Chapter 1

Profiles of Achievement Across Reading, Mathematics, and Science at the Fourth Grade

Ina V.S. Mullis
Boston College

Overview

TIMSS routinely reports about students' achievement in mathematics and science, and PIRLS routinely reports about achievement in reading. However, the cycles of the two assessments coinciding in 2011 made it possible for countries to have the same fourth grade students participate in both TIMSS and PIRLS. Thirty-four countries and three benchmarking participants took advantage of this opportunity to collect internationally comparable reading, mathematics, and science achievement on the same fourth grade students together with a large amount of background data.

Most relevant for this chapter, having TIMSS and PIRLS achievement data on the same students enables a comparison of achievement across the three subject areas in each country, although such a comparison has its challenges. This research addresses the question:

> Are primary schools around the world providing students a solid foundation in core subjects—reading, mathematics, and science?

The chapter presents profiles of fourth grade achievement across reading, mathematics, and science for each of the 34 countries and three benchmarking participants. Because both excellence and equity are important educational goals for countries around the world, achievement is profiled at the high level and also at the basic level. For a healthy citizenry and economy, it is important to have fourth grade students well prepared in reading, mathematics, and science concepts so that they can take full advantage of their further educational opportunities, and it also is important to understand how many students have a grasp of the basics across reading, mathematics, and science, as well as how many are lagging behind and still struggling with elementary skills and concepts. Those lagging behind may be at risk for academic success in the future.

The TIMSS and PIRLS achievement results at the fourth grade, as reported separately, suggest that some countries are remarkable in the high levels of achievement their students attain in particular subjects. For example, the East Asian countries, including Singapore, Korea, Hong Kong SAR, Chinese Taipei, and Japan excel in mathematics from assessment cycle to assessment cycle, and the Russian Federation and Finland are top performers in reading (please see *TIMSS 2011 International Results in Mathematics and PIRLS 2011 International Results in Reading*). This raises the question: Are fourth grade students receiving a well-rounded education across the core subject areas, or is there less emphasis on some areas in some countries?

It is well known that performance on the TIMSS and PIRLS achievement scales cannot be compared directly in terms of the content they represent (i.e., a "tablespoon" of mathematics achievement, for example, does not equal a "tablespoon" of reading achievement). However, the TIMSS and PIRLS International Benchmarks do provide a basis for comparisons from subject to subject, because they define the same points on each subject's achievement scale in terms of what students performing at those points know and do in reading, mathematics, or science.

The TIMSS and PIRLS 2011 International Benchmarks at the Fourth Grade

The TIMSS and PIRLS achievement scales summarize students' performance on large numbers of test items designed to measure breadth of understanding and cognitive processing in mathematics, science, and reading, respectively. At each grade, the achievement results are reported on the mathematics, science, and reading achievement scales, each with a range of 0—1,000 (although student performance typically ranges between 300 and 700). In each of the three subjects in addition to average achievement, TIMSS and PIRLS report achievement at four points along the scales as international benchmarks: Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). The percentage of students reaching each of these international benchmarks provides information to a country on student achievement all across the achievement spectrum. The TIMSS & PIRLS International Study Center worked with its subject matter expert advisory committees, the PIRLS 2011 Reading Development Group and the TIMSS 2011 Science and Mathematics Item Review Committee, to conduct detailed scale anchoring analyses to describe achievement at the benchmarks in reading, mathematics, and science, respectively. In a scale anchoring analysis, the students' achievement on the items in the assessment is used to identify what knowledge and skills are associated with achievement at particular points on the achievement scale. For example, fourth grade students scoring at the High International Benchmark (550) in mathematics were likely to solve an algebra problem requiring reasoning, whereas students scoring at lower levels on the scale were much less likely to answer this problem correctly.

In every participating country, TIMSS and PIRLS can identify the students that reached each of the various international benchmarks, and so it was decided to use the data on students reaching the high and low international benchmarks to conduct the analyses presented herein. The High International Benchmark was selected for this study rather than the Advanced International Benchmark, because only small percentages of students (if any in some countries) reached the advanced level.

Exhibit 1.1 contains the descriptions of students' achievement in reading, mathematics, and science at the High International Benchmarks. The High International Benchmark represents a proficient or competent level of fourth grade achievement in each subject and provides an interesting point

of comparison from country to country. Although the 50 countries that participated in TIMSS 2011 at the fourth grade did not intersect completely with all 45 countries that participated in PIRLS 2011, the median percentages (half the countries above and half below) of students reaching the high benchmarks in TIMSS and PIRLS 2011, were 28 percent in mathematics, 32 percent in science, and 44 percent in reading (indicating countries had somewhat less difficulty reaching the High International Benchmark in reading than in mathematics or science).

Exhibit 1.1: Descriptions of High International Benchmarks of Achievement at the Fourth Grade

Reading
When reading literary texts, students can locate and distinguish significant actions and details embedded across text; make inferences to explain relationships between intentions, actions, events, and feeling, and give text-based support; interpret and integrate story events and character actions and traits from parts of texts; evaluate the significance of events and actions across an entire story; and recognize the use of some language features (e.g., metaphor, tone, imagery). When reading informational texts, students can locate and distinguish relevant information with 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; and evaluate content and textual elements to make a generalization.
Mathematics
Students can apply their knowledge and understanding to solve problems. They can solve word problems involving operations with whole numbers, and use division in a variety of problem situations. They can use their understanding of place value to solve problems, and extend patterns to find a later specified term. They demonstrate understanding of line symmetry and geometric properties. Students can interpret and use data in tables and graphs to solve problems, and use information in pictographs and tally charts to complete bar graphs.
Science
Students can apply their knowledge and understanding of the sciences to explain phenomena in everyday and abstract contexts. They demonstrate some understanding of plant and animal structure, life processes, life cycles, and reproduction. They also demonstrate some understanding of ecosystems and organisms' interactions with their environment, including understanding of human responses to outside conditions and activities. Students demonstrate understanding of some properties of matter, electricity and energy, and magnetic and gravitational forces and motion. They show some knowledge of the solar system, and of Earth's physical characteristics, processes, and resources. Students demonstrate elementary knowledge and skills related to scientific inquiry. They compare, contrast, and make simple inferences, and provide brief descriptive responses combining knowledge of science concepts with information from both everyday and abstract contexts.

Exhibit 1.2 contains the descriptions of students' achievement in reading, mathematics, and science at the Low International Benchmarks. The Low International Benchmark indicates basic proficiency or competence. It is very important for students' future school careers to have developed a solid

foundation of basic understandings and skills across the core subject areas by the early grades. Students not reaching the Low International Benchmarks in one or more core subjects may be at some risk for future success in their educational careers, and may fall farther and farther behind their peers as they continue in school. Again, somewhat different countries participated in TIMSS 2011 at the fourth grade than in PIRLS 2011, but the median percentages of fourth grade students reaching the low benchmarks in TIMSS 2011 and PIRLS 2011, were 90 percent in mathematics, 92 percent in science, and 95 percent in reading. The data across all participating countries indicate a high degree of success in educating students in basic concepts and skills, across reading, mathematics, and science.

Exhibit 1.2: Descriptions of Low International Benchmarks of Achievement at the Fourth Grade

Reading
When reading literary texts, student can locate and retrieve an explicitly stated detail. When reading informational texts, students can locate and reproduce explicitly stated information that is at the beginning of the text.
Mathematics
Students have some basic mathematical knowledge. Students can add and subtract whole numbers. They have some recognition of parallel and perpendicular lines, familiar geometric shapes, and coordinate maps. They can read and complete simple bar graphs and tables.
Science
Students show some elementary knowledge of life, physical, and earth sciences. They demonstrate knowledge of some simple facts related to human health, ecosystems, and the behavioral and physical characteristics of animals. They also demonstrate some basic knowledge of energy and the physical properties of matter. Students interpret simple diagrams, complete simple tables, and provide short written response to questions requiring factual information.

Looking across the descriptions of achievement at the High International Benchmarks in reading, mathematics, and science presented in Exhibit 1.1, it can be seen that students performing at the High International Benchmarks in all three subjects were very accomplished fourth grade students—able to read complex materials with in-depth understanding, solve a variety of problems in mathematics, and show familiarity with a range of scientific information. In comparison, looking across the descriptions of achievement at the low benchmark presented in Exhibit 1.2, it can be seen that students reaching only the low benchmark showed that they can read and comprehend facts, read a variety of simple graphs and tables, know simple mathematics (such as adding, subtracting, and basic geometric figures), and know science facts about health,

ecosystems, and animals. Although these students had lower achievement than those at the high level, they do have a well-rounded foundation in core concepts and skills that provides a good basis for further learning.

Profiles of Achievement Across the International Benchmarks

For each country, data are provided about the percentages of fourth grade students reaching the PIRLS 2011 High International Benchmark in reading, the TIMSS 2011 High International Benchmark in mathematics, and the TIMSS 2011 High International Benchmark in science, as well as the percentage of students reaching the High International Benchmark in all three subjects. Students that reached the high benchmark in all three subjects would be proficient in reading, mathematics, and science; and very well-equipped to pursue more advanced study in a variety of subject areas.

Similarly, data are provided for each country and benchmarking participant showing the percentages of students reaching the Low International Benchmarks in each of the subjects, as well as the percentage reaching the low benchmark in all three subjects. Countries that have educated most of their fourth grade students to the low benchmark in all three subjects are to be congratulated, because essentially no students are being "left behind." A certain degree of equity has been achieved, because all students can continue in their schooling, building upon their basic foundation of knowledge and skills across the core curriculum areas.

For each country, the percentages of students reaching the benchmarks in each subject are presented together with graphic illustrations known as radar charts (or star charts). These types of charts are used to plot the values of different categories—in this case, the three percentages of students reaching the high benchmarks in reading, mathematics, and science—along a separate axis in the same graph, with the value of each point represented as the distance from the center of the chart. Depicting the data in this way illustrates the relative strengths and weaknesses across the three subjects, with the strengths depicted by results farther from the center of the graph. As hypothesized based on achievement results reported separately from subject to subject, there are interesting differences across countries, in that some have considerably higher percentages reaching the benchmarks in one or another of the subjects. That is, in some countries students reach considerable higher levels of achievement in mathematics, for example, than they do in science or reading, while in other

countries students are achieving at considerably higher in reading, than in mathematics or science.

Exhibits 1.3 through 1.39 contain the country-by-country results, ordered from highest to lowest according to the percentage of students reaching the High International Benchmark in all three subjects—reading, mathematics, and science.

Singapore was the only country that had more than half its students reaching the High International Benchmark in all three subjects. Two other countries, Chinese Taipei and Finland, had 50 percent or more of their students reaching each benchmark separately, but they were not the same students. Chinese Taipei had 40 percent of its students reaching the high benchmark in all three subjects and Finland had 39 percent as did Hong Kong SAR, followed by the Russian Federation with 35 percent. All the other participants in this study had fewer than 30 percent of their students reaching the high benchmark in all three subjects, providing evidence that this is a very challenging educational task. The percentages were very small in a number of countries.

As would be anticipated, more countries had success in raising most students to the Low International Benchmark in all three subjects. More than half the countries had 90 percent or more of their fourth grade students reaching the high benchmark in all three subjects.

Countries at the Fourth Grade

SINGAPORE The Singaporean fourth grade students showed a particular strength in mathematics, with 78 percent reaching the high benchmark, although achievement was also very good in science (68%), and in reading (62%). More than half the students (54%) reached the High International Benchmark in all three subjects, and essentially all of them (95%) reached the Low International Benchmark in all three subjects.

CHINESE TAIPEI The fourth grade students in Chinese Taipei also showed a particular strength in mathematics, with about three-fourths (74%) reaching the High Benchmark. Again, however, achievement also was very good in the other two subjects, with more than half reaching the high benchmark in reading (55%) and in science (54%). Forty percent reached the High International Benchmark in all three subjects, and essentially all of the students (96%) reached the Low International Benchmark in all three subjects.

HONG KONG SAR Of the countries included in this study, Hong Kong SAR had the greatest percentage (82%) of students reaching the High International Benchmark in mathematics, and mathematics was a considerable strength. In comparison, two-thirds reached the high benchmark in reading, and less than half (46%) in science. Still, performance in all three subjects was very good, with 39 percent of the students reaching the high benchmark in all three subjects, and virtually all (97%) reaching the low benchmark.

FINLAND In comparison to the three previous East Asian countries, the high performing Finnish students did less well in mathematics than in science and reading. More than three-fifths of the fourth grade students reached the high benchmark in science (65%) and reading (63%), and half reached that level in mathematics. Thirty-nine percent reached the high benchmark in all three subjects, and virtually all (97%) reached the low benchmark in all three subjects.

RUSSIAN FEDERATION The fourth grade students in the Russian Federation demonstrated their particular excellence in reading, and also performed well in mathematics and science. The percentages of students reaching the High International Benchmark were 63% in reading, compared to 52% in science and 47% in mathematics. Thirty-five percent reached the high benchmark in all three subject and essentially all students (96%) reached the low benchmark in all three subjects.

