent in ePIRLS. Thus, the international standards for participation in the assessment were successfully maintained in Canada. That being said, the PIRLS/ePIRLS guidelines for sample participation rates were not met in the province of Quebec, although a non-response bias analysis was not performed to determine the presence of a bias (Table A.4).

TABLE A.2 PIRLS/ePIRLS 2016 school sample sizes

	Number of schools in original sample[†]	Number of eligible schools in original sample[††]	Number of schools in original sample that participated	Number of replacement schools that participated	Total number of schools that participated
PIRLS					
British Columbia	149	147	146	0	146
Alberta	149	140	114	12	126
Ontario	198	196	186	2	188
Quebec	176	174	89	38	127
New Brunswick (English)	136	130	130	0	130
New Brunswick (French)	66	66	66	0	66
Newfoundland and Labrador	130	130	128	0	128
Canada*	1,020	998	872	54	926
ePIRLS					
British Columbia	149	147	144	0	144
Ontario	198	196	182	2	184
Quebec	30	30	14	5	19
Newfoundland and Labrador	130	130	127	0	127
Canada**	507	503	467	7	474

[†] This number includes participating, not participating, and excluded schools.
[††] This number includes participating and not participating schools.
* The Canadian PIRLS average comprises schools/students from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador.
** The Canadian ePIRLS average comprises schools/students from British Columbia, Ontario, Quebec, and Newfoundland and Labrador.

TABLE A.3 PIRLS/ePIRLS 2016 student sample sizes in participating schools

	Number of sampled students in participating schools†	Number of eligible students in the sample††	Number of students absent	Number of students assessed
PIRLS				
British Columbia	3,114	2,880	134	2,746
Alberta	2,799	2,643	108	2,535
Ontario	4,572	4,451	181	4,270
Quebec	3,396	3,320	141	3,179
New Brunswick (English)	2,510	2,345	64	2,281
New Brunswick (French)	1,269	1,187	49	1,138
Newfoundland and Labrador	2,138	1,995	131	1,864
Canada*	20,072	19,071	826	18,245
ePIRLS				
British Columbia	3,081	2,852	267	2,585
Ontario	4,464	4,356	306	4,050
Quebec	498	492	7	485
Newfoundland and Labrador	2,135	2,004	253	1,751
Canada**	10,178	9,704	833	8,871

† This number includes participating, not participating, and excluded students.

†† This number includes participating and not participating students.

* The Canadian PIRLS average comprises schools/students from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador.

** The Canadian ePIRLS average comprises schools/students from British Columbia, Ontario, Quebec, and Newfoundland and Labrador.

TABLE A.4 PIRLS/ePIRLS 2016 participation rates (weighted)

	School participation (%)		Class participation (%)	Student participation (%)	Overall participation (%)	
	Before replacement	After replacement			Before replacement	After replacement
PIRLS						
British Columbia	99	99	100	95	94	94
Alberta	80	90	100	96	77	86
Ontario	96	97	100	96	92	93
Quebec†	39	67	99	96	37	64
New Brunswick (English)	100	100	100	97	97	97
New Brunswick (French)	100	100	100	96	96	96
Newfoundland and Labrador	98	98	100	93	92	92
Canada*	81	90	100	96	77	86
ePIRLS						
British Columbia	98	98	100	92	89	89
Ontario	94	95	100	93	87	88
Quebec†	43	60	100	94	40	57
Newfoundland and Labrador	98	98	100	87	85	85
Canada**	79	85	100	93	74	79

† *Note*: Results for the province of Quebec should be treated with caution because international guidelines for sample participation rates were not satisfied.

* The Canadian PIRLS average comprises schools/students from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador.

** The Canadian ePIRLS average comprises schools/students from British Columbia, Ontario, Quebec, and Newfoundland and Labrador.

Appendix B – DATA TABLES

TABLE B.1.1 Percentage of students reaching the international benchmarks in reading (PIRLS)

Country or province	Advanced benchmark (625) %	Advanced benchmark (625) Standard error	High benchmark (550) %	High benchmark (550) Standard error	Intermediate benchmark (475) %	Intermediate benchmark (475) Standard error	Low benchmark (400) %	Low benchmark (400) Standard error	Below low benchmark (under 400) %	Below low benchmark (under 400) Standard error
British Columbia	16.4	(1.2)	38.8	(1.3)	30.8	(1.2)	11.1	(1.0)	2.9	(0.5)
Alberta	12.8	(1.1)	39.0	(1.5)	32.9	(1.7)	11.9	(1.2)	3.5	(0.7)
Ontario	13.5	(1.5)	36.5	(1.4)	32.1	(1.1)	13.5	(1.1)	4.3	(0.6)
Quebec	11.3	(1.2)	38.6	(1.6)	37.0	(1.5)	11.5	(1.3)	1.6	(0.4)
New Brunswick	8.0	(0.7)	30.3	(1.3)	36.9	(0.9)	18.9	(1.2)	5.9	(0.8)
New Brunswick (English)	10.4	(1.0)	34.3	(1.5)	35.3	(1.0)	15.0	(1.4)	5.0	(0.9)
New Brunswick (French)	3.0 ‡	(1.0)	21.8	(2.4)	40.4	(2.0)	27.2	(1.9)	7.6	(1.0)
Newfoundland and Labrador	11.2	(1.4)	33.5	(1.7)	34.1	(1.4)	14.6	(1.4)	6.5	(1.5)
Canada	**12.7**	**(0.7)**	**36.9**	**(0.8)**	**33.0**	**(0.8)**	**13.0**	**(0.6)**	**4.3**	**(0.4)**
Australia	15.9	(1.0)	35.3	(1.0)	29.6	(1.0)	13.6	(0.7)	5.5	(0.5)
Austria	8.4	(0.8)	38.8	(1.3)	37.2	(0.9)	13.2	(0.9)	2.4	(0.4)
Azerbaijan, Republic of	1.6	(0.3)	16.0	(1.0)	36.5	(1.5)	26.8	(1.2)	19.2	(1.7)
Bahrain	2.3	(0.3)	11.9	(0.6)	26.9	(0.8)	28.3	(0.9)	30.6	(1.0)
Belgium (Flemish)	4.1	(0.4)	31.4	(1.1)	44.6	(1.1)	17.4	(1.2)	2.6	(0.4)
Belgium (French)	2.6	(0.4)	19.7	(1.1)	42.4	(1.1)	27.0	(1.0)	8.4	(0.9)
Bulgaria	19.2	(1.3)	35.4	(1.3)	28.1	(1.3)	12.2	(1.2)	5.2	(0.9)
Chile	3.4	(0.4)	21.8	(1.2)	36.3	(1.4)	25.7	(1.4)	12.8	(1.1)
Chinese Taipei	14.4	(1.1)	44.4	(1.2)	31.1	(1.1)	8.5	(0.6)	1.6	(0.2)
Czech Republic	10.0	(0.7)	38.8	(1.0)	36.4	(1.0)	11.8	(0.7)	3.0	(0.5)
Denmark	11.2	(1.0)	40.8	(1.1)	33.5	(1.0)	11.8	(0.8)	2.6	(0.4)
Egypt	0.4	(0.1)	2.1	(0.3)	8.9	(1.0)	19.4	(1.0)	69.2	(1.8)
England	20.1	(0.9)	37.0	(1.1)	28.4	(0.9)	11.3	(0.6)	3.2	(0.4)
Finland	18.2	(0.8)	44.2	(1.1)	28.9	(1.0)	6.9	(0.6)	1.7	(0.3)
France	3.8	(0.6)	26.4	(1.1)	41.7	(1.2)	21.8	(1.0)	6.3	(0.5)
Georgia	2.5	(0.4)	19.6	(1.1)	37.9	(1.4)	26.5	(1.3)	13.5	(1.1)
Germany	11.1	(0.8)	35.9	(1.1)	34.1	(1.0)	13.4	(0.9)	5.5	(1.0)
Hong Kong, SAR	18.2	(1.3)	46.9	(1.5)	27.5	(1.4)	6.0	(0.7)	1.4	(0.3)
Hungary	16.6	(1.2)	38.9	(1.1)	29.5	(1.2)	12.1	(0.8)	2.9	(0.5)
Iran, Islamic Republic of	1.4	(0.2)	9.3	(0.5)	26.1	(1.0)	28.1	(0.8)	35.1	(1.5)
Ireland	21.4	(1.2)	40.5	(1.3)	27.5	(1.2)	8.3	(0.8)	2.3	(0.4)
Israel	12.8	(0.9)	33.1	(1.1)	29.2	(1.0)	16.0	(0.8)	9.0	(0.7)
Italy	10.7	(0.8)	41.4	(1.7)	34.8	(1.3)	11.1	(0.8)	2.1	(0.5)
Kazakhstan	7.1	(0.8)	34.9	(1.4)	41.8	(1.3)	14.2	(1.3)	1.9	(0.3)
Kuwait	0.8	(0.2)	4.9	(0.8)	16.3	(1.2)	28.7	(1.2)	49.4	(1.7)
Latvia	13.6	(1.0)	43.3	(1.4)	33.2	(1.3)	9.2	(0.8)	0.8	(0.2)
Lithuania	12.3	(0.9)	39.7	(1.2)	34.0	(1.3)	11.2	(0.9)	2.7	(0.5)
Macao SAR	9.9	(0.6)	40.6	(0.9)	35.6	(0.8)	11.5	(0.6)	2.4	(0.3)
Malta	0.9	(0.2)	11.9	(0.8)	31.7	(1.1)	28.6	(1.2)	26.8	(0.7)
Morocco	0.3 ‡	(0.1)	2.7	(0.4)	11.3	(0.7)	21.8	(1.0)	63.8	(1.5)
Netherlands	8.4	(0.6)	39.9	(1.1)	39.4	(1.3)	11.0	(0.8)	1.3	(0.3)
New Zealand	11.1	(0.6)	30.3	(1.0)	31.9	(1.0)	16.6	(0.7)	10.0	(0.7)
Northern Ireland	22.2	(1.4)	38.4	(1.0)	26.5	(1.0)	9.6	(0.7)	3.4	(0.4)
Norway (5)	14.9	(0.9)	42.6	(1.4)	32.3	(1.4)	8.8	(0.8)	1.4	(0.3)
Oman	1.6	(0.3)	8.1	(0.7)	22.2	(0.9)	27.2	(0.9)	40.9	(1.3)
Poland	20.2	(1.1)	40.5	(1.1)	28.1	(1.1)	9.2	(0.8)	2.0	(0.4)
Portugal	6.5	(0.9)	31.1	(1.2)	41.5	(1.1)	17.8	(1.1)	3.0	(0.4)
Qatar	3.2	(0.3)	13.5	(0.6)	24.9	(1.1)	24.6	(1.1)	33.8	(0.9)
Russian Federation	25.7	(1.2)	44.5	(1.0)	23.4	(1.0)	5.5	(0.5)	0.9	(0.3)
Saudi Arabia	1.4	(0.4)	9.2	(1.0)	23.9	(1.3)	28.8	(1.2)	36.7	(1.8)
Singapore	28.6	(1.6)	37.5	(1.5)	22.8	(1.1)	8.3	(0.7)	2.7	(0.5)
Slovak Republic	10.3	(0.8)	37.0	(1.3)	33.4	(1.1)	12.7	(0.8)	6.6	(1.1)
Slovenia	11.3	(0.8)	37.8	(1.1)	33.7	(0.9)	13.5	(0.8)	3.7	(0.5)
South Africa	U ‡	(0.1)	1.7	(0.4)	5.6	(0.7)	14.5	(0.7)	77.9	(1.5)
Spain	5.7	(0.4)	33.0	(0.9)	41.2	(0.8)	16.7	(0.8)	3.4	(0.6)
Sweden	13.7	(1.4)	43.1	(1.7)	31.1	(1.1)	10.2	(0.8)	1.9	(0.3)
Trinidad And Tobago	4.2	(0.5)	19.7	(1.1)	31.1	(1.3)	25.3	(1.0)	19.7	(1.2)
United Arab Emirates	4.6	(0.3)	15.4	(0.8)	23.5	(0.7)	24.2	(0.8)	32.4	(1.3)
United States	16.1	(1.3)	36.7	(1.4)	30.5	(1.1)	12.7	(0.9)	3.9	(0.5)
International median	**10.2**		**35.6**		**31.1**		**13.5**		**3.8**	

Note: Countries and provinces have been sorted alphabetically. The participating grade is identified in parentheses after the country name when it is not Grade 4.
‡ There are fewer than 30 observations.
U Too unreliable to be published

TABLE B.1.2 Percentage of students reaching the international benchmarks in reading (ePIRLS)