Exhibit 1.3: Singapore

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	54 (1.9)
Reading	62 (1.8)
Mathematics	78 (1.4)
Science	68 (1.7)

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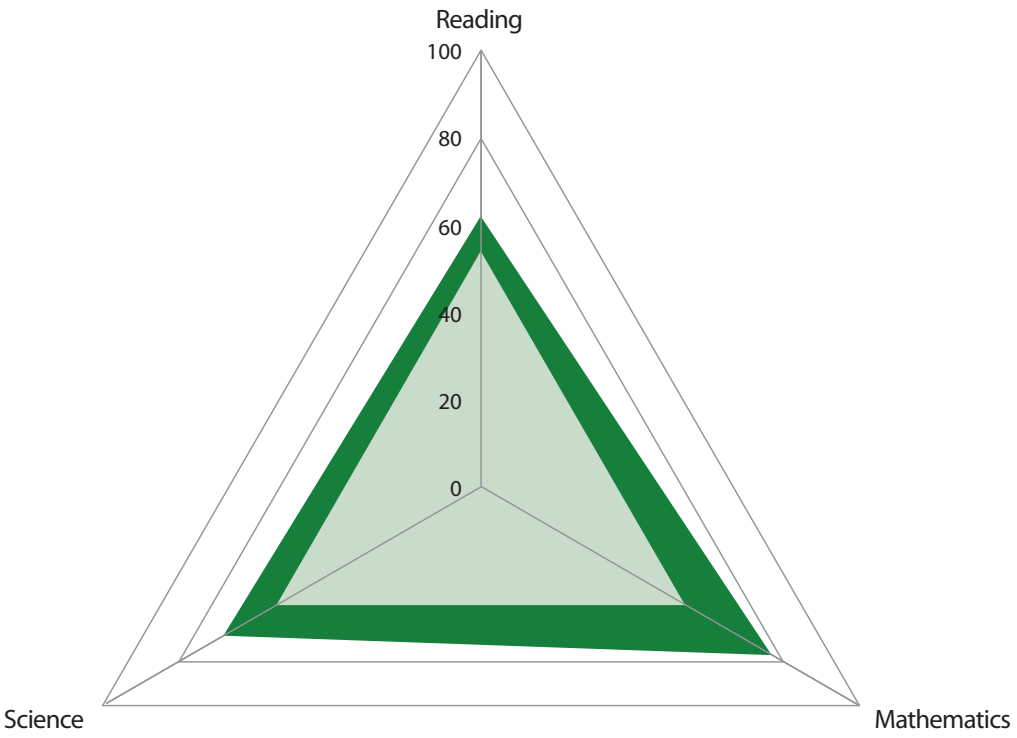

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	95 (0.6)
Reading	97 (0.4)
Mathematics	99 (0.2)
Science	97 (0.4)

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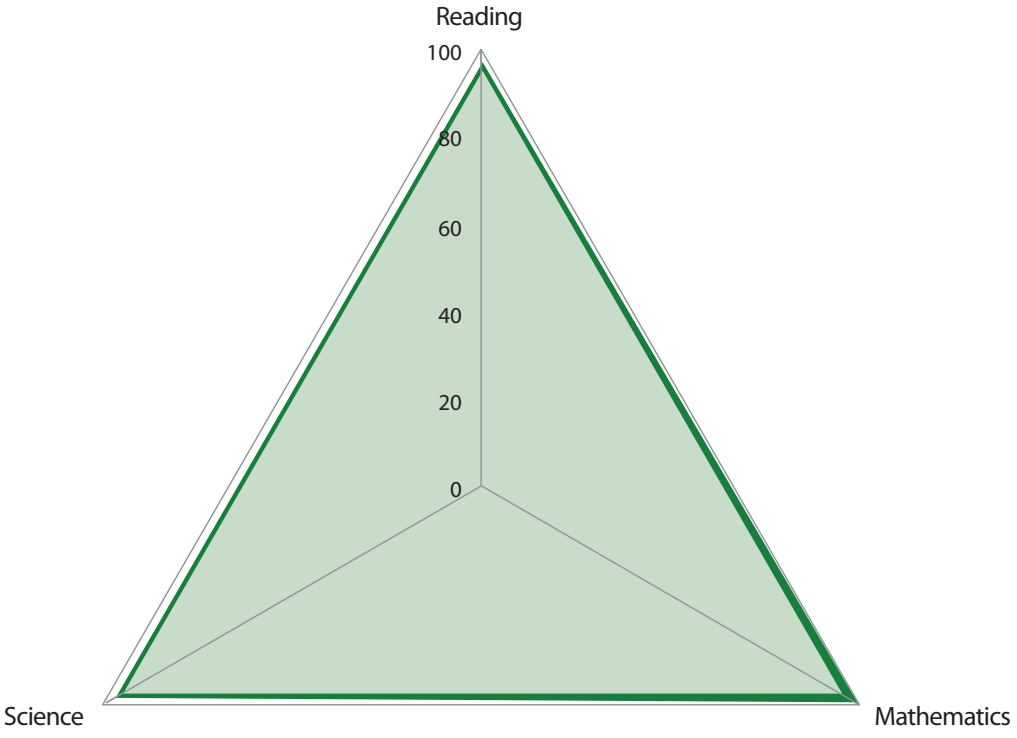

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.4: Chinese Taipei

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	40 (1.3)
Reading	55 (1.3)
Mathematics	74 (1.1)
Science	54 (1.3)

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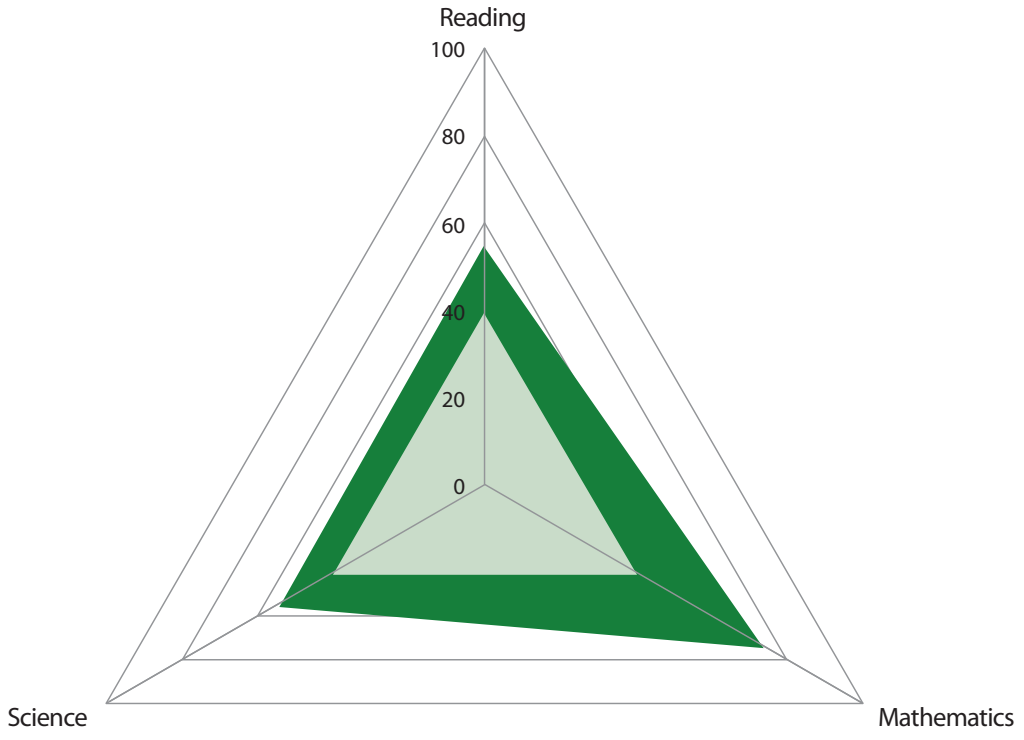

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	96 (0.4)
Reading	98 (0.4)
Mathematics	99 (0.2)
Science	97 (0.4)

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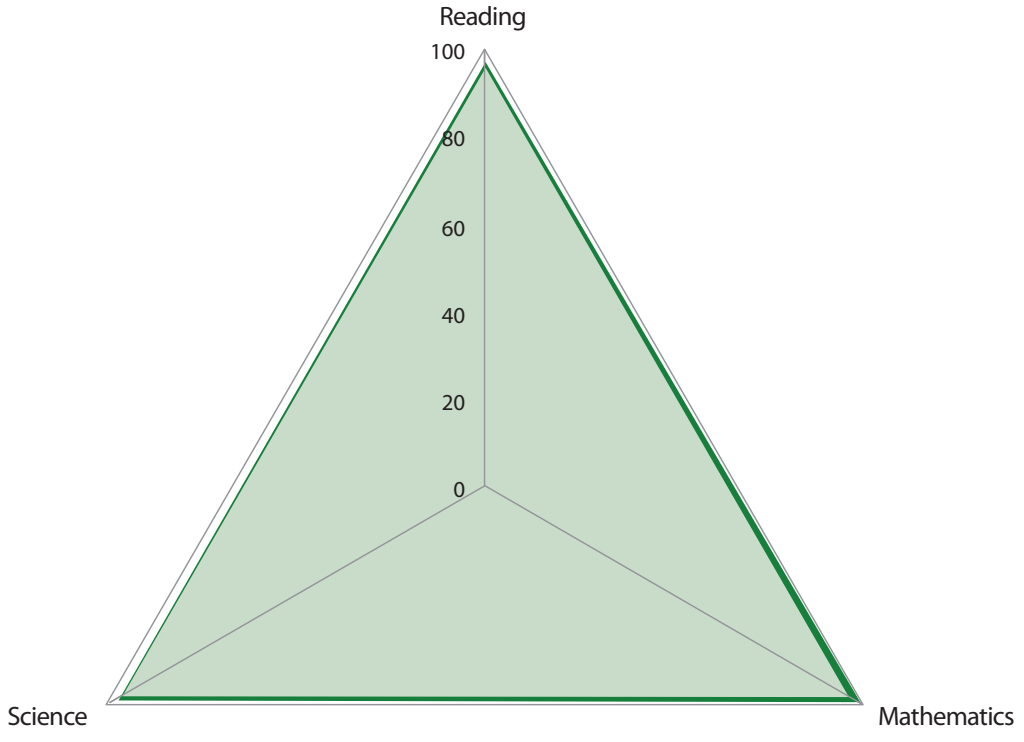

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.5: Hong Kong SAR

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	39 (1.8)
Reading	67 (1.6)
Mathematics	82 (1.3)
Science	46 (2.1)

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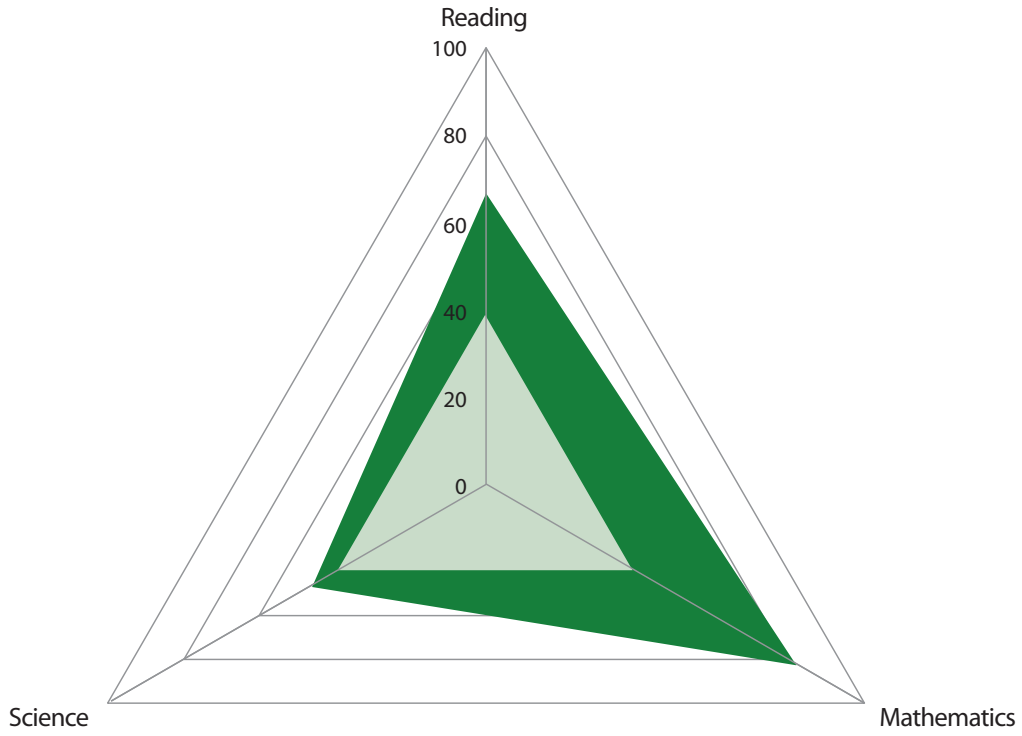

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	97 (0.5)
Reading	99 (0.2)
Mathematics	100 (0.1)
Science	97 (0.4)

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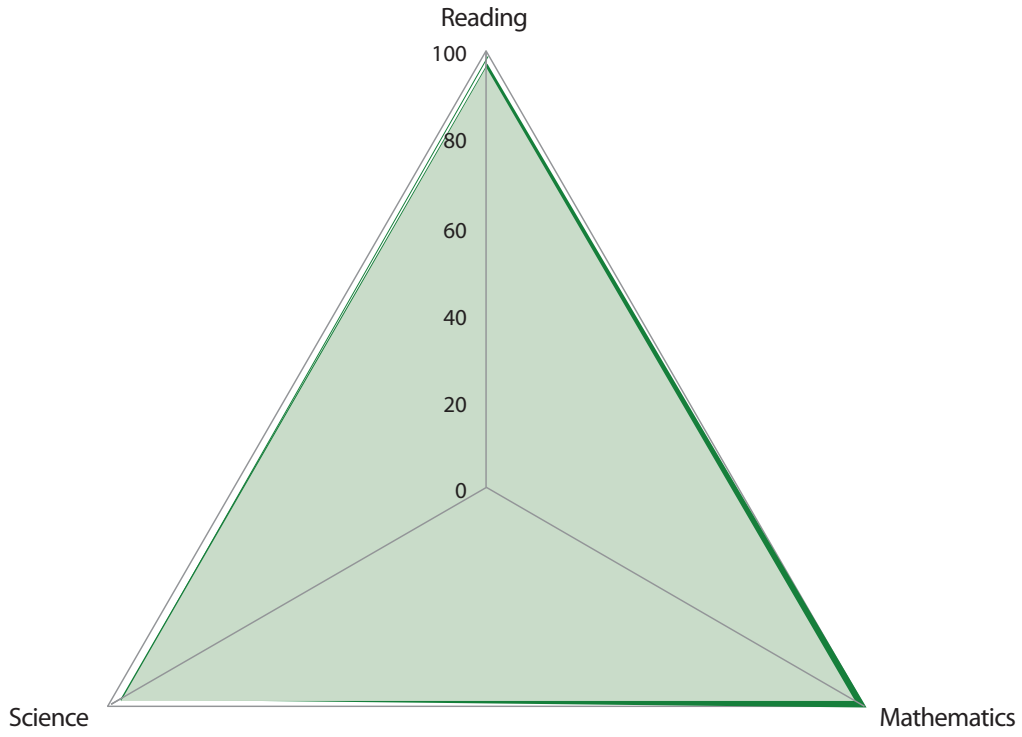

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.6: Finland

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	39 (1.3)
Reading	63 (1.2)
Mathematics	50 (1.4)
Science	65 (1.7)

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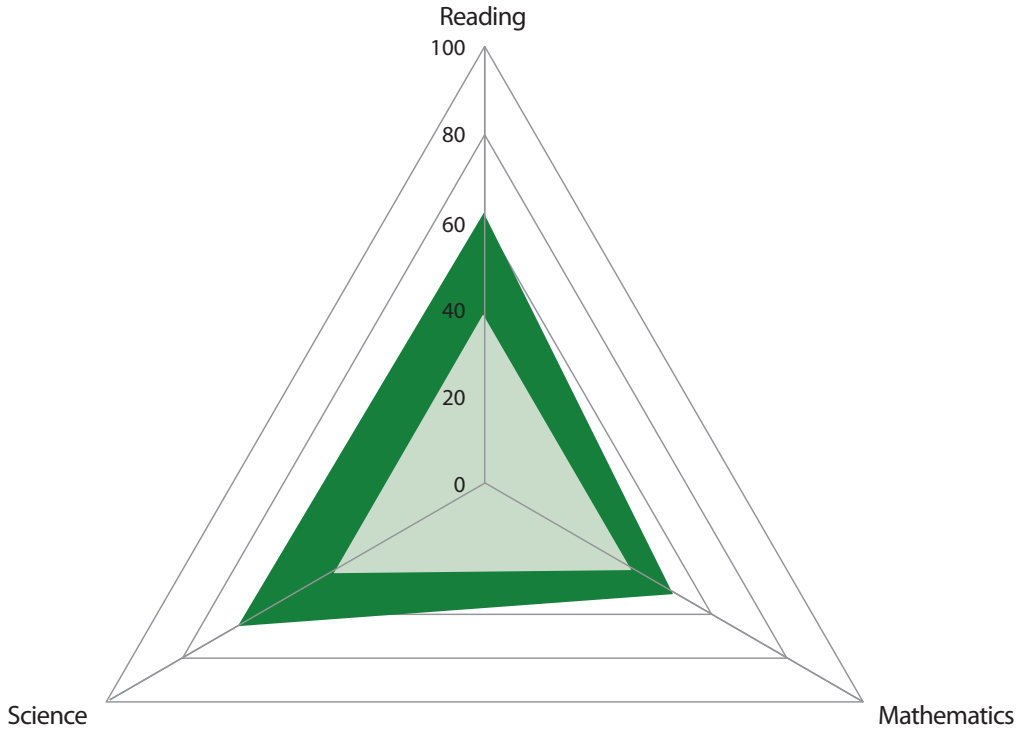

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	97 (0.5)
Reading	99 (0.2)
Mathematics	98 (0.4)
Science	99 (0.3)

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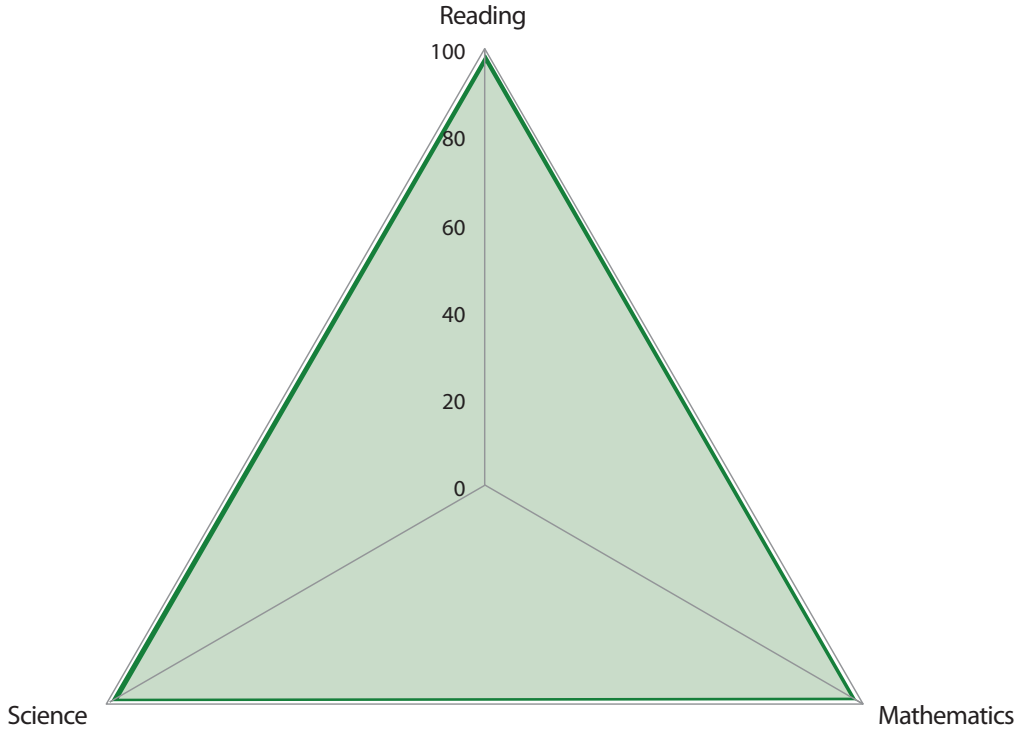

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.7: Russian Federation

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	35 (1.9)
Reading	63 (1.6)
Mathematics	47 (2.1)
Science	52 (2.0)

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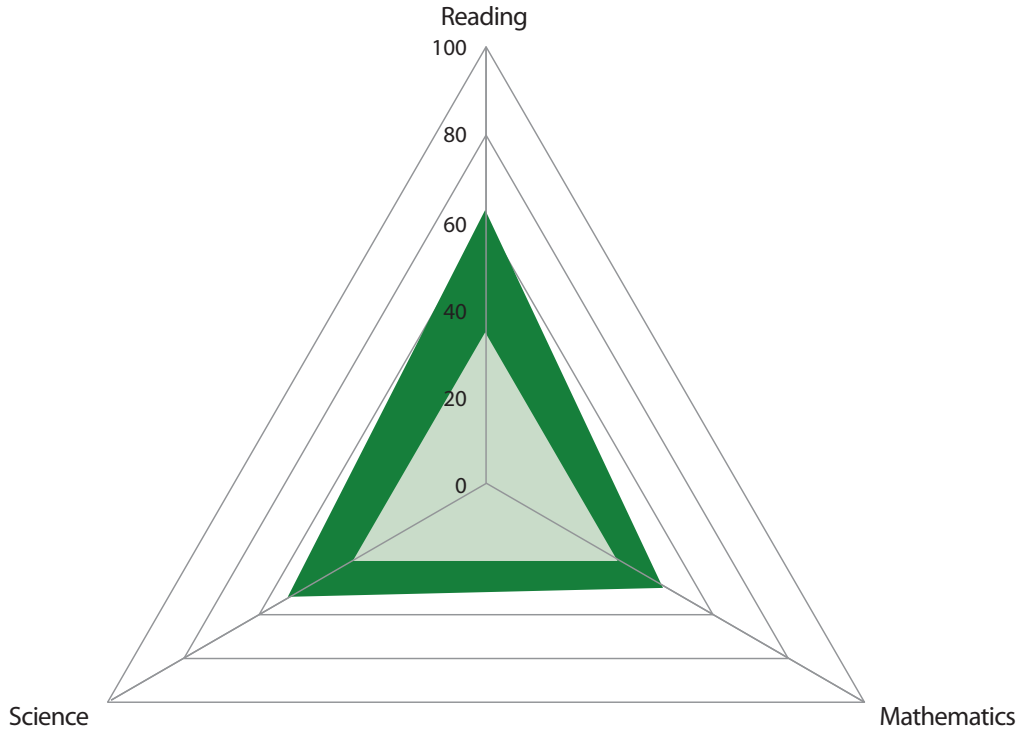

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	96 (0.6)
Reading	99 (0.3)
Mathematics	97 (0.5)
Science	98 (0.4)

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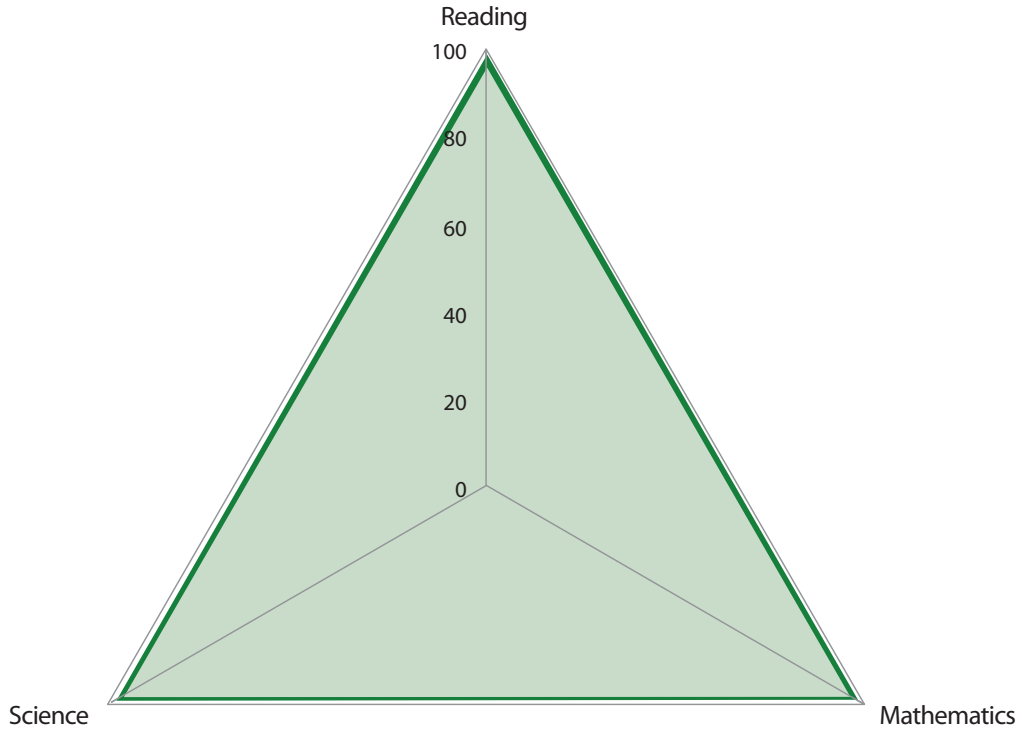

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

NORTHERN IRELAND These students performed very well in all three subjects, although relatively less so in science. While nearly three-fifths of the students reached the high benchmarks in mathematics (59%) and in reading (58%), one-third did in science (34%). Twenty-nine percent reached the high benchmark in all three subjects, and 92 percent reached the low benchmark in all three subjects.