Country or province	Advanced benchmark (625) %	Advanced benchmark (625) Standard error	High benchmark (550) %	High benchmark (550) Standard error	Intermediate benchmark (475) %	Intermediate benchmark (475) Standard error	Low benchmark (400) %	Low benchmark (400) Standard error	Below low benchmark (under 400) %	Below low benchmark (under 400) Standard error
British Columbia	16.0	(1.2)	40.4	(1.3)	30.1	(1.3)	10.9	(1.1)	2.6	(0.7)
Ontario	13.1	(1.3)	37.0	(1.4)	32.4	(1.5)	13.0	(1.1)	4.5	(0.6)
Newfoundland and Labrador	10.7	(1.3)	36.4	(2.1)	33.9	(2.2)	13.9	(1.3)	5.2	(1.0)
Canada	**12.0**	**(1.0)**	**37.0**	**(1.5)**	**33.3**	**(1.5)**	**13.6**	**(1.1)**	**4.0**	**(0.5)**
Chinese Taipei	9.7	(0.7)	41.8	(1.0)	34.6	(1.0)	11.1	(0.8)	2.8	(0.3)
Denmark	15.4	(1.0)	42.1	(1.2)	31.7	(1.2)	9.2	(0.8)	1.6	(0.4)
Georgia	1.1	(0.4)	14.5	(1.3)	37.9	(1.5)	31.6	(1.5)	14.9	(1.4)
Ireland	20.2	(1.3)	43.0	(1.3)	27.2	(1.3)	7.3	(0.8)	2.3	(0.4)
Israel	12.8	(1.0)	34.5	(1.2)	30.7	(1.1)	15.4	(0.7)	6.5	(0.7)
Italy	5.6	(0.7)	35.2	(1.3)	41.4	(1.1)	15.3	(1.1)	2.4	(0.5)
Norway (5)	17.7	(1.2)	45.5	(1.5)	29.0	(1.4)	6.9	(0.7)	0.9 ‡	(0.3)
Portugal	4.5	(0.6)	30.1	(1.1)	42.7	(1.0)	19.4	(1.0)	3.2	(0.5)
Singapore	34.1	(1.7)	37.6	(1.3)	20.0	(1.0)	6.3	(0.6)	2.0	(0.4)
Slovenia	5.4	(0.5)	33.4	(1.2)	39.2	(1.1)	17.2	(0.9)	4.8	(0.6)
Sweden	14.4	(1.0)	44.8	(1.4)	30.2	(1.4)	9.0	(0.8)	1.6	(0.3)
United Arab Emirates	5.0	(0.3)	17.5	(0.6)	27.7	(0.7)	24.4	(0.7)	25.4	(0.9)
United States	17.7	(1.2)	38.4	(1.1)	30.0	(1.1)	11.2	(0.8)	2.6	(0.4)
International median	**12.4**		**37.3**		**31.2**		**12.4**		**2.7**	

Note: Countries and provinces have been sorted alphabetically. The participating grade is identified in parentheses after the country name when it is not Grade 4.
‡ There are fewer than 30 observations.

TABLE B.1.3 Percentage of students reaching the international benchmarks in reading by language of the school system (PIRLS)

Canada and provinces	Language of the school system	Advanced benchmark (625) %	Advanced benchmark (625) Standard error	High benchmark (550) %	High benchmark (550) Standard error	Intermediate benchmark (475) %	Intermediate benchmark (475) Standard error	Low benchmark (400) %	Low benchmark (400) Standard error	Below low benchmark (under 400) %	Below low benchmark (under 400) Standard error
British Columbia	English	16.5	(1.2)	39.0	(1.3)	30.7	(1.2)	11.0	(1.0)	2.8	(0.5)
	French	5.2 ‡	(1.6)	25.2	(2.7)	38.4	(2.6)	23.9	(2.3)	7.4	(1.4)
Alberta	English	12.9	(1.1)	39.3	(1.5)	32.8	(1.7)	11.6	(1.2)	3.3	(0.7)
	French	5.0 ‡	(1.4)	22.4	(2.2)	37.5	(1.9)	24.9	(2.3)	10.2	(2.2)
Ontario	English	14.1	(1.5)	37.4	(1.5)	31.8	(1.2)	12.8	(1.2)	3.8	(0.6)
	French	3.4	(0.6)	21.3	(1.4)	36.3	(1.5)	26.2	(1.7)	12.8	(1.4)
Quebec	English	12.8	(1.5)	34.2	(2.1)	33.5	(1.7)	15.5	(1.6)	3.8	(1.2)
	French	11.1	(1.4)	39.0	(1.8)	37.3	(1.6)	11.1	(1.4)	1.4 ‡	(0.4)
New Brunswick	English	10.4	(1.0)	34.3	(1.5)	35.3	(1.0)	15.0	(1.4)	5.0	(0.9)
	French	3.0 ‡	(1.0)	21.8	(2.4)	40.4	(2.0)	27.2	(1.9)	7.6	(1.0)
Newfoundland and Labrador	English	11.2	(1.4)	33.5	(1.7)	34.1	(1.4)	14.6	(1.4)	6.5	(1.5)
	French	–	–	–	–	–	–	–	–	–	–
Canada	**English**	**13.6**	**(0.8)**	**37.0**	**(0.9)**	**31.6**	**(0.9)**	**13.0**	**(0.7)**	**4.7**	**(0.5)**
	French	**10.0**	**(1.1)**	**36.7**	**(1.5)**	**37.4**	**(1.5)**	**13.2**	**(1.3)**	**2.8**	**(0.4)**

‡ There are fewer than 30 observations.
– Data not available.

TABLE B.1.4 Percentage of students reaching the international benchmarks in reading by language of the school system (ePIRLS)

Canada and provinces	Language of the school system	Advanced benchmark (625) %	Advanced benchmark (625) Standard error	High benchmark (550) %	High benchmark (550) Standard error	Intermediate benchmark (475) %	Intermediate benchmark (475) Standard error	Low benchmark (400) %	Low benchmark (400) Standard error	Below low benchmark (under 400) %	Below low benchmark (under 400) Standard error
British Columbia	English	16.1	(1.3)	40.5	(1.3)	30.0	(1.3)	10.8	(1.1)	2.6	(0.7)
	French	4.5 ‡	(0.8)	23.8	(2.4)	40.9	(2.7)	25.8	(2.2)	5.1 ‡	(1.6)
Ontario	English	13.7	(1.3)	38.1	(1.4)	32.0	(1.5)	12.2	(1.2)	4.1	(0.6)
	French	3.1	(0.7)	19.0	(2.2)	39.0	(1.8)	27.2	(1.7)	11.6	(1.4)
Newfoundland and Labrador	English	10.7	(1.3)	36.4	(2.1)	33.9	(2.2)	13.9	(1.3)	5.2	(1.0)
	French	–	–	–	–	–	–	–	–	–	–
Canada	**English**	**13.9**	**(1.1)**	**38.7**	**(1.1)**	**31.8**	**(1.1)**	**11.9**	**(0.9)**	**3.8**	**(0.5)**
	French	**7.8**	**(2.2)**	**33.1**	**(4.4)**	**36.9**	**(4.4)**	**17.6**	**(3.4)**	**4.6**	**(1.1)**

‡ There are fewer than 30 observations.
– Data not available.

TABLE B.1.5 Percentage of students reaching the international benchmarks in reading by gender (PIRLS)

Canada and provinces	Gender	Advanced benchmark (625) %	Advanced benchmark (625) Standard error	High benchmark (550) %	High benchmark (550) Standard error	Intermediate benchmark (475) %	Intermediate benchmark (475) Standard error	Low benchmark (400) %	Low benchmark (400) Standard error	Below low benchmark (under 400) %	Below low benchmark (under 400) Standard error
British Columbia	Girls	18.6	(1.6)	40.4	(1.8)	30.3	(1.8)	8.9	(1.4)	1.8	(0.6)
	Boys	14.3	(1.5)	37.3	(1.9)	31.4	(1.5)	13.2	(1.1)	3.8	(0.7)
Alberta	Girls	15.2	(1.5)	39.7	(1.9)	31.1	(2.3)	11.2	(1.4)	2.8	(0.8)
	Boys	10.5	(1.3)	38.3	(1.8)	34.6	(2.0)	12.5	(1.5)	4.1	(1.0)
Ontario	Girls	15.2	(1.7)	38.8	(2.0)	29.9	(1.6)	12.3	(1.4)	3.8	(0.7)
	Boys	12.0	(1.9)	34.5	(1.8)	34.1	(1.5)	14.6	(1.5)	4.9	(0.8)
Quebec	Girls	13.3	(1.6)	39.2	(1.9)	35.8	(1.9)	10.5	(1.7)	1.3 ‡	(0.4)
	Boys	9.1	(1.3)	37.9	(2.0)	38.2	(1.9)	12.7	(1.3)	2.0	(0.6)
New Brunswick	Girls	9.9	(1.2)	33.7	(1.7)	35.8	(1.4)	16.1	(1.6)	4.4	(0.8)
	Boys	6.2	(1.0)	26.9	(1.7)	38.0	(1.6)	21.6	(1.4)	7.3	(1.0)
New Brunswick (English)	Girls	12.6	(1.4)	38.1	(2.1)	33.1	(1.8)	12.4	(1.7)	3.8	(0.8)
	Boys	8.2	(1.4)	30.6	(1.9)	37.4	(1.7)	17.5	(2.0)	6.2	(1.3)
New Brunswick (French)	Girls	4.2 ‡	(1.3)	24.1	(2.9)	41.8	(2.5)	24.3	(2.5)	5.6	(1.3)
	Boys	U ‡	(1.0)	19.5	(3.1)	39.1	(3.3)	30.0	(3.1)	9.5	(1.9)
Newfoundland and Labrador	Girls	12.2	(1.9)	33.6	(2.8)	33.9	(2.4)	14.2	(1.6)	6.2	(2.0)
	Boys	10.3	(1.5)	33.6	(2.2)	34.4	(2.1)	15.1	(2.2)	6.7	(1.6)
Canada	**Girls**	**14.5**	**(0.9)**	**38.5**	**(1.0)**	**31.6**	**(1.2)**	**11.7**	**(0.7)**	**3.7**	**(0.6)**
	Boys	**11.1**	**(0.8)**	**35.4**	**(1.0)**	**34.4**	**(0.9)**	**14.4**	**(0.8)**	**4.8**	**(0.4)**

‡ There are fewer than 30 observations.
U Too unreliable to be published

TABLE B.1.6 Percentage of students reaching the international benchmarks in reading by gender (ePIRLS)

Canada and provinces	Gender	Advanced benchmark (625) %	Advanced benchmark (625) Standard error	High benchmark (550) %	High benchmark (550) Standard error	Intermediate benchmark (475) %	Intermediate benchmark (475) Standard error	Low benchmark (400) %	Low benchmark (400) Standard error	Below low benchmark (under 400) %	Below low benchmark (under 400) Standard error
British Columbia	Girls	17.4	(1.7)	42.1	(2.0)	29.0	(2.1)	9.7	(1.3)	1.8 ‡	(0.6)
	Boys	14.7	(1.5)	38.7	(1.9)	31.2	(1.9)	12.1	(1.5)	3.4	(1.0)
Ontario	Girls	14.1	(1.7)	38.7	(2.0)	31.6	(2.3)	11.6	(1.2)	4.0	(0.9)
	Boys	12.2	(1.5)	35.5	(2.1)	33.1	(2.1)	14.3	(1.6)	4.9	(0.8)
Newfoundland and Labrador	Girls	10.7	(1.5)	37.7	(2.4)	33.5	(2.8)	13.2	(1.7)	5.0	(1.4)
	Boys	10.7	(1.6)	35.2	(3.0)	34.2	(2.9)	14.6	(1.9)	5.3	(1.4)
Canada	**Girls**	**13.1**	**(1.5)**	**37.6**	**(1.5)**	**33.5**	**(1.9)**	**12.4**	**(1.5)**	**3.4**	**(0.7)**
	Boys	**11.0**	**(1.1)**	**36.5**	**(2.1)**	**33.1**	**(1.8)**	**14.8**	**(1.6)**	**4.6**	**(0.6)**

‡ There are fewer than 30 observations.

TABLE B.2.1 Achievement scores in reading (PIRLS)

Country or province	Average score	Standard error	Confidence interval – 95% lower limit	Confidence interval – 95% upper limit
Russian Federation	581	(2.2)	576	585
Singapore	576	(3.2)	570	582
Hong Kong, SAR	569	(2.7)	563	574
Ireland	567	(2.5)	562	571
Finland	566	(1.8)	562	570
Poland	565	(2.1)	560	569
Northern Ireland	565	(2.2)	560	569
Norway (5)	559	(2.3)	555	563
Chinese Taipei	559	(2.0)	555	563
England	559	(1.9)	555	562
Latvia	558	(1.7)	554	561
Sweden	555	(2.4)	550	560
British Columbia	555	(2.9)	549	560
Hungary	554	(2.9)	549	560
Bulgaria	552	(4.2)	543	560
United States	549	(3.1)	543	555
Lithuania	548	(2.6)	543	553
Italy	548	(2.2)	544	552
Denmark	547	(2.1)	543	552
Quebec	547	(2.8)	542	553
Alberta	547	(3.2)	540	553
Macao SAR	546	(1.0)	544	548
Netherlands	545	(1.7)	542	548
Australia	544	(2.5)	539	549
Ontario	544	(3.2)	537	550
Czech Republic	543	(2.1)	539	548
Canada	**543**	**(1.8)**	**540**	**547**
Slovenia	542	(2.0)	539	546
Austria	541	(2.4)	536	545
Germany	537	(3.2)	531	544
Kazakhstan	536	(2.5)	531	541
New Brunswick (English)	535	(3.8)	528	543
Slovak Republic	535	(3.1)	529	541
Newfoundland and Labrador	534	(5.1)	523	544
Israel	530	(2.5)	525	535
Portugal	528	(2.3)	523	532
Spain	528	(1.7)	524	531
Belgium (Flemish)	525	(1.9)	521	529
New Brunswick	524	(2.8)	519	530
New Zealand	523	(2.2)	518	527
France	511	(2.2)	507	516
International average	**511**	**(0.4)**	**510**	**511**
New Brunswick (French)	501	(3.6)	494	508
Belgium (French)	497	(2.6)	492	503
Chile	494	(2.5)	489	499
Georgia	488	(2.8)	483	494
Trinidad And Tobago	479	(3.3)	473	486
Azerbaijan, Republic of	472	(4.2)	464	480
Malta	452	(1.8)	448	456
United Arab Emirates	450	(3.2)	444	456
Bahrain	446	(2.3)	441	451
Qatar	442	(1.8)	439	446
Saudi Arabia	430	(4.2)	422	439
Iran, Islamic Republic of	428	(4.0)	420	436
Oman	418	(3.3)	412	425
Kuwait	393	(4.1)	385	402
Morocco	358	(3.9)	350	366
Egypt	330	(5.6)	319	342
South Africa	320	(4.4)	311	328

Note: The international PIRLS scale centrepoint was 500. The participating grade is identified in parentheses after the country name when it is not Grade 4.