HUNGARY The Hungarian students performed similarly in all three subjects. Just under half the fourth grade students reached the high benchmark in reading (48%) and science (46%), while 37 percent did so in mathematics. Twenty-eight percent reached the high benchmark in all three subjects. Ninety percent or more reached the low benchmark in each of the three subjects, and 88 percent reached this level in all three subjects.

IRELAND In Ireland, the fourth grade students demonstrated a particular strength in reading, with 54 percent reaching the high benchmark, compared to 41 percent in mathematics and 35 percent in science. One-fourth of the students reached the high benchmark in all three subjects, and 90 percent reached the low benchmark in all three subjects.

GERMANY The German fourth grade students performed similarly across the three subjects, with 46 percent reaching the high benchmark in reading, 39 percent in science, and 37 percent in mathematics. Nearly one-fourth (23%) of the students reached the High International benchmark in all three subjects, and most students (94%) reached the Low International Benchmark in all three subjects.

PORTUGAL In Portugal, there were achievement differences across the subjects, but no large gaps. Forty-seven percent of the students reached the high benchmark in reading, 40 percent in mathematics, and 36 percent in science. Similar to Germany, nearly one-fourth (23%) of the students reached the high benchmark in all three subjects, and most students (93%) reached the low benchmark in all three subjects.

Exhibit 1.8: Northern Ireland

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	29 (1.4)
Reading	58 (1.4)
Mathematics	59 (1.4)
Science	34 (1.6)

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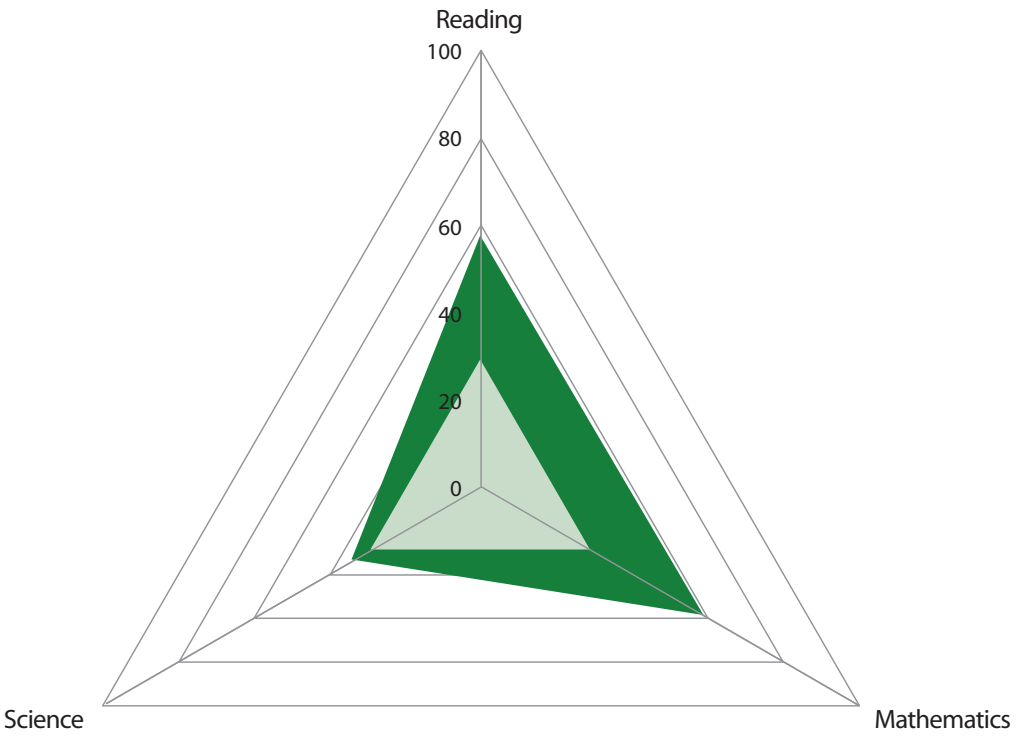

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	92 (0.8)
Reading	97 (0.5)
Mathematics	96 (0.6)
Science	94 (0.8)

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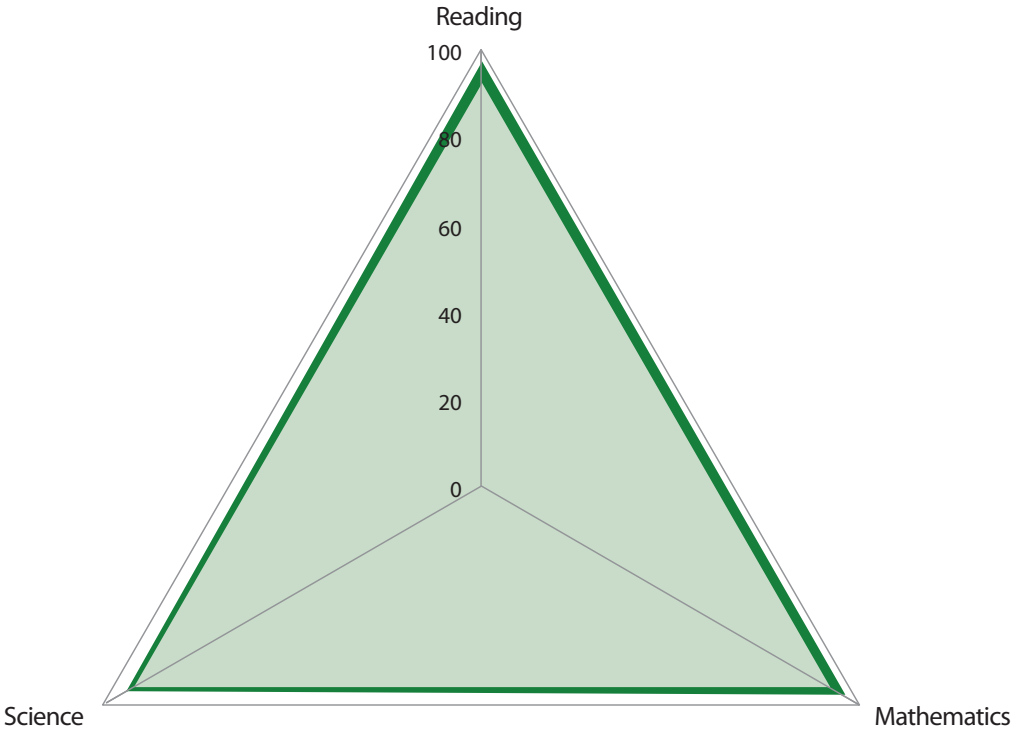

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Study – TIMSS and PIRLS 2011

Exhibit 1.9: Hungary

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	28 (13)
Reading	48 (1.5)
Mathematics	37 (1.4)
Science	46 (2.0)

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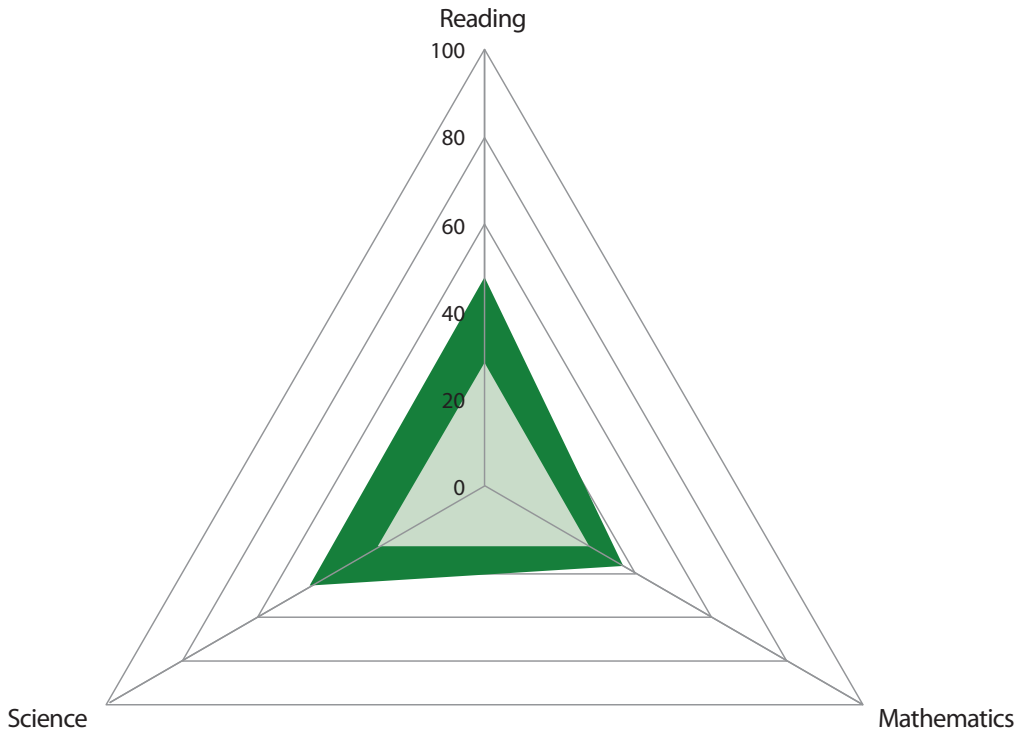

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	88 (1.1)
Reading	95 (0.8)
Mathematics	90 (0.9)
Science	93 (0.9)

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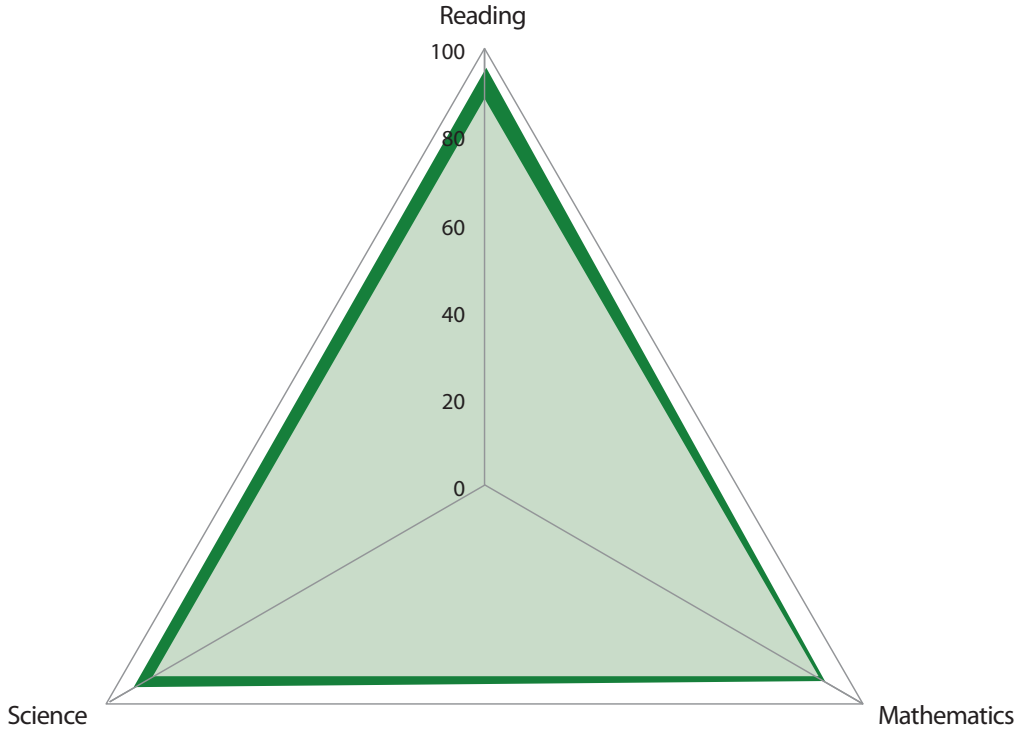

SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.10: Ireland

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	25 (1.5)
Reading	54 (1.4)
Mathematics	41 (1.6)
Science	35 (1.7)