TABLE B.2.2 Achievement scores in reading (ePIRLS)

Country or province	Average score	Standard error	Confidence interval – 95% lower limit	Confidence interval – 95% upper limit
Singapore	588	(3.0)	582	594
Norway (5)	568	(2.2)	563	572
Ireland	567	(2.5)	562	572
Sweden	559	(2.3)	555	564
Denmark	558	(2.2)	554	563
United States	557	(2.6)	551	562
British Columbia	555	(3.1)	549	562
Chinese Taipei	546	(2.0)	542	550
Ontario	544	(3.1)	538	550
Canada	**543**	**(3.2)**	**536**	**549**
International average	**539**	**(0.7)**	**538**	**540**
Newfoundland and Labrador	538	(3.9)	530	545
Israel	536	(2.3)	532	541
Italy	532	(2.1)	528	537
Slovenia	525	(1.9)	521	529
Portugal	522	(2.2)	518	527
Georgia	477	(3.3)	470	483
United Arab Emirates	468	(2.2)	464	473

Note: The international PIRLS scale centrepoint was 500. The participating grade is identified in parentheses after the country name when it is not Grade 4.

TABLE B.2.3 Achievement scores in reading by language of the school system (PIRLS)

Canada and provinces	Anglophone school system		Francophone school system		Difference between systems	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	555	(2.9)	511	(3.7)	44*	(4.6)
Alberta	547	(3.3)	502	(6.7)	46*	(7.3)
Ontario	547	(3.4)	493	(3.8)	53*	(5.1)
Quebec	540	(4.4)	548	(3.1)	-8	(5.4)
New Brunswick	535	(3.8)	501	(3.6)	34*	(5.3)
Newfoundland and Labrador	534	(5.1)	–	–	–	
Canada	**544**	**(2.2)**	**541**	**(2.6)**	**3**	**(3.4)**

Note: Newfoundland and Labrador did not oversample students by language. Results are included for comparisons to be made with the Canadian English average score.

* Statistically significant difference

TABLE B.2.4 Achievement scores in reading by language of the school system (ePIRLS)

Canada and provinces	Anglophone school system		Francophone school system		Difference between systems	
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	556	(3.2)	509	(4.0)	47*	(5.3)
Ontario	547	(3.3)	493	(3.9)	54*	(5.2)
Newfoundland and Labrador	538	(3.9)	–	–	–	
Canada	**548**	**(2.7)**	**529**	**(8.5)**	**19***	**(9.0)**

Note: Newfoundland and Labrador did not oversample students by language. Results are included for comparisons to be made with the Canadian English average score.

* Statistically significant difference

TABLE B.2.5 Achievement scores in reading by gender (PIRLS)

Country or province	Girls		Boys		Difference between girls and boys	
	Average score	Standard error	Average score	Standard error	Average score	Standard error
British Columbia	563	(3.3)	547	(3.0)	16*	(2.8)
Alberta	553	(3.8)	541	(3.8)	11*	(4.3)
Ontario	550	(3.6)	538	(3.8)	12*	(3.6)
Quebec	552	(3.3)	542	(3.1)	11*	(3.1)
New Brunswick	534	(2.9)	514	(3.6)	20*	(3.6)
New Brunswick (English)	545	(3.6)	525	(4.8)	20*	(4.5)
New Brunswick (French)	511	(4.2)	492	(4.7)	19*	(4.9)
Newfoundland and Labrador	536	(6.3)	532	(4.8)	4	(4.3)
Canada	**549**	**(2.2)**	**537**	**(2.1)**	**12***	**(2.2)**
Australia	555	(2.6)	534	(3.0)	22*	(2.5)
Austria	544	(2.7)	538	(2.7)	6*	(2.4)
Azerbaijan, Republic of	479	(4.3)	466	(4.5)	13*	(3.0)
Bahrain	468	(2.8)	424	(3.5)	43*	(3.8)
Belgium (Flemish)	530	(2.1)	520	(2.3)	10*	(2.0)
Belgium (French)	503	(2.5)	492	(3.4)	11*	(3.0)
Bulgaria	559	(4.9)	544	(4.3)	16*	(3.4)
Chile	501	(2.9)	487	(3.2)	14*	(3.7)
Chinese Taipei	563	(2.2)	555	(2.3)	8*	(1.9)
Czech Republic	549	(2.2)	538	(2.6)	10*	(2.4)
Denmark	554	(2.6)	541	(2.7)	13*	(3.1)
Egypt	349	(5.6)	312	(6.6)	37*	(4.8)
England	566	(2.2)	551	(2.4)	15*	(2.8)
Finland	577	(1.9)	555	(2.3)	22*	(2.2)
France	515	(2.6)	507	(2.5)	8*	(2.7)
Georgia	498	(2.7)	479	(3.6)	19*	(3.2)
Germany	543	(3.2)	532	(3.7)	11*	(2.9)
Hong Kong, SAR	573	(2.9)	564	(3.1)	9*	(2.5)
Hungary	561	(3.4)	548	(3.1)	13*	(3.1)
Iran, Islamic Republic of	452	(4.5)	407	(5.1)	46*	(5.9)
Ireland	572	(2.9)	561	(3.3)	12*	(3.8)
Israel	537	(2.9)	524	(3.4)	13*	(3.8)
Italy	552	(2.7)	544	(2.4)	7*	(2.6)
Kazakhstan	542	(2.8)	531	(2.5)	11*	(2.1)
Kuwait	410	(4.8)	376	(6.4)	34*	(7.7)
Latvia	566	(2.1)	549	(2.0)	17*	(2.4)
Lithuania	558	(2.7)	538	(3.3)	20*	(3.1)
Macao SAR	546	(1.6)	545	(1.7)	1	(2.6)
Malta	463	(2.6)	442	(2.2)	21*	(3.1)
Morocco	372	(4.0)	344	(4.4)	28*	(3.0)
Netherlands	550	(1.7)	540	(2.3)	10*	(2.2)
New Zealand	533	(2.4)	512	(3.0)	22*	(3.2)
Northern Ireland	574	(2.8)	555	(2.8)	18*	(3.5)
Norway (5)	570	(2.6)	548	(2.6)	21*	(2.3)
Oman	442	(3.2)	395	(3.9)	46*	(3.0)
Poland	574	(2.5)	556	(2.6)	18*	(3.0)
Portugal	529	(2.7)	527	(2.5)	1	(2.7)
Qatar	460	(1.9)	424	(3.4)	36*	(4.0)
Russian Federation	588	(2.2)	574	(2.6)	15*	(2.1)
Saudi Arabia	464	(5.4)	399	(5.8)	65*	(7.5)
Singapore	585	(3.5)	568	(3.4)	17*	(3.0)
Slovak Republic	539	(3.7)	530	(3.1)	9*	(2.7)
Slovenia	552	(2.3)	533	(2.6)	19*	(2.9)
South Africa	347	(4.0)	295	(5.1)	52*	(3.0)
Spain	532	(1.4)	524	(2.7)	8*	(2.5)
Sweden	563	(2.7)	548	(2.6)	15*	(2.5)
Trinidad And Tobago	490	(3.8)	468	(4.4)	22*	(4.9)
United Arab Emirates	465	(4.2)	436	(4.5)	30*	(5.8)
United States	553	(3.2)	545	(3.6)	8*	(2.9)
International average	**520**	**(0.4)**	**501**	**(0.5)**	**19***	**(0.5)**

Note: The participating grade is identified in parentheses after the country name when it is not Grade 4.
* Statistically significant difference

TABLE B.2.6 Achievement scores in reading by gender (ePIRLS)

Country or province	Girls		Boys		Difference between girls and boys	
	Average score	Standard error	Average score	Standard error	Average score	Standard error
British Columbia	561	(3.3)	550	(3.7)	11*	(3.2)
Ontario	548	(3.5)	540	(4.0)	9*	(4.2)
Newfoundland and Labrador	540	(4.6)	536	(4.2)	4	(4.2)
Canada	**547**	**(3.7)**	**539**	**(3.7)**	**8***	**(3.8)**
Chinese Taipei	551	(2.3)	541	(2.2)	9*	(2.0)
Denmark	560	(2.9)	556	(2.9)	4	(3.8)
Georgia	485	(3.2)	469	(3.8)	15*	(2.5)
Ireland	572	(2.8)	561	(3.4)	11*	(3.6)
Israel	542	(2.5)	530	(3.1)	11*	(3.0)
Italy	534	(2.6)	531	(2.4)	2	(2.6)
Norway (5)	576	(2.6)	558	(2.9)	18*	(3.2)
Portugal	524	(2.6)	521	(2.6)	3	(2.7)
Singapore	599	(3.2)	578	(3.3)	21*	(2.8)
Slovenia	532	(2.5)	518	(2.5)	14*	(3.3)
Sweden	567	(2.6)	552	(2.7)	15*	(2.5)
United Arab Emirates	483	(3.4)	454	(4.1)	29*	(6.3)
United States	560	(2.8)	554	(3.1)	6*	(2.9)
International average	**545**	**(0.8)**	**533**	**(0.8)**	**12***	**(0.9)**

Note: The participating grade is identified in parentheses after the country name when it is not Grade 4.
* Statistically significant difference

TABLE B.2.7 Achievement scores in reading purposes (PIRLS)

Country or province	Reading purpose: Literary – Average score	Reading purpose: Literary – Standard error	Reading purpose: Informational – Average score	Reading purpose: Informational – Standard error	Difference between reading purposes – Score difference	Difference between reading purposes – Standard error
British Columbia	559	(2.9)	552	(3.0)	7*	(1.1)
Alberta	550	(3.3)	545	(3.4)	6*	(1.5)
Ontario	549	(3.2)	539	(3.4)	9*	(1.3)
Quebec	550	(2.9)	547	(3.0)	3	(1.7)
New Brunswick	529	(2.9)	520	(3.3)	9*	(2.0)
New Brunswick (English)	541	(3.9)	530	(4.3)	11*	(1.7)
New Brunswick (French)	504	(3.7)	498	(3.8)	6	(3.4)
Newfoundland and Labrador	540	(5.3)	528	(4.9)	11*	(1.8)
Canada	**547**	**(1.9)**	**540**	**(1.9)**	**7***	**(1.0)**
Australia	547	(2.4)	543	(2.6)	5*	(1.0)
Austria	544	(2.3)	539	(2.4)	5*	(0.9)
Azerbaijan, Republic of	466	(3.9)	477	(4.6)	-12*	(1.4)
Bahrain	437	(2.8)	453	(2.1)	-16*	(1.6)
Belgium (Flemish)	524	(1.9)	526	(1.9)	-2*	(1.0)
Belgium (French)	504	(2.2)	490	(2.4)	14*	(0.9)
Bulgaria	551	(4.5)	554	(4.2)	-2	(1.5)
Chile	500	(2.5)	485	(2.7)	15*	(1.2)
Chinese Taipei	548	(2.0)	569	(2.2)	-21*	(1.8)
Czech Republic	545	(2.1)	541	(2.3)	4*	(1.3)
Denmark	551	(2.2)	543	(2.5)	8*	(1.7)
Egypt	328	(5.5)	332	(5.8)	-4*	(1.4)
England	563	(2.2)	556	(2.1)	6*	(1.4)
Finland	565	(1.9)	569	(2.0)	-4*	(0.9)
France	513	(2.4)	510	(2.4)	3*	(0.9)
Georgia	490	(2.6)	486	(3.1)	4*	(1.4)
Germany	542	(3.3)	533	(3.3)	9*	(1.6)
Hong Kong, SAR	562	(3.0)	576	(2.8)	-14*	(1.2)
Hungary	558	(2.8)	551	(3.3)	7*	(1.5)
Iran, Islamic Republic of	430	(3.8)	425	(3.8)	6*	(1.2)
Ireland	571	(2.7)	565	(2.7)	7*	(1.3)
Israel	532	(2.6)	529	(2.5)	4*	(0.9)
Italy	549	(2.1)	549	(2.2)	0	(1.7)
Kazakhstan	527	(2.5)	544	(2.8)	-16*	(2.2)
Kuwait	388	(4.3)	398	(4.3)	-11*	(1.7)
Latvia	555	(1.9)	561	(1.8)	-6*	(1.4)
Lithuania	547	(2.7)	551	(2.6)	-3	(1.6)
Macao SAR	536	(1.7)	556	(1.3)	-20*	(1.1)
Malta	452	(2.0)	451	(2.0)	0	(1.1)
Morocco	353	(4.0)	359	(4.0)	-5*	(1.1)
Netherlands	546	(1.7)	545	(1.9)	2	(1.0)
New Zealand	525	(2.3)	520	(2.4)	5*	(1.2)
Northern Ireland	570	(2.5)	561	(2.3)	10*	(2.2)
Norway (5)	560	(2.5)	559	(2.4)	2	(1.3)
Oman	411	(3.3)	425	(3.3)	-15*	(0.7)
Poland	567	(2.2)	564	(2.6)	2	(1.4)
Portugal	528	(2.5)	528	(2.3)	-1	(1.1)
Qatar	434	(2.3)	450	(1.9)	-16*	(1.1)
Russian Federation	579	(2.2)	584	(2.3)	-5*	(0.9)
Saudi Arabia	430	(4.0)	429	(4.5)	1	(1.8)
Singapore	575	(3.3)	579	(3.3)	-4*	(1.0)
Slovak Republic	539	(3.0)	531	(3.1)	8*	(0.9)
Slovenia	541	(2.4)	544	(2.1)	-3*	(1.3)
South Africa	323	(4.7)	314	(4.5)	9*	(1.2)
Spain	530	(1.9)	527	(1.6)	3*	(0.9)
Sweden	556	(2.4)	555	(2.6)	1	(1.0)
Trinidad And Tobago	478	(3.3)	480	(3.5)	-2	(1.4)
United Arab Emirates	440	(3.4)	460	(3.2)	-20*	(0.7)
United States	557	(3.0)	543	(3.1)	14*	(1.1)
International average	**510**	**(0.4)**	**511**	**(0.4)**	**-1***	**(0.2)**

Note: The participating grade is identified in parentheses after the country name when it is not Grade 4.
* Statistically significant difference

TABLE B.2.8 Achievement scores in informational reading purpose (PIRLS/ePIRLS)

Country or province	Informational reading purpose				Difference between PIRLS and ePIRLS	
	PIRLS		ePIRLS			
	Average score	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	554	(3.1)	555	(3.1)	-2	(1.5)
Ontario	540	(3.4)	544	(3.1)	-4*	(1.7)
Newfoundland and Labrador	530	(4.8)	538	(3.9)	-8*	(2.2)
Canada	**540**	**(3.2)**	**543**	**(3.2)**	**-3**	**(1.4)**
Chinese Taipei	569	(2.2)	546	(2.0)	24*	(1.5)
Denmark	544	(2.7)	558	(2.2)	-15*	(1.9)
Georgia	487	(3.4)	477	(3.3)	10*	(2.4)
Ireland	564	(3.0)	567	(2.5)	-3	(1.5)
Israel	530	(2.4)	536	(2.3)	-6*	(1.4)
Italy	549	(2.4)	532	(2.1)	17*	(1.9)
Norway (5)	560	(2.4)	568	(2.2)	-8*	(1.5)
Portugal	528	(2.4)	522	(2.2)	6*	(1.1)
Singapore	579	(3.3)	588	(3.0)	-9*	(1.1)
Slovenia	544	(2.1)	525	(1.9)	19*	(1.1)
Sweden	555	(2.6)	559	(2.3)	-5*	(1.4)
United Arab Emirates	460	(2.7)	468	(2.2)	-8*	(1.3)
United States	543	(2.9)	557	(2.6)	-13*	(1.4)
International average	**539**	**(0.7)**	**539**	**(0.7)**	**0**	**(0.4)**

Note: The participating grade is identified in parentheses after the country name when it is not Grade 4.
* Statistically significant difference

Table B.2.9 Achievement scores in comprehension processes (PIRLS)

Country or province	Comprehension process: Retrieving and straightforward inferencing – Average score	Comprehension process: Retrieving and straightforward inferencing – Standard error	Comprehension process: Interpreting, integrating, and evaluating – Average score	Comprehension process: Interpreting, integrating, and evaluating – Standard error	Difference between comprehension processes – Score difference	Difference between comprehension processes – Standard error
British Columbia	554	(3.2)	557	(3.3)	-3*	(0.9)
Alberta	545	(3.2)	548	(3.2)	-4*	(0.9)
Ontario	539	(3.3)	548	(3.2)	-9*	(1.0)
Quebec	551	(3.0)	545	(3.0)	6*	(0.7)
New Brunswick	523	(2.8)	526	(2.8)	-3*	(0.7)
New Brunswick (English)	533	(3.7)	537	(3.7)	-4*	(1.0)
New Brunswick (French)	501	(4.0)	501	(4.1)	0	(1.2)
Newfoundland and Labrador	531	(4.9)	536	(5.2)	-5*	(1.2)
Canada	**541**	**(1.8)**	**545**	**(1.8)**	**-4***	**(0.5)**
Australia	541	(2.6)	549	(2.4)	-8*	(1.1)
Austria	550	(2.8)	534	(2.5)	16*	(1.1)
Azerbaijan, Republic of	477	(4.2)	465	(4.3)	13*	(1.1)
Bahrain	444	(2.1)	446	(2.7)	-1	(1.3)
Belgium (Flemish)	526	(2.1)	524	(2.2)	1	(1.1)
Belgium (French)	501	(2.3)	494	(2.4)	6*	(1.1)
Bulgaria	550	(4.0)	552	(4.3)	-2*	(0.9)
Chile	496	(2.5)	491	(2.9)	5*	(1.7)
Chinese Taipei	560	(1.9)	558	(2.2)	2*	(0.7)
Czech Republic	551	(2.4)	538	(2.2)	13*	(1.2)
Denmark	550	(2.1)	546	(2.2)	4*	(1.3)
Egypt	329	(5.6)	340	(5.7)	-11*	(1.7)
England	556	(2.0)	561	(1.9)	-6*	(0.5)
Finland	572	(2.0)	562	(1.8)	10*	(0.6)
France	521	(2.3)	501	(2.4)	20*	(0.8)
Georgia	486	(2.6)	490	(2.9)	-4*	(0.8)
Germany	546	(3.3)	530	(3.2)	16*	(0.6)
Hong Kong, SAR	568	(2.7)	568	(2.9)	-1	(1.2)
Hungary	552	(3.3)	557	(3.0)	-5*	(1.2)
Iran, Islamic Republic of	429	(4.0)	425	(4.1)	5*	(1.1)
Ireland	566	(2.6)	569	(2.9)	-3*	(1.5)
Israel	530	(2.4)	530	(2.7)	0	(1.0)
Italy	547	(2.1)	550	(2.1)	-3*	(0.5)
Kazakhstan	529	(2.5)	542	(2.4)	-13*	(0.9)
Kuwait	394	(4.1)	388	(4.5)	5*	(1.2)
Latvia	554	(1.9)	562	(1.7)	-8*	(1.2)
Lithuania	549	(2.6)	548	(2.6)	2	(0.9)
Macao SAR	549	(1.1)	543	(1.6)	6*	(1.7)
Malta	452	(1.7)	451	(1.9)	1	(1.4)
Morocco	364	(3.9)	336	(4.5)	28*	(1.1)
Netherlands	546	(2.0)	544	(1.7)	2*	(1.0)
New Zealand	521	(2.3)	525	(2.4)	-3*	(1.0)
Northern Ireland	562	(2.1)	567	(2.2)	-6*	(1.0)
Norway (5)	561	(2.4)	558	(2.4)	3*	(1.3)
Oman	419	(3.2)	415	(3.6)	5*	(0.8)
Poland	560	(2.1)	570	(2.4)	-10*	(0.9)
Portugal	528	(2.2)	526	(2.4)	1	(0.7)
Qatar	442	(1.8)	441	(1.9)	1*	(0.5)
Russian Federation	581	(2.3)	582	(2.2)	-1	(1.1)
Saudi Arabia	425	(4.1)	439	(4.1)	-13*	(1.3)
Singapore	573	(3.1)	579	(3.2)	-6*	(0.7)
Slovak Republic	538	(3.1)	531	(3.2)	6*	(1.0)
Slovenia	547	(2.3)	539	(2.5)	7*	(1.4)
South Africa	321	(4.5)	308	(5.3)	13*	(1.5)
Spain	526	(1.7)	529	(1.7)	-3*	(0.4)
Sweden	560	(2.7)	553	(2.5)	7*	(0.9)
Trinidad And Tobago	483	(3.6)	472	(3.6)	11*	(1.5)
United Arab Emirates	448	(3.2)	453	(3.3)	-5*	(0.4)
United States	543	(3.0)	555	(3.1)	-12*	(0.8)
International average	**511**	**(0.4)**	**510**	**(0.4)**	**2***	**(0.2)**

Note: The participating grade is identified in parentheses after the country name when it is not Grade 4.
* Statistically significant difference

TABLE B.2.10 Achievement scores in comprehension processes (ePIRLS)

Country or province	Comprehension process: Retrieving and straightforward inferencing — Average score	Comprehension process: Retrieving and straightforward inferencing — Standard error	Comprehension process: Interpreting, integrating, and evaluating — Average score	Comprehension process: Interpreting, integrating, and evaluating — Standard error	Difference between comprehension processes — Score difference	Difference between comprehension processes — Standard error
British Columbia	552	(3.5)	558	(3.3)	-6*	(2.1)
Ontario	541	(3.2)	547	(3.3)	-6*	(1.1)
Newfoundland and Labrador	536	(4.5)	536	(4.0)	-1	(3.5)
Canada	**541**	**(3.0)**	**545**	**(3.2)**	**-4***	**(0.6)**
Chinese Taipei	548	(2.1)	544	(1.9)	4*	(0.9)
Denmark	560	(2.2)	556	(2.6)	4*	(1.8)
Georgia	485	(3.3)	466	(3.7)	19*	(1.5)
Ireland	566	(2.4)	568	(2.5)	-3*	(0.7)
Israel	536	(2.5)	535	(2.4)	1	(1.5)
Italy	534	(2.1)	531	(2.3)	3*	(1.1)
Norway (5)	567	(2.2)	568	(2.3)	0	(1.2)
Portugal	525	(2.4)	521	(2.1)	4*	(0.8)
Singapore	594	(3.3)	585	(3.1)	10*	(0.8)
Slovenia	525	(1.8)	523	(2.0)	2*	(0.9)
Sweden	561	(2.2)	559	(2.5)	2	(1.2)
United Arab Emirates	471	(2.1)	465	(2.2)	6*	(0.5)
United States	553	(2.6)	560	(2.6)	-7*	(0.5)
International average	**540**	**(0.7)**	**538**	**(0.7)**	**3***	**(0.3)**

Note: The participating grade is identified in parentheses after the country name when it is not Grade 4.
* Statistically significant difference

TABLE B.2.11 Achievement scores in reading over time, 2001–2016 (PIRLS)

	2001		2006		2011		2016	
Canada and provinces	**Average score**	**Standard error**	**Average score**	**Standard error**	**Average score**	**Standard error**	**Average score**	**Standard error**
British Columbia	–	–	558	(2.6)	556	(3.1)	555	(2.9)
Alberta	–	–	560	(2.4)	548	(2.9)	547	(3.2)
Ontario	548	(3.3)	555	(2.9)	552	(2.6)	544	(3.2)
Quebec	537	(3.0)	533	(2.7)	538	(2.2)	547	(2.8)
New Brunswick (French)	–	–	–	–	514	(3.0)	501	(3.6)
Newfoundland and Labrador	–	–	–	–	546	(2.7)	534	(5.1)
Canada	**–**	**–**	**–**	**–**	**548**	**(1.6)**	**543**	**(1.8)**

TABLE B.2.12 Comparison of reading performance over time, 2001–2016 (PIRLS)

	Difference compared to 2016					
	2001		2006		2011	
Canada and provinces	**Score difference**	**Standard error**	**Score difference**	**Standard error**	**Score difference**	**Standard error**
British Columbia	–		-3	(3.9)	-1	(4.2)
Alberta	–		-13*	(4.0)	-1	(4.3)
Ontario	-4	(4.6)	-12*	(4.3)	-8*	(4.1)
Quebec	10*	(4.1)	15*	(3.9)	10*	(3.6)
New Brunswick (French)	–		–		-13*	(4.7)
Newfoundland and Labrador	–		–		-12*	(5.8)
Canada					**-5***	**(2.4)**

Note: A negative difference means that the reading performance in PIRLS 2016 is lower.
* Statistically significant difference

TABLE B.3.1 Relationship between being born in the country and student achievement in reading (PIRLS)