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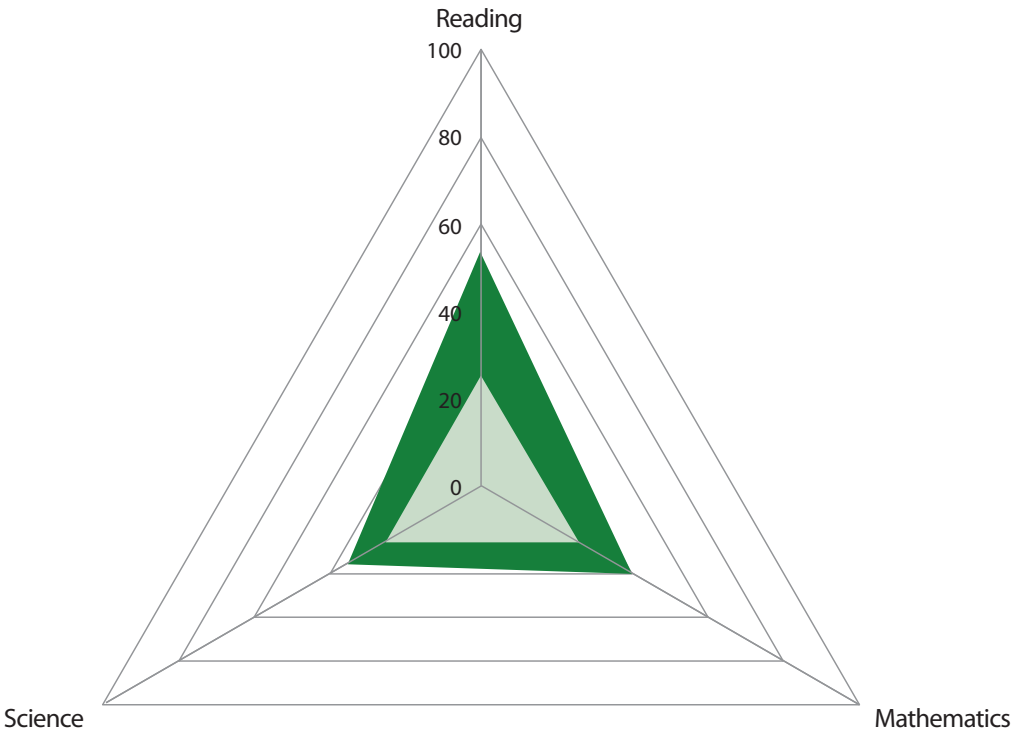

Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	90 (0.9)
Reading	97 (0.5)
Mathematics	94 (0.6)
Science	92 (0.8)

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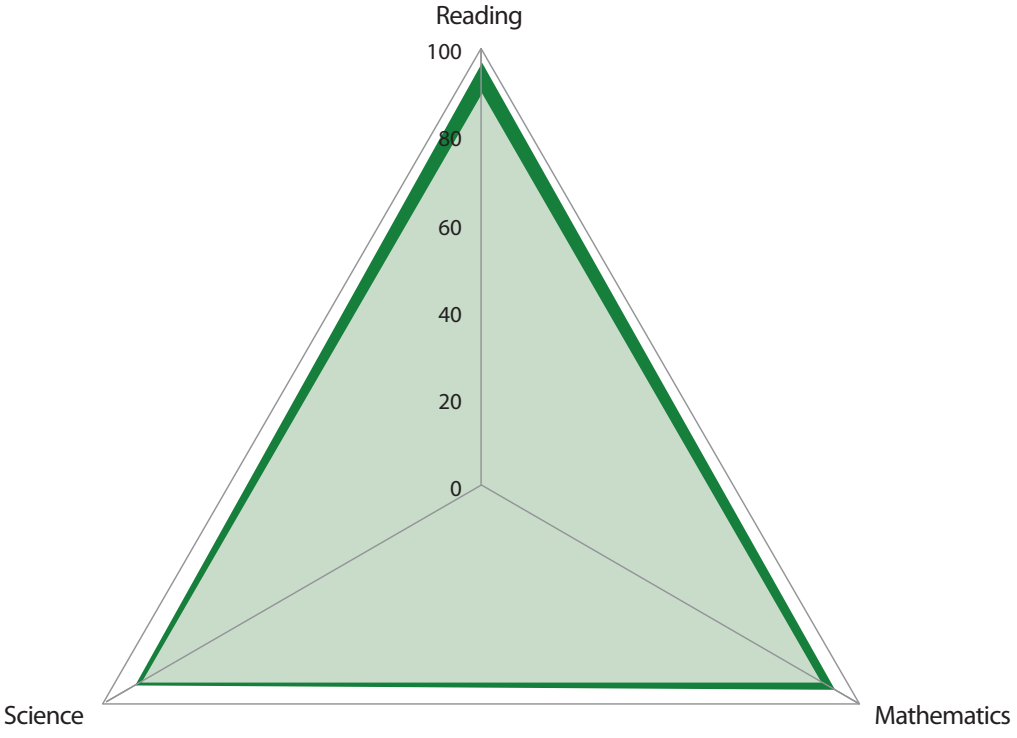


SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

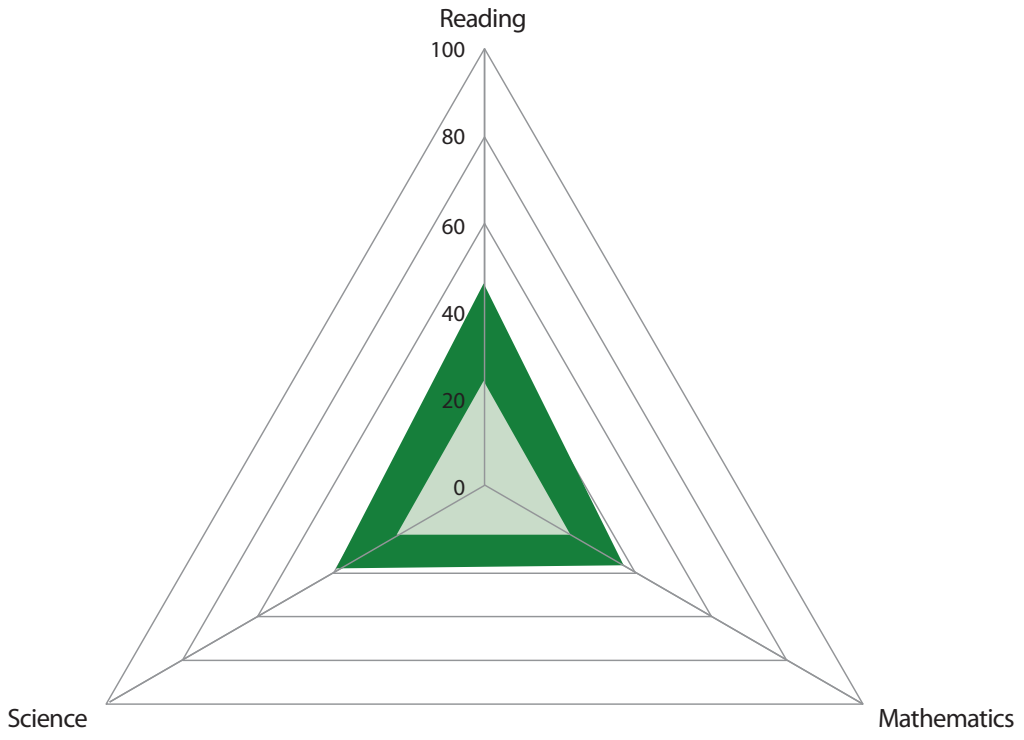
Exhibit 1.11: Germany

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	23 (1.3)
Reading	46 (1.3)
Mathematics	37 (1.4)
Science	39 (1.5)

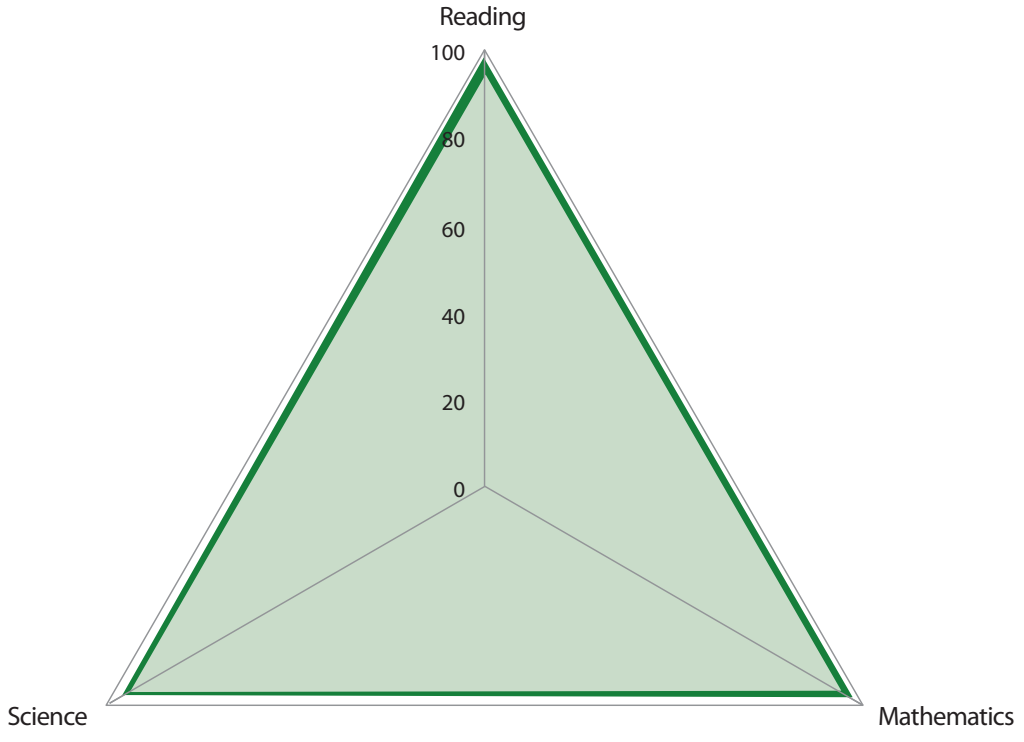
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	94 (0.8)
Reading	98 (0.4)
Mathematics	97 (0.5)
Science	96 (0.8)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

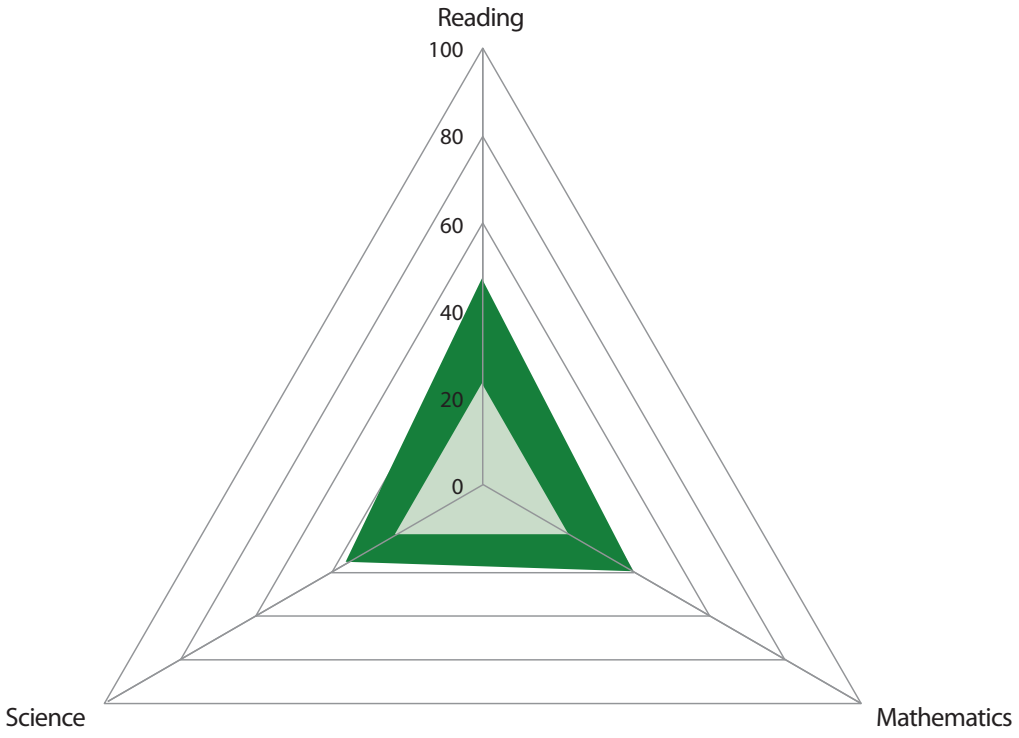
Exhibit 1.12: Portugal

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	23 (1.7)
Reading	47 (1.8)
Mathematics	40 (2.0)
Science	36 (2.0)