Canada, provinces, and international average	Born in the country				Not born in the country				Difference between average scores	
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	87.8	(1.1)	559	(3.1)	12.2	(1.1)	575	(6.2)	-17*	(5.9)
Alberta	87.9	(1.3)	554	(3.7)	12.1	(1.3)	554	(5.9)	0	(5.8)
Ontario	89.5	(1.0)	550	(3.3)	10.5	(1.0)	557	(6.9)	-7	(6.9)
Quebec	90.1	(1.4)	550	(2.8)	9.9	(1.4)	556	(5.3)	-6	(5.4)
New Brunswick	95.4	(0.6)	528	(2.7)	4.6	(0.6)	544	(9.0)	-16	(8.6)
New Brunswick (English)	94.3	(0.8)	539	(3.5)	5.7	(0.8)	544	(10.2)	-5	(9.4)
New Brunswick (French)	97.6	(0.7)	505	(4.0)	2.4 ‡	(0.7)	548 ‡	(16.8)	-42*	(17.1)
Newfoundland and Labrador	97.1	(0.6)	540	(4.8)	2.9	(0.6)	570	(12.3)	-30*	(13.2)
Canada	**89.1**	**(0.7)**	**548**	**(1.9)**	**10.9**	**(0.7)**	**558**	**(3.5)**	**-10***	**(3.7)**
International average	**92.1**	**(0.1)**	**511**	**(0.4)**	**7.9**	**(0.1)**	**509**	**(1.2)**	**2**	**(1.2)**

‡ There are fewer than 30 observations.
* Statistically significant difference

TABLE B.3.2 Relationship between being born in the country and student achievement in reading (ePIRLS)

Canada, provinces, and international average	Born in the country				Not born in the country				Difference between average scores	
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	87.6	(1.2)	559	(3.4)	12.4	(1.2)	577	(6.5)	-18*	(6.2)
Ontario	89.2	(1.0)	550	(3.2)	10.8	(1.0)	562	(7.3)	-12	(7.0)
Newfoundland and Labrador	97.0	(0.7)	542	(3.8)	3.0	(0.7)	573	(10.6)	-32*	(10.8)
Canada	**90.0**	**(0.9)**	**547**	**(3.2)**	**10.0**	**(0.9)**	**551**	**(7.5)**	**-4**	**(7.8)**
International average	**90.8**	**(0.2)**	**538**	**(0.7)**	**9.2**	**(0.2)**	**534**	**(2.2)**	**4**	**(2.2)**

* Statistically significant difference

TABLE B.3.3 Relationship between speaking the language of the test at home and reading achievement (PIRLS)

	Always or almost always				Sometimes or never				Difference between average scores	
Canada, provinces, and international average	**%**	**Standard error**	**Average score**	**Standard error**	**%**	**Standard error**	**Average score**	**Standard error**	**Score difference**	**Standard error**
British Columbia	80.2	(1.8)	555	(2.9)	19.8	(1.8)	554	(4.9)	2	(4.5)
Alberta	81.5	(1.8)	550	(3.3)	18.5	(1.8)	535	(5.4)	16*	(4.9)
Ontario	76.2	(1.4)	546	(3.4)	23.8	(1.4)	537	(4.3)	10*	(4.0)
Quebec	74.7	(2.1)	551	(3.2)	25.3	(2.1)	538	(4.3)	13*	(4.5)
New Brunswick	80.9	(1.2)	528	(3.1)	19.1	(1.2)	512	(4.4)	15*	(4.9)
New Brunswick (English)	88.0	(1.2)	535	(3.9)	12.0	(1.2)	540	(5.1)	-5	(4.7)
New Brunswick (French)	66.0	(2.6)	506	(3.7)	34.0	(2.6)	492	(5.9)	14*	(6.0)
Newfoundland and Labrador	92.2	(2.3)	539	(3.7)	7.8	(2.3)	479	(28.5)	60*	(27.7)
Canada	**77.6**	**(0.9)**	**546**	**(1.9)**	**22.4**	**(0.9)**	**536**	**(2.6)**	**10***	**(2.6)**
International average	**77.7**	**(0.2)**	**514**	**(0.4)**	**22.3**	**(0.2)**	**496**	**(0.8)**	**18***	**(0.8)**

* Statistically significant difference

TABLE B.3.4 Relationship between speaking the language of the test at home and reading achievement (ePIRLS)

	Always or almost always				Sometimes or never				Difference between average scores	
Canada, provinces, and international average	**%**	**Standard error**	**Average score**	**Standard error**	**%**	**Standard error**	**Average score**	**Standard error**	**Score difference**	**Standard error**
British Columbia	80.1	(1.8)	555	(3.2)	19.9	(1.8)	560	(5.0)	-5	(5.0)
Ontario	76.0	(1.4)	546	(3.4)	24.0	(1.4)	539	(4.0)	6	(4.0)
Newfoundland and Labrador	92.3	(2.2)	542	(3.5)	7.7	(2.2)	491	(19.1)	51*	(19.5)
Canada	**75.0**	**(1.4)**	**544**	**(3.5)**	**25.0**	**(1.4)**	**538**	**(4.3)**	**7**	**(4.4)**
International average	**78.9**	**(0.3)**	**542**	**(0.7)**	**21.1**	**(0.3)**	**528**	**(1.3)**	**14***	**(1.3)**

* Statistically significant difference

TABLE B.3.5 Relationship between home educational resources and Grade 4 student achievement in reading (PIRLS)

	Many resources				Some or few resources				Difference between average scores	
Canada, provinces, and international average	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	40.9	(2.2)	588	(3.4)	59.1	(2.2)	542	(2.9)	46*	(3.4)
Alberta	37.3	(2.4)	584	(3.7)	62.7	(2.4)	537	(3.8)	47*	(4.5)
Ontario	36.2	(2.0)	580	(3.6)	63.8	(2.0)	534	(3.3)	46*	(3.9)
Quebec	31.3	(1.9)	577	(3.4)	68.7	(1.9)	540	(2.6)	37*	(3.5)
New Brunswick	36.8	(1.9)	556	(3.5)	63.2	(1.9)	513	(2.6)	43*	(3.8)
New Brunswick (English)	38.2	(2.7)	568	(3.8)	61.8	(2.7)	522	(3.7)	46*	(4.7)
New Brunswick (French)	33.8	(2.6)	529	(5.3)	66.2	(2.6)	496	(3.5)	33*	(4.7)
Newfoundland and Labrador	35.6	(2.5)	562	(9.0)	64.4	(2.5)	530	(3.3)	32*	(8.1)
Canada	**34.7**	**(1.0)**	**579**	**(1.9)**	**65.3**	**(1.0)**	**535**	**(1.9)**	**44***	**(2.0)**
International average	**19.9**	**(0.2)**	**572**	**(0.6)**	**80.1**	**(0.2)**	**504**	**(0.4)**	**54***	**(0.7)**

* Statistically significant difference

TABLE B.3.6 Relationship between home educational resources and Grade 4 student achievement in reading (ePIRLS)

	Many resources				Some or few resources				Difference between average scores	
Canada, provinces, and international average	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	40.6	(2.2)	586	(3.3)	59.4	(2.2)	544	(3.7)	42*	(4.1)
Ontario	35.9	(2.1)	578	(3.4)	64.1	(2.1)	537	(3.4)	41*	(3.8)
Newfoundland and Labrador	35.7	(2.8)	560	(6.1)	64.3	(2.8)	533	(3.0)	27*	(5.6)
Canada	**34.1**	**(1.5)**	**578**	**(3.6)**	**65.9**	**(1.5)**	**533**	**(2.7)**	**45***	**(3.2)**
International average	**26.3**	**(0.3)**	**577**	**(0.9)**	**73.7**	**(0.3)**	**529**	**(0.7)**	**48***	**(1.0)**

* Statistically significant difference

TABLE B.3.7 Relationship between parental reading enjoyment and reading achievement by language of the school system (PIRLS)

Canada and provinces	Like reading very much				Somewhat like reading				Do not like reading			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
Anglophone school system												
British Columbia	45.6	(1.8)	575*	(3.7)	42.6	(1.6)	550	(3.7)	11.7	(0.9)	545	(6.8)
Alberta	45.1	(1.5)	570*	(4.1)	41.0	(1.3)	545*	(4.9)	13.9	(1.1)	531	(5.9)
Ontario	42.9	(1.3)	569*	(3.9)	44.1	(1.0)	543	(3.9)	13.0	(0.9)	537	(5.1)
Quebec	44.3	(2.1)	558*	(5.0)	38.6	(1.8)	543*	(5.5)	17.1	(1.6)	521	(8.7)
New Brunswick	46.2	(1.9)	555*	(4.0)	36.5	(1.6)	527	(4.3)	17.3	(1.0)	524	(6.7)
Newfoundland and Labrador	43.7	(2.1)	557*	(5.3)	42.8	(1.6)	528	(5.8)	13.6	(0.9)	528	(5.8)
Canada	**43.2**	**(0.9)**	**568***	**(2.5)**	**43.0**	**(0.8)**	**540**	**(3.3)**	**13.9**	**(0.6)**	**532**	**(4.1)**
Francophone school system												
British Columbia	41.8	(3.0)	536*	(5.4)	51.6	(3.0)	514	(5.3)	6.6 ‡	(1.5)	510 ‡	(12.7)
Alberta	33.3	(1.7)	543*	(7.6)	57.5	(1.9)	504*	(7.5)	9.2	(1.2)	479	(13.8)
Ontario	29.6	(1.9)	521*	(6.7)	53.7	(1.8)	498*	(4.1)	16.7	(1.4)	480	(6.9)
Quebec	30.1	(1.4)	565*	(3.7)	52.6	(1.3)	548*	(3.7)	17.4	(1.1)	537	(4.0)
New Brunswick	24.1	(2.3)	523*	(6.6)	54.0	(2.3)	505	(4.3)	21.9	(1.5)	492	(6.3)
Newfoundland and Labrador	–	–	–	–	–	–	–	–	–	–	–	–
Canada	**30.1**	**(1.3)**	**560***	**(3.3)**	**52.7**	**(1.1)**	**541***	**(3.3)**	**17.2**	**(1.0)**	**531**	**(3.5)**

Note: Newfoundland and Labrador did not oversample students by language. Results are included for comparisons to be made with the Canadian English average score.
* Significant difference compared to the average score in the "Do not like reading" category
‡ There are fewer than 30 observations.

TABLE B.3.7.1 Intra-provincial comparison of reading achievement between anglophone and francophone schools

	Like reading very much	Somewhat like reading	Do not like reading
British Columbia	**	**	**
Alberta	**	**	**
Ontario	**	**	**
Quebec			
New Brunswick	**	**	**
Newfoundland and Labrador	-	-	-
Canada	**		

** Significant difference within the province

TABLE B.3.8 Relationship between confidence in reading and student achievement in reading by gender (PIRLS)

Canada, provinces, and international average	Very confident				Somewhat confident				Not confident			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
Girls												
British Columbia	59.2	(1.7)	589*	(3.4)	29.1	(1.5)	541	(4.3)	11.8	(1.2)	500*	(6.7)
Alberta	57.0	(1.9)	580*	(3.8)	29.0	(1.6)	537	(4.6)	14.0	(1.2)	484*	(7.2)
Ontario	54.4	(1.6)	580*	(3.5)	30.4	(1.1)	535	(4.8)	15.3	(1.2)	486*	(7.9)
Quebec	46.3	(1.9)	580*	(3.4)	35.4	(1.8)	544	(4.5)	18.3	(1.4)	501*	(5.6)
New Brunswick	55.3	(1.4)	565*	(2.5)	31.3	(1.1)	513	(3.4)	13.3	(1.1)	465*	(5.8)
New Brunswick (English)	58.9	(1.5)	573*	(2.9)	29.5	(1.2)	523	(4.6)	11.6	(1.0)	473*	(8.8)
New Brunswick (French)	47.8	(2.7)	544*	(4.3)	35.3	(2.4)	495	(5.8)	17.0	(2.1)	454*	(6.8)
Newfoundland and Labrador	63.4	(2.5)	562*	(6.3)	21.9	(1.5)	521	(6.5)	14.7	(1.5)	448*	(9.8)
Canada	**53.5**	**(0.9)**	**578***	**(2.0)**	**31.0**	**(0.7)**	**534**	**(2.6)**	**15.4**	**(0.7)**	**486***	**(4.7)**
International average	**48.1**	**(0.2)**	**551***	**(0.5)**	**33.9**	**0.2**	**510**	**(0.6)**	**18.0**	**(0.1)**	**464***	**(0.8)**
Boys												
British Columbia	54.9	(1.7)	578*	(3.3)	31.1	(1.7)	527	(4.9)	14.0	(1.1)	478*	(7.7)
Alberta	54.6	(1.8)	566*	(4.4)	32.5	(1.7)	522	(5.6)	12.9	(1.3)	492*	(8.2)
Ontario	49.3	(1.6)	571*	(3.7)	31.8	(1.8)	523	(5.4)	18.9	(2.2)	483*	(6.9)
Quebec	43.3	(1.5)	569*	(3.7)	36.0	(1.4)	538	(3.7)	20.7	(1.2)	496*	(4.9)
New Brunswick	47.1	(1.2)	551*	(3.5)	34.3	(1.3)	497	(4.3)	18.5	(1.2)	456*	(5.6)
New Brunswick (English)	51.8	(1.5)	558*	(4.5)	33.1	(1.5)	505	(5.6)	15.1	(1.4)	462*	(9.3)
New Brunswick (French)	37.6	(2.4)	531*	(6.4)	36.9	(2.7)	483	(6.2)	25.5	(2.3)	449*	(6.4)
Newfoundland and Labrador	57.9	(1.9)	564*	(4.6)	28.6	(1.8)	503	(6.8)	13.5	(1.3)	462*	(9.3)
Canada	**49.2**	**(0.8)**	**569***	**(2.1)**	**32.6**	**(0.9)**	**526**	**(2.9)**	**18.2**	**(1.0)**	**479***	**(3.8)**
International average	**41.3**	**(0.2)**	**539***	**(0.6)**	**35.3**	**0.2**	**496**	**(0.6)**	**23.4**	**(0.2)**	**448***	**(0.8)**

* Significant difference compared to the average score in the "Somewhat confident" category

TABLE B.3.8.1 Intra-provincial comparison of reading achievement between girls and boys

	Very confident	Somewhat confident	Not confident
British Columbia	**	**	**
Alberta	**	**	
Ontario	**	**	
Quebec	**		
New Brunswick	**	**	
New Brunswick (English)	**	**	
New Brunswick (French)	**		
Newfoundland and Labrador		**	
Canada	**	**	

** Significant difference within the province

TABLE B.3.9 Relationship between attendance of pre-primary education and student achievement in reading (PIRLS)

Canada, provinces, and international average	Did not attend				1 year or less				2 years				3 years or more			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	9.2	(0.8)	543	(7.7)	18.9	(1.1)	549	(6.4)	33.5	(1.2)	558	(3.8)	38.4	(1.5)	572*	(3.5)
Alberta	12.3	(1.1)	541	(6.5)	23.8	(1.3)	548	(4.7)	30.9	(1.2)	558*	(5.3)	33.1	(1.7)	560*	(4.6)
Ontario	19.8	(1.3)	535	(3.7)	13.5	(0.8)	543	(5.6)	27.8	(1.0)	553*	(4.3)	38.9	(1.6)	560*	(4.3)
Quebec	17.2	(1.1)	534	(3.7)	10.7	(0.7)	551*	(7.0)	13.9	(0.9)	545	(5.4)	58.1	(1.3)	557*	(2.9)
New Brunswick	14.9	(0.8)	527	(6.2)	24.7	(1.0)	522	(3.1)	21.5	(0.9)	528	(4.7)	38.9	(1.2)	534	(3.7)
New Brunswick (English)	15.0	(0.9)	536	(8.2)	25.7	(1.2)	531	(3.8)	22.7	(1.0)	537	(5.7)	36.6	(1.7)	549	(4.2)
New Brunswick (French)	14.6	(1.6)	508	(9.7)	22.5	(1.6)	500	(6.3)	19.0	(1.8)	507	(6.4)	43.8	(2.2)	508	(5.2)
Newfoundland and Labrador	17.9	(1.2)	535	(9.1)	27.6	(1.3)	534	(5.7)	20.0	(1.4)	542	(5.7)	34.5	(1.6)	549	(5.3)
Canada	**16.3**	**(0.6)**	**534**	**(2.6)**	**15.5**	**(0.5)**	**542***	**(2.9)**	**25.5**	**(0.7)**	**550***	**(2.6)**	**42.7**	**(0.8)**	**558***	**(2.0)**
International average	**10.9**	**(0.1)**	**472**	**(1.5)**	**12.4**	**(0.1)**	**498***	**(0.9)**	**18.2**	**(0.1)**	**507***	**(0.8)**	**58.6**	**(0.2)**	**520***	**(0.5)**

* Significant difference compared to the average score in the "Did not attend" category

TABLE B.3.10 Relationship between age when starting Grade 1 and student achievement in reading (PIRLS)

Canada, provinces, and international average	5 years old or younger				6 years old				7 years old or older			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	39.6	(1.2)	550*	(4.3)	58.3	(1.2)	568	(3.4)	2.1	(0.4)	557	(10.2)
Alberta	38.2	(1.2)	547*	(4.1)	59.3	(1.3)	560	(4.1)	2.5	(0.4)	541	(13.2)
Ontario	40.0	(1.4)	539*	(4.1)	57.3	(1.3)	559	(3.5)	2.7	(0.5)	550	(13.7)
Quebec	28.6	(1.3)	544*	(3.6)	67.7	(1.3)	554	(3.1)	3.7	(0.5)	542	(10.4)
New Brunswick	48.0	(1.2)	523*	(3.4)	51.0	(1.2)	534	(3.1)	1.0 ‡	(0.2)	523 ‡	(15.8)
New Brunswick (English)	50.1	(1.4)	531*	(4.4)	49.0	(1.4)	548	(3.9)	0.9 ‡	(0.2)	534 ‡	(18.9)
New Brunswick (French)	43.8	(1.8)	503	(4.4)	54.9	(1.9)	509	(4.8)	1.3 ‡	(0.4)	508 ‡	(27.6)
Newfoundland and Labrador	39.8	(1.4)	535*	(5.4)	58.8	(1.4)	545	(4.7)	1.5 ‡	(0.4)	530 ‡	(19.5)
Canada	**36.8**	**(0.7)**	**540***	**(3.0)**	**60.5**	**(0.7)**	**555**	**(2.0)**	**2.7**	**(0.3)**	**547**	**(6.4)**
International average	**19.5**	**(0.1)**	**509***	**(1.5)**	**54.1**	**(0.1)**	**514**	**(0.6)**	**26.5**	**(0.1)**	**500***	**(1.4)**

* Significant difference compared to the average score in the "6-years-old" category
‡ There are fewer than 30 observations.

TABLE B.3.11 Relationship between frequency of homework and student achievement in reading (PIRLS)

Canada, provinces, and international average	No homework				Less than once a week				1 or 2 times a week				3 or 4 times a week or more			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	12.4	(2.0)	551	(8.3)	16.1	(1.3)	557	(6.1)	28.1	(1.6)	563	(4.1)	43.5	(2.7)	564	(3.6)
Alberta	13.0	(1.4)	556	(7.6)	22.7	(1.7)	561	(5.3)	27.6	(1.8)	550	(5.8)	36.7	(2.7)	553	(4.9)
Ontario	7.8	(0.9)	552	(7.1)	16.8	(1.4)	556	(5.2)	32.5	(1.7)	550	(5.2)	42.8	(2.3)	549	(3.8)
Quebec	1.5	(0.3)	548	(16.3)	1.9	(0.3)	580*	(15.4)	20.3	(1.4)	559*	(3.4)	76.4	(1.6)	548	(3.1)
New Brunswick	4.8	(0.8)	534	(10.9)	5.2	(0.7)	530	(9.5)	22.5	(1.1)	534	(4.3)	67.6	(1.7)	527	(2.9)
New Brunswick (English)	5.7	(1.1)	534	(12.3)	5.9	(1.0)	532	(11.4)	22.6	(1.6)	544	(5.2)	65.8	(2.4)	540	(3.7)
New Brunswick (French)	2.9 ‡	(0.8)	532 ‡	(27.8)	3.7 ‡	(0.7)	524 ‡	(14.8)	22.3	(1.8)	514	(5.4)	71.2	(2.5)	502	(4.1)
Newfoundland and Labrador	4.3	(1.1)	561*	(10.4)	9.8	(1.9)	540	(7.2)	27.0	(1.9)	545	(7.7)	58.9	(2.8)	537	(5.2)
Canada	**8.4**	**(0.7)**	**542**	**(6.2)**	**13.9**	**(0.7)**	**554**	**(3.6)**	**27.6**	**(0.9)**	**552**	**(2.8)**	**50.0**	**(1.1)**	**549**	**(1.9)**
International average	**2.5**	**(0.1)**	**487***	**(3.9)**	**3.9**	**(0.1)**	**481***	**(2.1)**	**12.7**	**(0.1)**	**499***	**(1.4)**	**81.0**	**(0.2)**	**516**	**(0.4)**

* Significant difference compared to the average score in the "3 or 4 times a week or more" category
‡ There are fewer than 30 observations.

TABLE B.3.12 Percentage of Grade 4 teachers by gender (PIRLS)

Canada, provinces, and international average	Females		Males	
	%	Standard error	%	Standard error
British Columbia	82.0	(3.2)	18.0	(3.2)
Alberta	74.2	(4.6)	25.8	(4.6)
Ontario	66.5	(4.1)	33.5	(4.1)
Quebec	93.0*	(2.4)	U	(2.4)
New Brunswick	88.2*	(2.5)	11.8	(2.5)
New Brunswick (English)	86.1*	(3.7)	13.9	(3.7)
New Brunswick (French)	92.4*	(3.4)	U	(3.4)
Newfoundland and Labrador	83.9	(3.9)	16.1	(3.9)
Canada	**75.5**	**(2.2)**	**24.5**	**(2.2)**
International average	**83.7***	**(0.3)**	**16.3**	**(0.3)**

* Significant difference compared to Canada
U Too unreliable to be published

TABLE B.3.13 Percentage of Grade 4 teachers by age group (PIRLS)

Canada, provinces, and international average	Under 30		30–39		40–49		50 or above	
	%	Standard error	%	Standard error	%	Standard error	%	Standard error
British Columbia	7.7*	(2.5)	24.1	(3.9)	34.8	(4.1)	33.4*	(4.4)
Alberta	25.1	(3.8)	33.5	(4.6)	15.5*	(2.8)	25.9	(4.5)
Ontario	20.8	(3.1)	26.0	(3.7)	30.6	(4.1)	22.5	(3.5)
Quebec	12.7	(3.5)	31.6	(5.0)	31.8	(3.9)	23.8	(4.2)
New Brunswick	11.8	(2.9)	35.8	(3.8)	34.0	(4.2)	18.4	(3.0)
New Brunswick (English)	11.2	(3.5)	29.8	(4.9)	36.6	(5.9)	22.4	(4.7)
New Brunswick (French)	U	(5.3)	48.3*	(4.5)	28.5	(6.3)	10.1*	(2.3)
Newfoundland and Labrador	U	(3.4)	35.1	(4.6)	29.5	(5.8)	27.0	(5.4)
Canada	**17.3**	**(1.8)**	**29.3**	**(2.5)**	**29.6**	**(2.2)**	**23.8**	**(1.7)**
International average	**13.1***	**(0.3)**	**27.6**	**(0.4)**	**31.6**	**(0.5)**	**27.8***	**(0.4)**

* Significant difference compared to Canada
U Too unreliable to be published

TABLE B.3.14 Mean years of teaching experience of Grade 4 teachers (PIRLS)

	Years of experience	Standard error
British Columbia	15.2	(0.8)
Alberta	12.5	(1.1)
Ontario	13.6	(0.6)
Quebec	15.9*	(1.0)
New Brunswick	14.2	(0.7)
New Brunswick (English)	14.8	(0.9)
New Brunswick (French)	12.9	(0.9)
Newfoundland and Labrador	16.9*	(0.8)
Canada	**14.1**	**(0.4)**
International average	**17.5***	**(0.1)**

* Significant difference compared to Canada

TABLE B.3.15 Relationship between teachers' highest level of formal education and Grade 4 student achievement in reading (PIRLS)

	Bachelor's degree				Master's or doctorate degree				Difference between average scores	
Canada, provinces, and international average	**%**	**Standard error**	**Average score**	**Standard error**	**%**	**Standard error**	**Average score**	**Standard error**	**Score difference**	**Standard error**
British Columbia	72.6	(3.9)	557	(3.6)	27.4	(3.9)	552	(5.3)	-4	(6.3)
Alberta	92.4	(2.4)	546	(3.5)	7.6	(2.4)	549	(7.5)	3	(8.2)
Ontario	84.8	(3.1)	544	(3.6)	15.2	(3.1)	548	(5.8)	3	(6.4)
Quebec	86.8	(3.4)	547	(3.5)	13.2	(3.4)	546	(7.3)	-1	(8.9)
New Brunswick	82.9	(2.6)	523	(3.3)	17.1	(2.6)	531	(6.2)	8	(7.4)
New Brunswick (English)	78.8	(3.6)	535	(4.5)	21.2	(3.6)	537	(6.7)	2	(8.1)
New Brunswick (French)	91.5	(2.8)	501	(3.9)	8.5	(2.8)	500	(11.8)	-1	(12.6)
Newfoundland and Labrador	45.2	(5.2)	536	(8.2)	54.5	(5.2)	532	(7.1)	-5	(10.9)
Canada	**83.9**	**(1.8)**	**543**	**(2.2)**	**16.0**	**(1.8)**	**548**	**(2.8)**	**5**	**(3.2)**
International average	**60.0**	**(0.4)**	**508**	**(0.8)**	**26.0**	**(0.3)**	**515**	**(2.0)**	**8***	**(2.3)**

* Statistically significant difference

TABLE B.3.16 Relationship between teacher professional development and student achievement in reading (PIRLS)