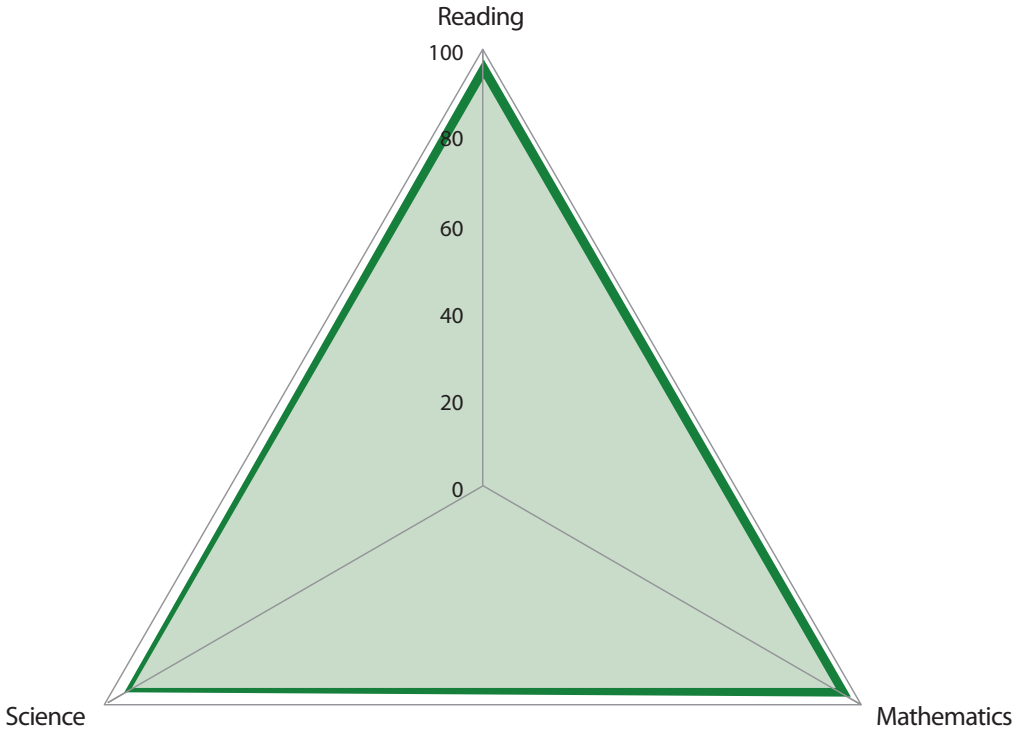
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	93 (1.1)
Reading	98 (0.5)
Mathematics	97 (0.7)
Science	95 (0.9)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

AUSTRALIA In reading, 42 percent of the Australian students reached the high benchmark and 35-36% reached this level in mathematics and science. Twenty-two percent reached the high benchmark in all three subjects. Although more than 90 percent reached the low level in each of three subjects separately, somewhat less (86%) reached the low benchmark in all three subjects.

CZECH REPUBLIC The fourth grade students in the Czech Republic demonstrated a relative weakness in mathematics. Although half reached the high benchmark in reading and 45 percent in science, a comparative smaller percent (30%) reached this level in mathematics. Twenty-one percent of the students reached the high benchmark in all three subjects, and most (92%) reached the low level in all three subjects.

SLOVAK REPUBLIC Similar to the Czech students, the Slovak fourth graders also demonstrated a relative weakness in mathematics, with 44 percent reaching the high benchmark in both reading and science but only 30 percent in mathematics. Also, like the Czech students, 21 percent reached the high benchmark in all three subjects. Although more than 90 percent of the Slovak students reached the low benchmark in each of the subjects, slightly fewer (89%) reached it all three subjects.

LITHUANIA Similar to both the Czech Republic and the Slovak Republic, 21 percent of the Lithuanian students reached the high benchmark in all three subjects. However, the Lithuanian students showed their relative weakness in science. Forty-three percent reached the high benchmark in mathematics and 39 percent in reading, but somewhat fewer (31%) in science. Most students (92%) reached the low benchmark in all three subjects.

SLOVENIA The Slovenian students had the highest percentage of students (42%) reaching the high benchmark in reading, the next highest in science (36%), and the lowest in mathematics (31%). One-fifth the students reached the high benchmark in all three subjects, 90 percent reached the low benchmark in all three subjects.

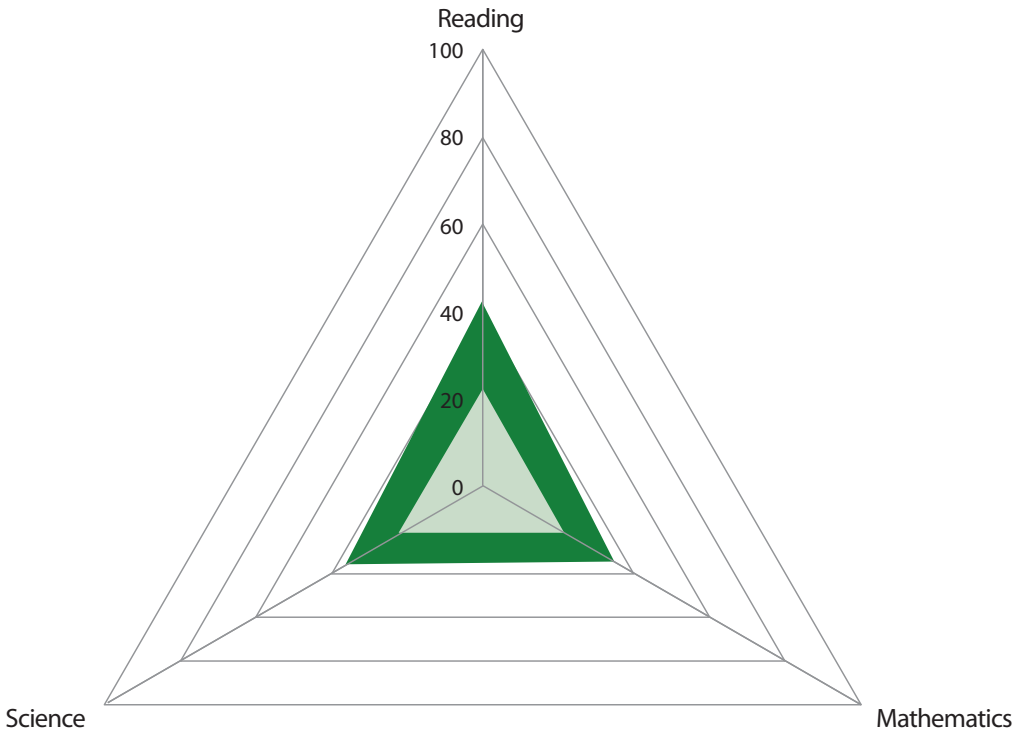
Exhibit 1.13: Australia

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	22 (1.2)
Reading	42 (1.2)
Mathematics	35 (1.4)
Science	36 (1.4)

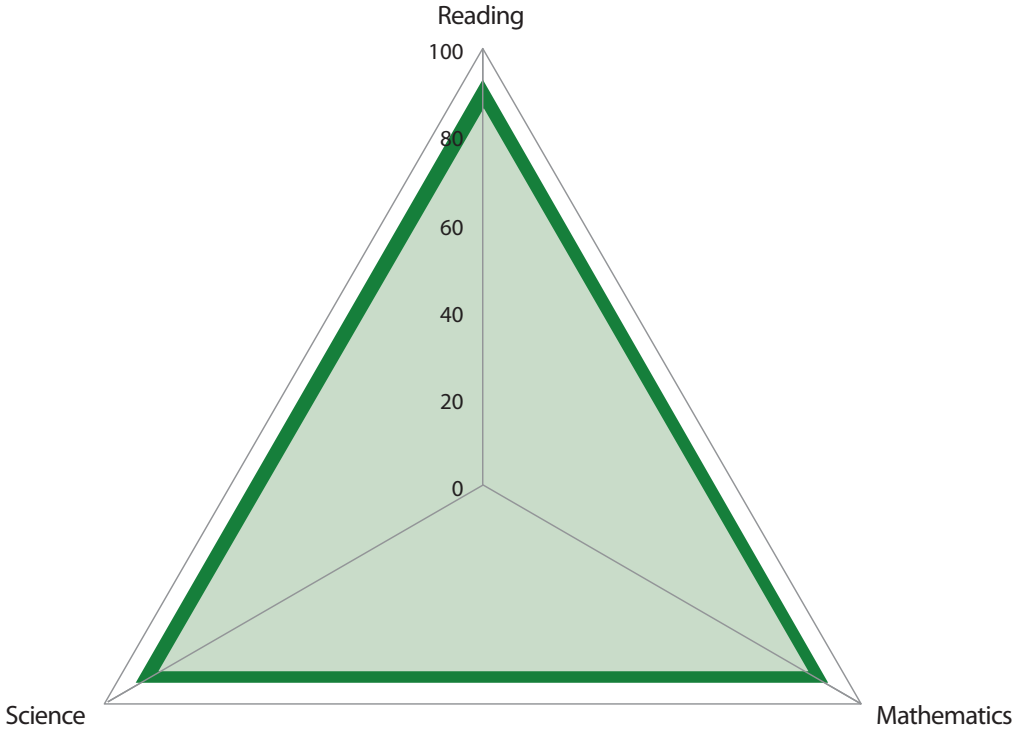
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	86 (1.1)
Reading	93 (0.7)
Mathematics	91 (0.9)
Science	92 (0.9)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

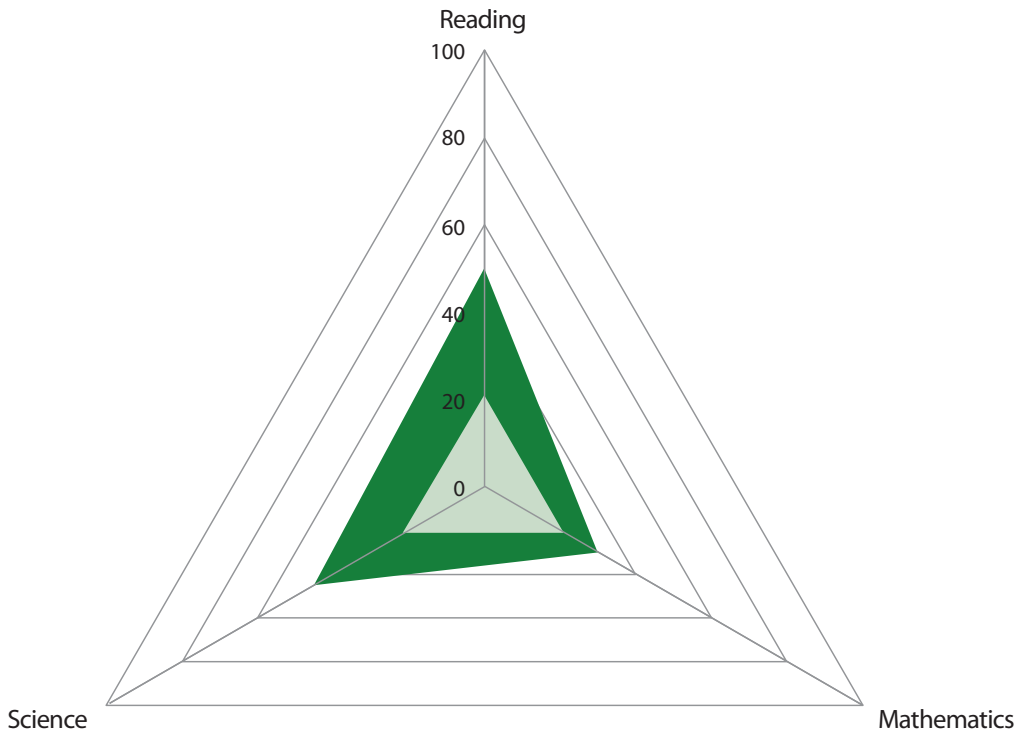
Exhibit 1.14: Czech Republic

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	21 (1.1)
Reading	50 (1.4)
Mathematics	30 (1.6)
Science	45 (1.5)

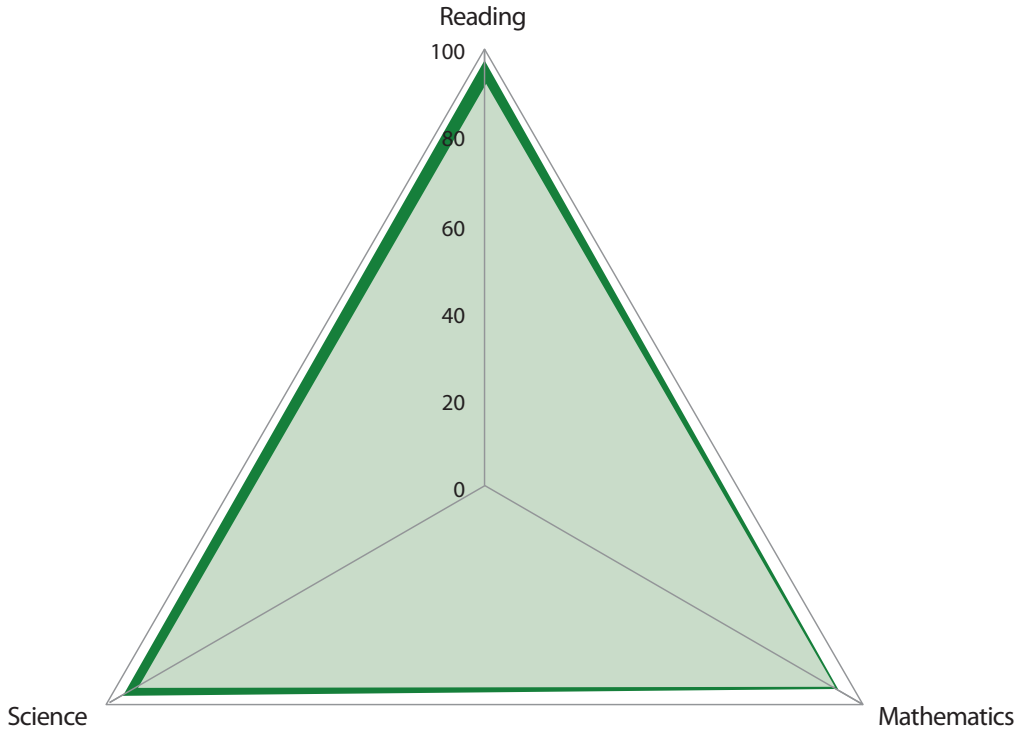
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	92 (0.8)
Reading	98 (0.5)
Mathematics	93 (0.8)
Science	96 (0.7)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