Canada, provinces, and international average	No time				Less than 6 hours				6–15 hours				16–35 hours				More than 35 hours			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	U	(2.1)	568	(8.1)	25.0	(3.9)	554	(6.3)	25.1	(3.5)	559	(6.1)	21.6	(3.7)	548	(6.8)	22.3	(4.0)	557	(5.9)
Alberta	U	(3.1)	557	(8.3)	18.5	(3.8)	536*	(6.8)	32.2	(4.5)	548	(6.1)	25.5	(4.7)	553	(6.1)	15.2	(3.5)	543	(7.0)
Ontario	8.6	(2.6)	562	(7.8)	32.6	(4.4)	544	(5.5)	27.1	(3.7)	548	(6.1)	14.6	(3.3)	548	(7.2)	17.1	(3.4)	528*	(6.9)
Quebec	9.2	(2.0)	544	(7.4)	35.7	(4.8)	555	(4.0)	39.0	(4.6)	540	(5.7)	13.4	(3.4)	547	(6.2)	U	(1.5)	551	(9.5)
New Brunswick	U	(1.5)	497	(9.4)	22.6	(3.2)	517	(6.5)	40.2	(3.7)	526*	(4.5)	21.5	(3.3)	531*	(6.6)	11.8	(2.5)	528*	(7.0)
New Brunswick (English)	U	(0.7)	511	(20.5)	21.0	(3.4)	529	(8.3)	42.5	(4.3)	534	(5.5)	22.3	(4.0)	544	(7.5)	12.4	(3.4)	537	(6.7)
New Brunswick (French)	U	(4.3)	491	(11.7)	26.0	(8.1)	497	(9.1)	35.3	(7.7)	506	(7.3)	19.8	(5.2)	500	(10.4)	U	(4.3)	506	(7.9)
Newfoundland and Labrador	U	(0.9)	529	(8.5)	15.5	(2.5)	536	(7.0)	38.0	(6.8)	520	(9.7)	30.8	(6.1)	547	(8.0)	14.3	(3.4)	539	(5.4)
Canada	**7.8**	**(1.3)**	**556**	**(4.5)**	**28.5**	**(2.2)**	**546**	**(3.1)**	**29.8**	**(2.1)**	**545***	**(3.1)**	**19.8**	**(1.9)**	**541***	**(5.1)**	**14.1**	**(1.6)**	**530***	**(4.1)**
International average	**15.7**	**(0.4)**	**514**	**(1.5)**	**22.0**	**(0.4)**	**513**	**(1.1)**	**26.6**	**(0.5)**	**512**	**(1.0)**	**17.2**	**(0.4)**	**509***	**(1.6)**	**18.6**	**(0.4)**	**510**	**(1.4)**

* Significant difference compared to the average score in the "No time" category
U Too unreliable to be published

TABLE B.3.17 Relationship between teacher job satisfaction and student achievement in reading (PIRLS)

Canada, provinces, and international average	Very satisfied				Somewhat satisfied				Less than satisfied			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	55.5	(4.8)	558	(4.1)	38.5	(4.4)	552	(4.5)	U	(2.4)	556	(9.9)
Alberta	62.9	(5.1)	545	(4.4)	33.8	(4.7)	549	(4.9)	U	(1.7)	559	(13.6)
Ontario	53.8	(4.3)	546	(3.8)	41.5	(4.5)	542	(4.9)	U	(2.0)	545	(12.1)
Quebec	52.2	(4.9)	544	(4.3)	45.1	(5.1)	551	(3.4)	U	(1.2)	540	(7.4)
New Brunswick	60.2	(3.8)	526	(3.6)	37.0	(3.7)	523	(3.4)	U	(1.1)	493	(27.5)
New Brunswick (English)	59.9	(4.2)	538	(4.6)	35.9	(4.1)	535	(5.2)	U	(1.7)	493	(27.5)
New Brunswick (French)	60.8	(8.2)	503	(5.6)	39.2	(8.2)	499	(5.9)	–	–	–	–
Newfoundland and Labrador	60.2	(6.3)	536	(6.3)	30.4	(5.8)	527	(10.5)	U	(3.5)	551	(11.3)
Canada	**56.1**	**(2.4)**	**542**	**(2.4)**	**39.7**	**(2.3)**	**545**	**(2.6)**	**4.2**	**(1.0)**	**542**	**(8.4)**
International average	**57.1**	**(0.5)**	**513**	**(0.6)**	**37.2**	**(0.5)**	**508***	**(0.9)**	**5.7**	**(0.2)**	**525***	**(2.3)**

* Significant difference compared to the average score in the "Very satisfied" category
U Too unreliable to be published
– Data not available

TABLE B.3.18 Relationship between school socioeconomic composition and student achievement in reading (PIRLS)

Canada, provinces, and international average	More affluent				Neither more affluent nor more disadvantaged				More disadvantaged			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	39.2	(4.3)	569	(4.4)	42.8	(4.5)	552*	(4.7)	18.0	(4.1)	527*	(8.2)
Alberta	44.9	(5.6)	558	(5.0)	40.1	(5.6)	544	(5.3)	14.9	(3.8)	521*	(7.8)
Ontario	40.0	(5.1)	554	(5.1)	41.2	(4.6)	548	(4.6)	18.8	(3.9)	518*	(7.0)
Quebec	56.6	(4.7)	555	(2.8)	21.5	(3.5)	554	(8.3)	21.9	(4.5)	523*	(5.9)
New Brunswick	36.5	(3.8)	524	(5.0)	43.0	(4.0)	526	(5.0)	20.4	(3.2)	520	(6.6)
New Brunswick (English)	27.9	(4.8)	542	(6.7)	45.6	(5.4)	536	(5.6)	26.5	(4.7)	527	(6.9)
New Brunswick (French)	54.1	(6.7)	505	(3.2)	37.9	(6.9)	502	(8.1)	U	(2.8)	478*	(10.5)
Newfoundland and Labrador	37.6	(7.0)	545	(5.1)	51.7	(6.9)	525*	(6.2)	10.8	(2.6)	525	(10.3)
Canada	**41.7**	**(2.7)**	**556**	**(2.2)**	**37.5**	**(2.3)**	**546***	**(2.9)**	**20.7**	**(2.1)**	**513***	**(4.5)**
International average	**37.9**	**(0.5)**	**530**	**(0.9)**	**33.5**	**(0.5)**	**513***	**(0.9)**	**28.6**	**(0.4)**	**487***	**(1.1)**

* Significant difference compared to the average score in the "More affluent" category
U Too unreliable to be published

TABLE B.3.19 Relationship between providing a free breakfast and Grade 4 student achievement in reading (PIRLS)

Canada, provinces, and international average	Breakfast provided for all students				Breakfast provided for some students				Breakfast not provided			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	10.7	(2.6)	530*	(7.1)	31.2	(4.5)	541*	(5.9)	58.1	(4.5)	566	(3.6)
Alberta	U	(3.0)	519*	(13.1)	23.3	(4.3)	541	(7.1)	69.7	(4.6)	552	(3.8)
Ontario	14.9	(3.2)	526*	(8.7)	20.7	(3.5)	537*	(5.7)	64.4	(4.7)	550	(3.8)
Quebec	U	(2.0)	523*	(8.0)	U	(3.0)	536	(8.8)	87.4	(3.6)	550	(3.5)
New Brunswick	34.4	(3.8)	526	(4.2)	48.3	(4.0)	526	(5.3)	17.2	(3.3)	516	(5.4)
New Brunswick (English)	42.5	(4.9)	533	(4.1)	49.2	(4.6)	536	(7.0)	U	(2.9)	543	(7.2)
New Brunswick (French)	U	(6.0)	492	(4.7)	46.5	(7.7)	504	(8.1)	36.3	(8.1)	502	(6.6)
Newfoundland and Labrador	75.1	(6.0)	526*	(5.0)	U	(2.8)	530*	(7.6)	18.4	(5.3)	562	(10.7)
Canada	**13.4**	**(1.7)**	**510***	**(6.9)**	**19.9**	**(1.9)**	**539***	**(3.3)**	**66.7**	**(2.7)**	**552**	**(2.0)**
International average	**9.4**	**(0.2)**	**496***	**(2.0)**	**27.0**	**(0.4)**	**501***	**(1.4)**	**63.6**	**(0.4)**	**518**	**(1.0)**

* Significant difference compared to the average score in the "Breakfast not provided" category
U Too unreliable to be published

TABLE B.3.20 Relationship between providing a free lunch and Grade 4 student achievement in reading (PIRLS)

Canada, provinces, and international average	Lunch provided for all students				Lunch provided for some students				Lunch not provided			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	U	(1.3)	514*	(16.3)	50.3	(4.3)	545*	(4.0)	47.5	(4.3)	568	(3.8)
Alberta	U ‡	(1.8)	480 ‡	(6.9)	36.8	(5.5)	541	(5.9)	61.4	(5.2)	552	(3.8)
Ontario	U ‡	(1.4)	511 ‡	(6.8)	27.4	(4.6)	533*	(6.6)	71.2	(4.7)	549	(3.7)
Quebec	–	–	–	–	10.4	(2.9)	540	(7.3)	89.6	(2.9)	549	(3.5)
New Brunswick	U	(1.5)	536	(21.0)	87.0	(2.4)	523	(3.1)	10.4	(2.0)	529	(5.5)
New Brunswick (English)	U	(2.2)	544	(18.2)	83.4	(3.2)	535	(4.4)	13.2	(2.5)	535	(5.1)
New Brunswick (French)	U ‡	(1.0)	481 ‡	(3.2)	94.4	(3.1)	502	(3.8)	U	(2.9)	498	(9.1)
Newfoundland and Labrador	9.6	(2.2)	539	(6.0)	37.3	(6.5)	542	(7.3)	53.1	(6.6)	525	(7.3)
Canada	**U**	**(0.7)**	**510***	**(7.7)**	**30.1**	**(2.2)**	**534***	**(3.9)**	**68.6**	**(2.2)**	**548**	**(2.1)**
International average	**11.5**	**(0.2)**	**488***	**(3.2)**	**32.3**	**(0.3)**	**507***	**(2.0)**	**56.2**	**(0.3)**	**516**	**(1.1)**

* Significant difference compared to the average score in the "Lunch not provided" category
‡ There are fewer than 30 observations.
U Too unreliable to be published
– Data not available

TABLE B.3.21 Relationship between a school library and student achievement in reading (PIRLS)

Canada, provinces, and international average	Have a school library				No school library				Difference between average scores	
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	99.5	(0.5)	555	(2.9)	U ‡	(0.5)	609 ‡	(6.8)	-54	--
Alberta	98.4	(1.3)	547	(3.3)	U	(1.3)	544	(21.0)	2	(21.1)
Ontario	99.9	(0.1)	544	(3.3)	U ‡	(0.1)	447 ‡	(9.8)	97	--
Quebec	95.6	(2.1)	548	(3.0)	U	(2.1)	547	(14.3)	0	(14.6)
New Brunswick	97.4	(0.9)	524	(2.9)	U	(0.9)	534	(12.1)	-10	(12.6)
New Brunswick (English)	96.5	(1.2)	535	(4.0)	U	(1.2)	537	(12.5)	-2	(13.4)
New Brunswick (French)	99.4	(0.6)	502	(3.7)	U ‡	(0.6)	497 ‡	(9.1)	5	--
Newfoundland and Labrador	97.6	(1.0)	533	(4.9)	U	(1.0)	517	(20.0)	16	(20.6)
Canada	**98.6**	**(0.6)**	**543**	**(1.9)**	**U**	**(0.6)**	**547**	**(9.9)**	**-3**	**(10.1)**
International average	**86.8**	**(0.3)**	**513**	**(0.5)**	**13.2**	**(0.3)**	**501**	**(1.6)**	**8***	**(1.8)**

-- Statistical testing unavailable due to insufficient sample sizes
* Statistically significant difference
‡ There are fewer than 30 observations.
U Too unreliable to be published

TABLE B.3.22 Relationship between the number of books in a school library and student achievement in reading (PIRLS)

Canada, provinces, and international average	500 or less				501–2,000				2,001–5,000				More than 5,000			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	0.0 ‡	(0.0)	480 ‡	(11.9)	11.4	(3.1)	540*	(7.3)	23.3	(4.0)	552	(7.2)	65.3	(4.6)	557	(4.2)
Alberta	U ‡	(0.7)	518‡*	(3.1)	11.8	(3.5)	537	(7.9)	22.9	(4.0)	550	(7.9)	64.6	(4.4)	548	(4.2)
Ontario	U	(1.8)	530	(11.5)	15.0	(3.3)	539	(9.7)	32.8	(4.4)	544	(5.9)	49.5	(4.9)	545	(4.0)
Quebec	U	(1.9)	562	(24.6)	20.7	(4.8)	555	(5.5)	39.0	(5.5)	539*	(5.3)	36.8	(5.0)	552	(3.2)
New Brunswick	U	(0.3)	471*	(14.5)	17.4	(3.1)	523	(6.7)	31.7	(4.4)	536*	(4.7)	50.3	(4.9)	520	(5.1)
New Brunswick (English)	–	–	–	–	20.1	(4.1)	530	(7.6)	36.8	(5.5)	546	(4.4)	43.1	(5.8)	531	(7.8)
New Brunswick (French)	U	(0.8)	471*	(14.5)	U	(4.4)	501	(9.0)	20.9	(6.9)	496	(6.3)	65.5	(7.5)	504	(5.3)
Newfoundland and Labrador	U	(1.3)	540	(30.4)	21.8	(4.5)	532	(4.6)	34.1	(6.7)	515*	(10.9)	41.4	(6.9)	541	(5.6)
Canada	**U**	**(0.9)**	**541**	**(11.5)**	**15.4**	**(2.0)**	**542**	**(4.8)**	**30.8**	**(2.2)**	**539**	**(3.2)**	**51.7**	**(2.6)**	**547**	**(2.5)**
International average	**20.3**	**(0.5)**	**494***	**(1.7)**	**22.5**	**(0.5)**	**511***	**(1.2)**	**23.9**	**(0.5)**	**513***	**(1.3)**	**33.3**	**(0.4)**	**525**	**(1.4)**

* Significant difference compared to the average score in the "More than 5,000" category
‡ There are fewer than 30 observations.
U Too unreliable to be published
– Data not available

TABLE B.3.23 Relationship between school access to digital books and student achievement in reading (ePIRLS)

Canada, provinces, and international average	Access to digital books				No access to digital books				Difference between average scores	
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	Score difference	Standard error
British Columbia	49.2	(4.7)	557	(3.7)	50.8	(4.7)	555	(4.8)	3	(5.9)
Ontario	62.4	(4.5)	542	(4.1)	37.6	(4.5)	548	(4.8)	-5	(6.3)
Newfoundland and Labrador	71.1	(5.0)	535	(4.0)	28.9	(5.0)	543	(8.8)	-9	(9.9)
Canada	**55.6**	**(5.3)**	**542**	**(4.4)**	**44.4**	**(5.3)**	**544**	**(4.2)**	**-2**	**(5.5)**
International average	**52.2**	**(1.0)**	**539**	**(1.0)**	**47.8**	**(1.0)**	**537**	**(1.1)**	**2**	**(1.5)**

TABLE B.3.24 Relationship between school emphasis on academic success and student achievement in reading (PIRLS)

Canada, provinces, and international average	Very high emphasis				High emphasis				Medium emphasis			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	8.5	(2.7)	576	(14.9)	56.8	(4.8)	563	(3.3)	34.7	(4.6)	536*	(5.0)
Alberta	17.4	(3.7)	565*	(7.5)	64.3	(5.0)	547	(3.5)	18.3	(4.0)	529*	(6.6)
Ontario	7.7	(1.3)	562	(7.9)	62.9	(4.8)	551	(4.1)	29.4	(4.6)	524*	(5.3)
Quebec	U	(1.5)	555	(15.6)	68.4	(4.7)	554	(3.3)	29.0	(4.9)	532*	(6.1)
New Brunswick	U	(1.9)	536	(12.0)	61.7	(4.0)	529	(3.8)	32.9	(4.0)	514*	(4.6)
New Brunswick (English)	U	(2.8)	539	(11.8)	59.2	(4.7)	542	(4.6)	33.2	(4.9)	522*	(5.8)
New Brunswick (French)	U ‡	(0.8)	464 ‡	(8.1)	67.0	(7.3)	504	(3.7)	32.2	(7.3)	497	(10.1)
Newfoundland and Labrador	U	(4.3)	542	(10.0)	75.1	(5.6)	536	(5.6)	15.4	(3.8)	513	(13.3)
Canada	**7.5**	**(1.0)**	**564***	**(4.8)**	**62.8**	**(2.9)**	**551**	**(2.5)**	**29.7**	**(2.7)**	**523***	**(3.1)**
International average	**8.1**	**(0.3)**	**531***	**(1.9)**	**54.0**	**(0.5)**	**518**	**(0.6)**	**37.9**	**(0.5)**	**494***	**(0.8)**

* Significant difference compared to the average score in the "High emphasis" category
‡ There are fewer than 30 observations.
U Too unreliable to be published

TABLE B.3.25 Relationship between student factors limiting classroom instruction and student achievement in reading (PIRLS)

Canada, provinces, and international average	Teaching limited very little				Teaching limited to some extent				Teaching limited a lot			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	17.2	(3.5)	572	(6.5)	80.3	(3.5)	552*	(3.4)	U	(1.5)	554	(24.4)
Alberta	23.6	(4.6)	558	(7.0)	75.1	(4.7)	543	(3.3)	U	(0.7)	521	(30.2)
Ontario	22.7	(4.1)	554	(7.2)	74.2	(4.4)	544	(3.4)	U	(1.4)	473*	(16.3)
Quebec	19.0	(4.0)	573	(6.6)	72.7	(4.7)	541*	(2.6)	U	(2.8)	535*	(8.5)
New Brunswick	14.0	(3.5)	546	(7.4)	79.9	(3.7)	522*	(3.4)	6.1	(1.8)	499*	(6.0)
New Brunswick (English)	14.2	(4.1)	556	(8.0)	81.5	(4.2)	533*	(4.5)	4.3	(1.4)	498*	(8.2)
New Brunswick (French)	U	(6.4)	524	(12.5)	76.5	(6.9)	497*	(3.2)	U	(4.3)	500	(9.1)
Newfoundland and Labrador	28.1	(6.2)	555	(7.5)	71.9	(6.2)	526*	(5.6)	–	–	–	–
Canada	**20.0**	**(2.1)**	**561**	**(3.9)**	**75.7**	**(2.3)**	**540***	**(2.2)**	**4.2**	**(0.8)**	**515***	**(8.8)**
International average	**33.6**	**(0.5)**	**528**	**(0.9)**	**62.5**	**(0.5)**	**504***	**(0.5)**	**3.9**	**(0.2)**	**473***	**(4.1)**

* Significant difference compared to the average score in the "Very little" category
U Too unreliable to be published
– Data not available

TABLE B.3.26 Relationship between arriving at school feeling hungry and student achievement in reading (PIRLS)

Canada, provinces, and international average	Every day				Almost every day				Sometimes				Never			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	12.3	(0.9)	525*	(6.3)	13.4	(0.8)	548*	(5.3)	44.6	(1.1)	560*	(3.1)	29.7	(1.2)	569	(4.5)
Alberta	13.5	(0.9)	518*	(5.1)	13.6	(0.8)	538*	(5.3)	43.8	(1.3)	550*	(4.1)	29.0	(1.4)	564	(5.3)
Ontario	16.4	(1.6)	522*	(5.0)	13.8	(0.7)	532*	(5.8)	44.4	(1.4)	549*	(4.1)	25.5	(1.3)	559	(4.2)
Quebec	19.5	(1.2)	535*	(4.6)	17.6	(1.0)	544*	(4.4)	40.6	(1.0)	551	(3.1)	22.2	(1.4)	558	(4.4)
New Brunswick	18.5	(1.1)	502*	(4.0)	16.2	(0.7)	522*	(4.6)	40.1	(0.9)	531	(3.0)	25.2	(1.1)	538	(4.0)
New Brunswick (English)	16.5	(1.1)	507*	(6.4)	15.1	(0.8)	534*	(5.6)	40.6	(1.0)	545	(4.0)	27.9	(1.3)	547	(5.3)
New Brunswick (French)	22.6	(2.5)	493*	(5.8)	18.4	(1.3)	501	(7.4)	39.3	(1.9)	503	(3.7)	19.7	(1.5)	510	(5.2)
Newfoundland and Labrador	17.4	(1.1)	507*	(9.4)	13.1	(1.0)	525*	(9.3)	45.5	(1.1)	538*	(5.5)	24.0	(1.1)	556	(7.3)
Canada	**16.1**	**(0.7)**	**524***	**(3.0)**	**14.5**	**(0.4)**	**535***	**(3.3)**	**43.6**	**(0.7)**	**547***	**(2.2)**	**25.8**	**(0.7)**	**558**	**(2.6)**
International average	**14.5**	**(0.1)**	**487***	**(0.7)**	**12.0**	**(0.1)**	**503***	**(0.7)**	**41.0**	**(0.2)**	**515***	**(0.5)**	**32.5**	**(0.2)**	**526**	**(0.5)**

* Significant difference compared to the average score in the "Never" category

TABLE B.3.27 Relationship between arriving at school feeling tired and student achievement in reading (PIRLS)

Canada, provinces, and international average	Every day				Almost every day				Sometimes				Never			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	15.2	(0.9)	523*	(5.7)	22.4	(1.0)	558	(3.7)	54.3	(1.1)	564	(3.1)	8.2	(0.8)	551	(7.3)
Alberta	19.1	(1.1)	523*	(5.5)	22.6	(1.2)	554	(4.2)	48.4	(1.5)	557	(3.7)	10.0	(0.8)	537*	(6.4)
Ontario	19.8	(1.0)	524*	(5.2)	21.6	(0.9)	546	(4.8)	47.7	(1.1)	553	(3.6)	10.8	(0.8)	542	(7.1)
Quebec	12.2	(0.7)	531*	(4.7)	20.8	(1.1)	550	(4.1)	56.1	(1.4)	551	(3.3)	10.9	(1.0)	545	(5.9)
New Brunswick	20.9	(1.2)	510*	(5.2)	21.7	(0.7)	533	(2.8)	47.4	(1.3)	532	(3.1)	9.9	(0.5)	507*	(4.8)
New Brunswick (English)	23.6	(1.5)	515*	(6.4)	21.3	(0.8)	545	(3.8)	46.5	(1.4)	547	(4.0)	8.6	(0.7)	515*	(7.2)
New Brunswick (French)	15.4	(1.6)	492	(10.5)	22.7	(1.4)	509	(5.0)	49.4	(2.7)	503	(3.7)	12.6	(1.0)	495	(6.6)
Newfoundland and Labrador	27.2	(1.1)	517*	(5.6)	19.5	(1.2)	538	(6.4)	43.3	(1.3)	545	(6.1)	10.0	(0.7)	531	(10.8)
Canada	**17.8**	**(0.5)**	**522***	**(3.7)**	**21.8**	**(0.5)**	**547**	**(3.0)**	**50.0**	**(0.6)**	**552**	**(2.0)**	**10.5**	**(0.4)**	**538***	**(4.7)**
International average	**16.2**	**(0.1)**	**488***	**(0.7)**	**15.8**	**(0.1)**	**514***	**(0.7)**	**49.8**	**(0.2)**	**520**	**(0.5)**	**18.2**	**(0.1)**	**509***	**(0.7)**

* Significant difference compared to the average score in the "Sometimes" category

TABLE B.3.28 Relationship between school discipline problems and Grade 4 student achievement in reading (PIRLS)

Canada, provinces, and international average	Hardly any problems				Minor problems				Moderate to severe problems			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	61.8	(4.9)	562	(3.8)	36.9	(4.8)	545*	(5.0)	U	(1.0)	516*	(10.6)
Alberta	69.4	(4.8)	552	(3.4)	28.3	(4.5)	536*	(6.1)	U ‡	(1.7)	505 ‡	(24.4)
Ontario	71.2	(4.5)	552	(3.6)	25.8	(4.3)	530*	(5.4)	U	(1.4)	490*	(19.7)
Quebec	69.2	(4.7)	552	(3.3)	30.8	(4.7)	537	(6.9)	–	–	–	–
New Brunswick	58.3	(4.7)	523	(3.2)	40.4	(4.7)	526	(4.5)	U	(0.8)	544	(13.3)
New Brunswick (English)	48.7	(6.3)	540	(4.3)	49.4	(6.3)	531	(5.3)	U	(1.2)	544	(13.3)
New Brunswick (French)	78.5	(5.5)	501	(3.7)	21.5	(5.5)	505	(12.4)	–	–	–	–
Newfoundland and Labrador	70.4	(6.5)	534	(5.9)	28.7	(6.6)	528	(8.6)	U ‡	(0.9)	559 ‡	(8.3)
Canada	**67.6**	**(2.7)**	**550**	**(2.1)**	**30.6**	**(2.7)**	**532***	**(4.4)**	**U**	**(0.7)**	**496***	**(14.1)**
International average	**61.9**	**(0.5)**	**518**	**(0.7)**	**30.2**	**(0.5)**	**503***	**(0.9)**	**7.9**	**(0.3)**	**455***	**(2.4)**

* Significant difference compared to the average score in the "Hardly any problems" category
‡ There are fewer than 30 observations.
U Too unreliable to be published
– Data not available

TABLE B.3.29 Relationship between being bullied and student achievement in reading (PIRLS)

Canada, provinces, and international average	Almost never				About monthly				About weekly			
	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error	%	Standard error	Average score	Standard error
British Columbia	54.6	(1.4)	564	(3.3)	30.5	(1.1)	551*	(4.2)	14.9	(1.1)	537*	(4.9)
Alberta	50.7	(1.5)	558	(3.9)	32.4	(1.2)	543*	(3.3)	16.9	(1.0)	524*	(4.8)
Ontario	46.5	(1.3)	557	(3.6)	35.0	(1.6)	541*	(3.7)	18.4	(1.3)	521*	(4.6)
Quebec	54.5	(1.5)	553	(3.2)	32.9	(1.2)	546	(3.5)	12.6	(0.9)	531*	(4.4)
New Brunswick	50.7	(1.6)	534	(3.4)	32.0	(1.1)	521*	(3.3)	17.3	(0.8)	506*	(3.8)
New Brunswick (English)	54.0	(1.8)	543	(4.4)	29.8	(1.3)	532*	(4.4)	16.3	(0.9)	521*	(4.9)
New Brunswick (French)	43.9	(2.9)	511	(5.5)	36.6	(1.9)	501	(3.2)	19.5	(2.0)	481*	(7.2)
Newfoundland and Labrador	52.1	(1.5)	544	(6.3)	31.3	(1.2)	532*	(6.8)	16.5	(1.1)	509*	(5.0)
Canada	**50.2**	**(0.8)**	**554**	**(1.9)**	**33.3**	**(0.7)**	**539***	**(2.1)**	**16.4**	**(0.7)**	**521***	**(3.3)**
International average	**56.6**	**(0.2)**	**521**	**(0.4)**	**29.0**	**(0.1)**	**507***	**(0.5)**	**14.5**	**(0.1)**	**482***	**(0.8)**

* Significant difference compared to the average score in the "Almost never" category