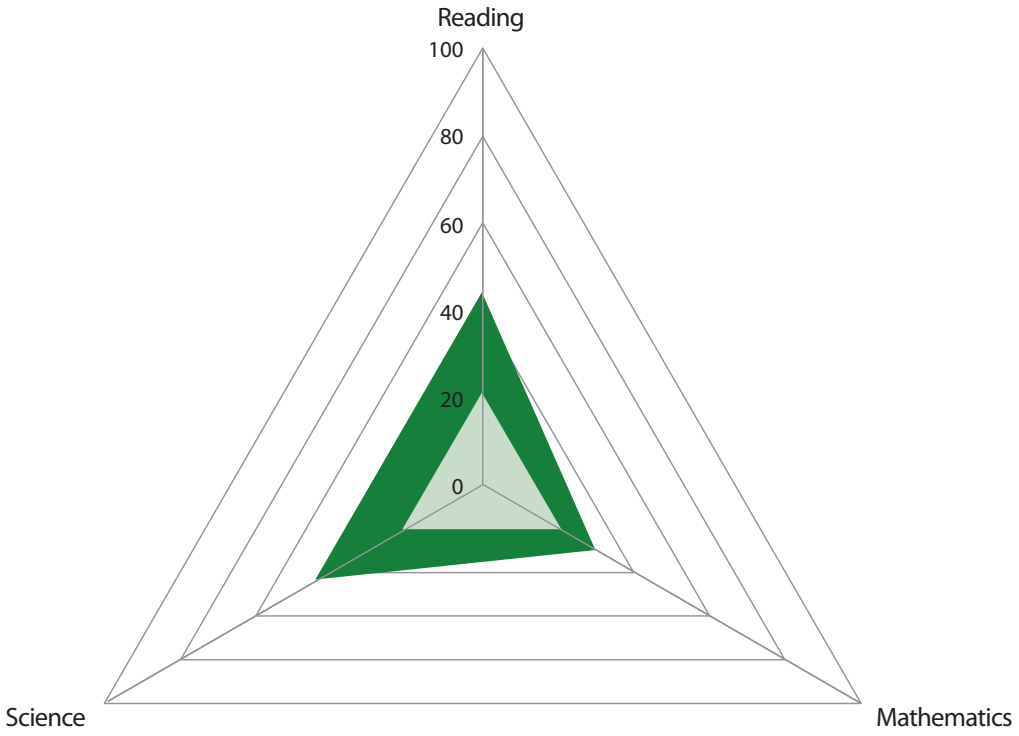
Exhibit 1.15: Slovak Republic

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	21 (1.3)
Reading	44 (1.4)
Mathematics	30 (1.6)
Science	44 (1.6)

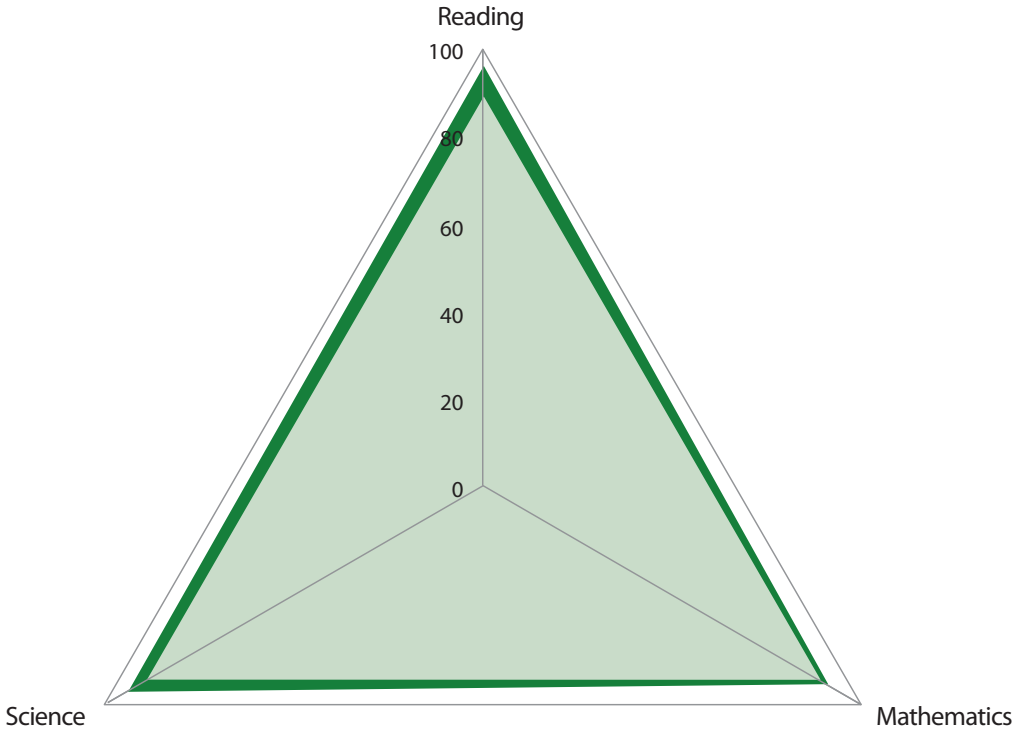
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	89 (1.3)
Reading	96 (0.8)
Mathematics	91 (1.3)
Science	94 (1.0)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

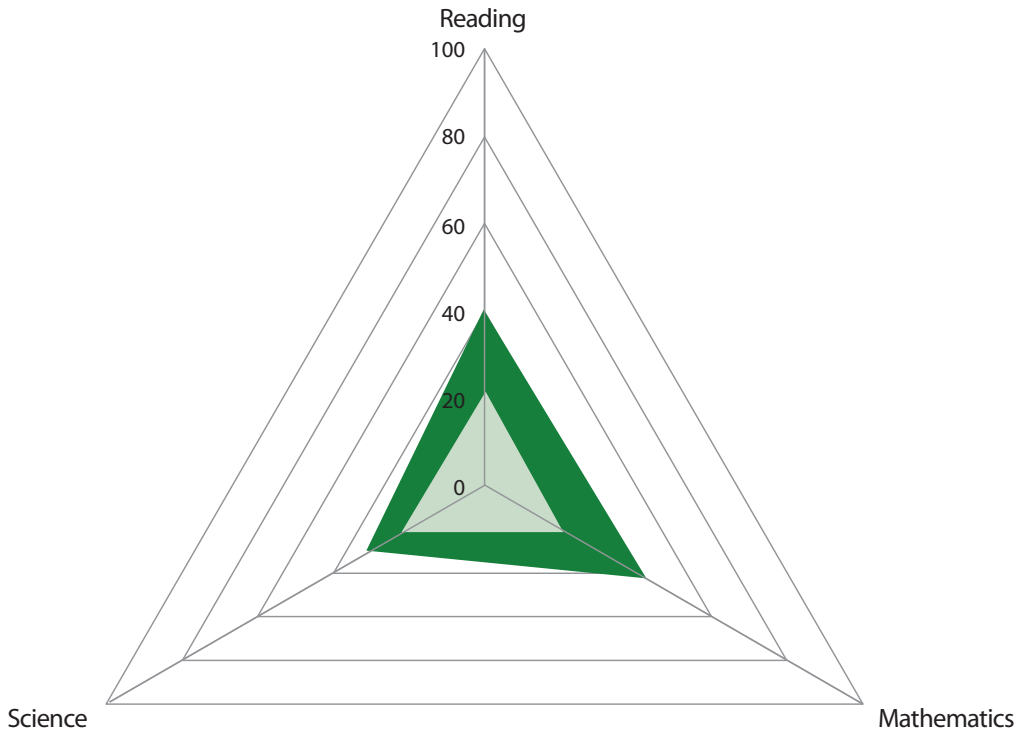
Exhibit 1.16: Lithuania

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	21 (1.3)
Reading	39 (1.3)
Mathematics	43 (1.6)
Science	31 (1.6)

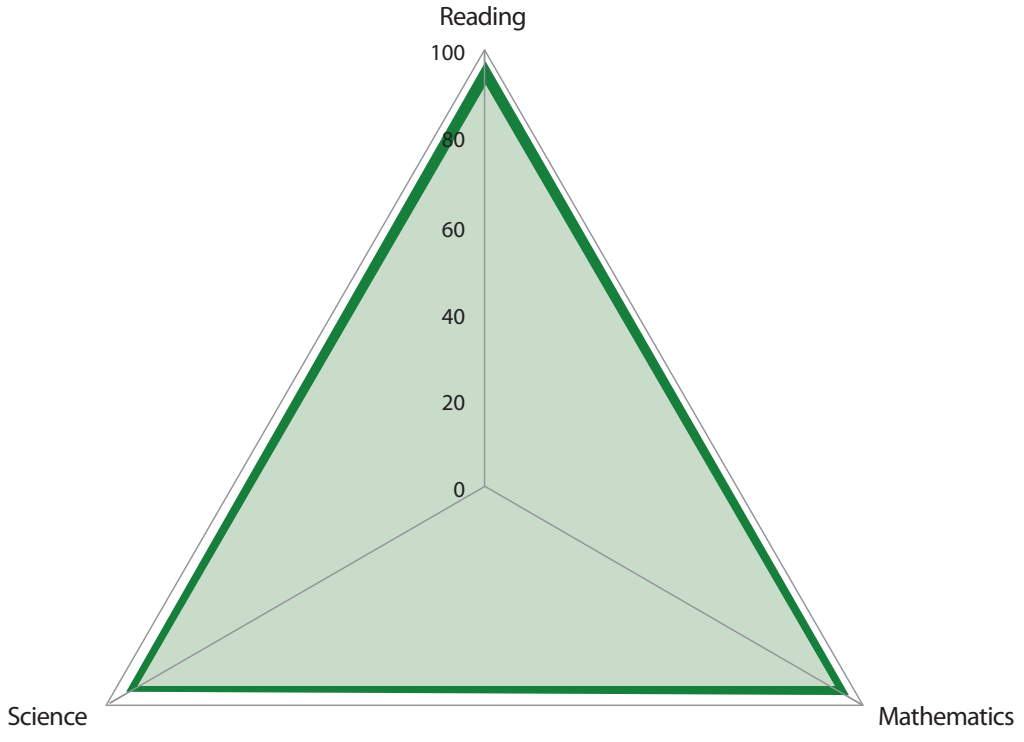
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	92 (0.8)
Reading	97 (0.4)
Mathematics	96 (0.6)
Science	95 (0.6)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

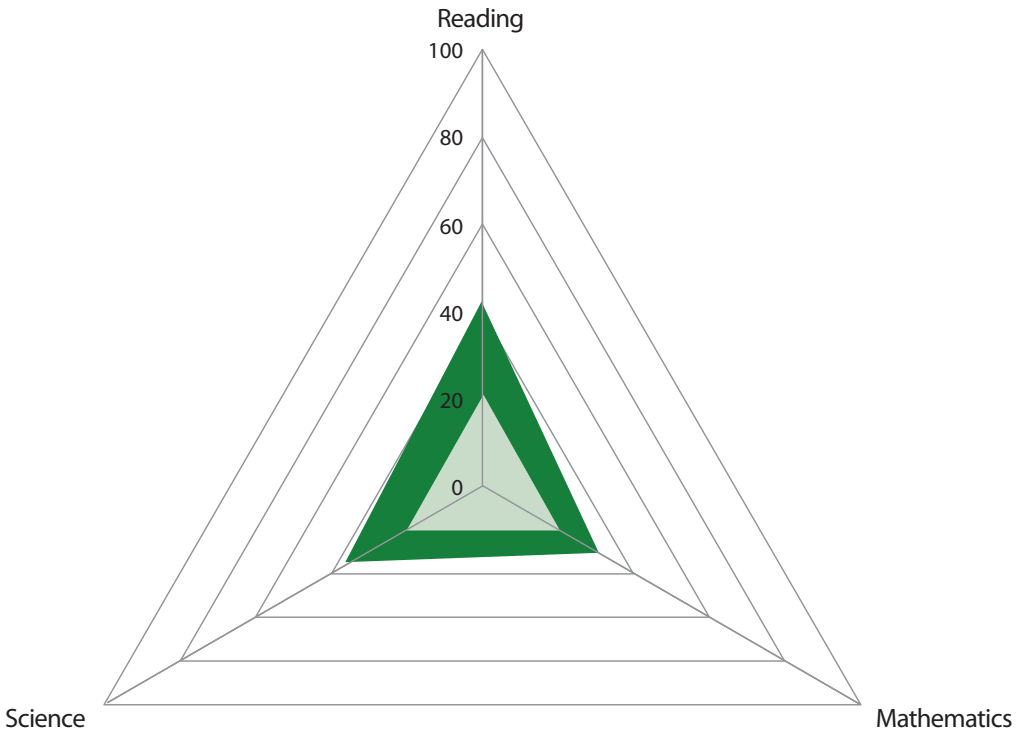
Exhibit 1.17: Slovenia

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	20 (1.3)
Reading	42 (1.3)
Mathematics	31 (1.3)
Science	36 (1.6)

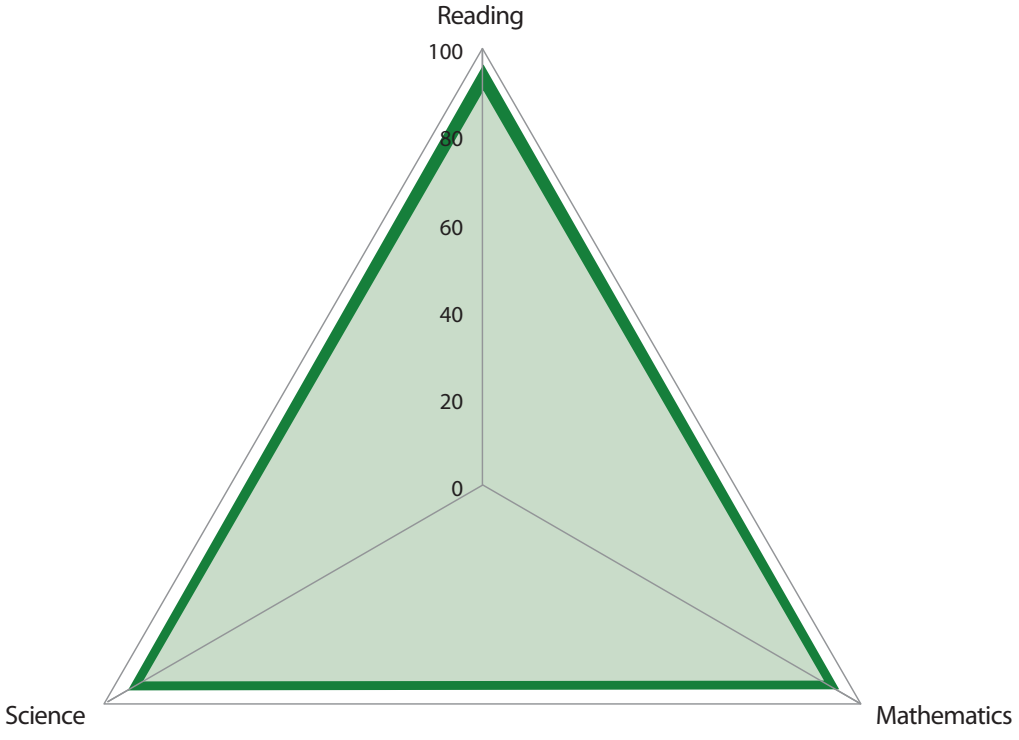
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	90 (0.7)
Reading	96 (0.5)
Mathematics	94 (0.6)
Science	94 (0.6)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

ITALY The Italian fourth grade students show considerable variation in achievement across the three subjects. In reading, 46 percent of the students reached the high benchmark, in science 37 percent, and in mathematics 28 percent. Eighteen percent reached the high benchmark in all three subjects, and 90 percent reached the low benchmark in all three subjects.

SWEDEN The Swedish students showed a relative weakness in mathematics. In reading, 47 percent of the students reached the high benchmark and in science 44 percent did, but in comparison only 25 percent reached that level in mathematics. Similar to Italy, 18 percent reached the high benchmark in all three subjects, and 91 percent reached the low benchmark in all three subjects.

AUSTRIA Very similar to Sweden, the Austrian fourth grade students also showed a relative weakness in mathematics. In science, 42 percent of the students reached the high benchmark and in reading 39 percent did. However, only 26 percent reached that level in mathematics. Eighteen percent reached the high benchmark in all three subjects, and 92 percent reached the low benchmark in all three subjects.

ROMANIA Seventeen percent of the Romanian fourth grade students reached the high benchmark in all three subjects, with 37% reaching that level in science, 32% in reading, and 28% in mathematics. Considering that the percentage of students reaching the high level in all three subjects was similar to a number of the preceding countries, it is interesting that only 73 percent reached the low benchmark in all three subjects.

CROATIA The Croatian fourth grade students showed considerable variation in achievement across the three subjects. They had very good achievement in reading, with more than half the students (54%) reaching the high benchmark. Thirty percent reached the high benchmark in science, but only 19 did in mathematics. While 13 percent reached the high benchmark in all three subjects, 90 percent reached the low benchmark in all three subjects.

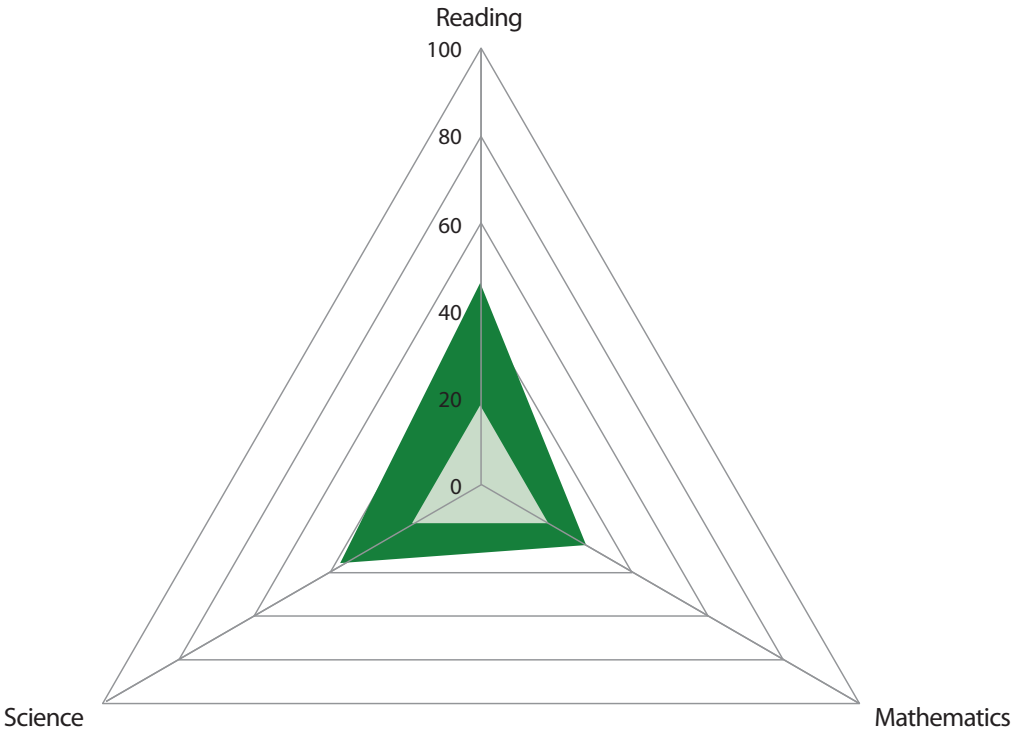
Exhibit 1.18: Italy

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	18 (1.1)
Reading	46 (1.4)
Mathematics	28 (1.6)
Science	37 (1.6)

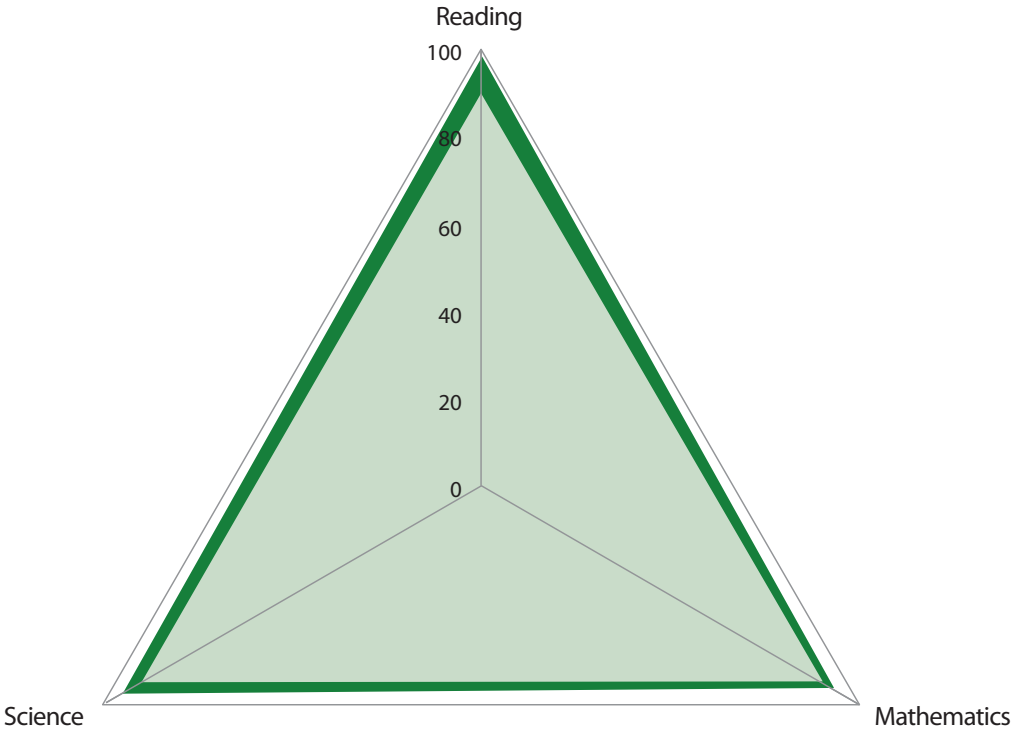
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	90 (0.9)
Reading	98 (0.4)
Mathematics	93 (0.8)
Science	95 (1.0)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

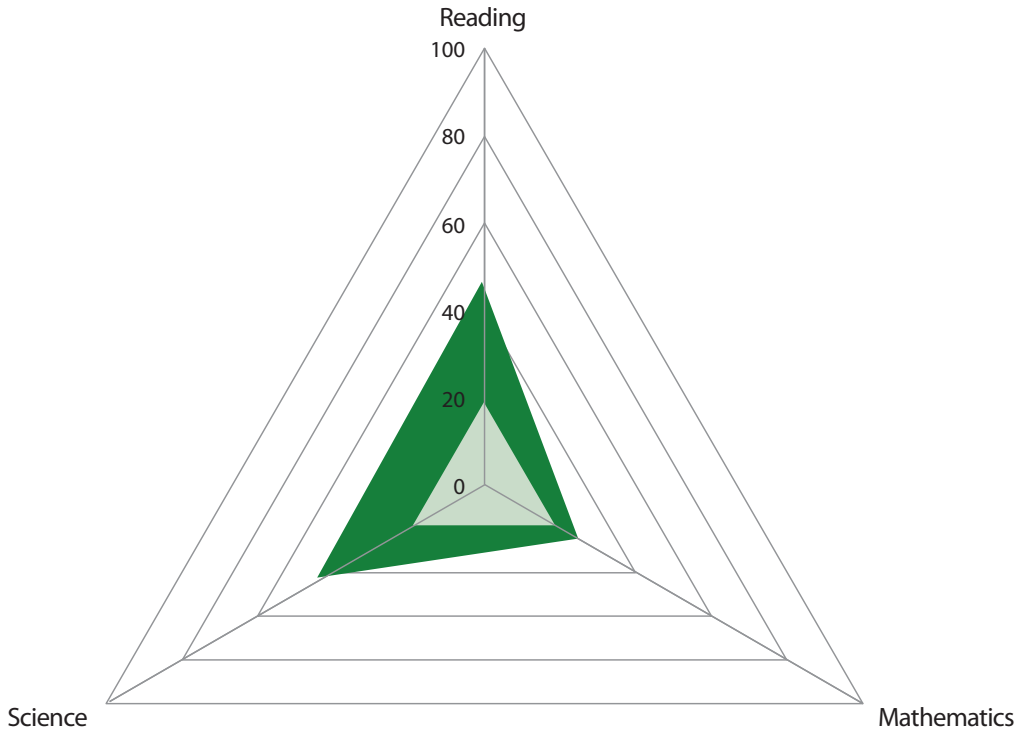
Exhibit 1.19: Sweden

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	18 (1.1)
Reading	47 (1.6)
Mathematics	25 (1.2)
Science	44 (1.5)

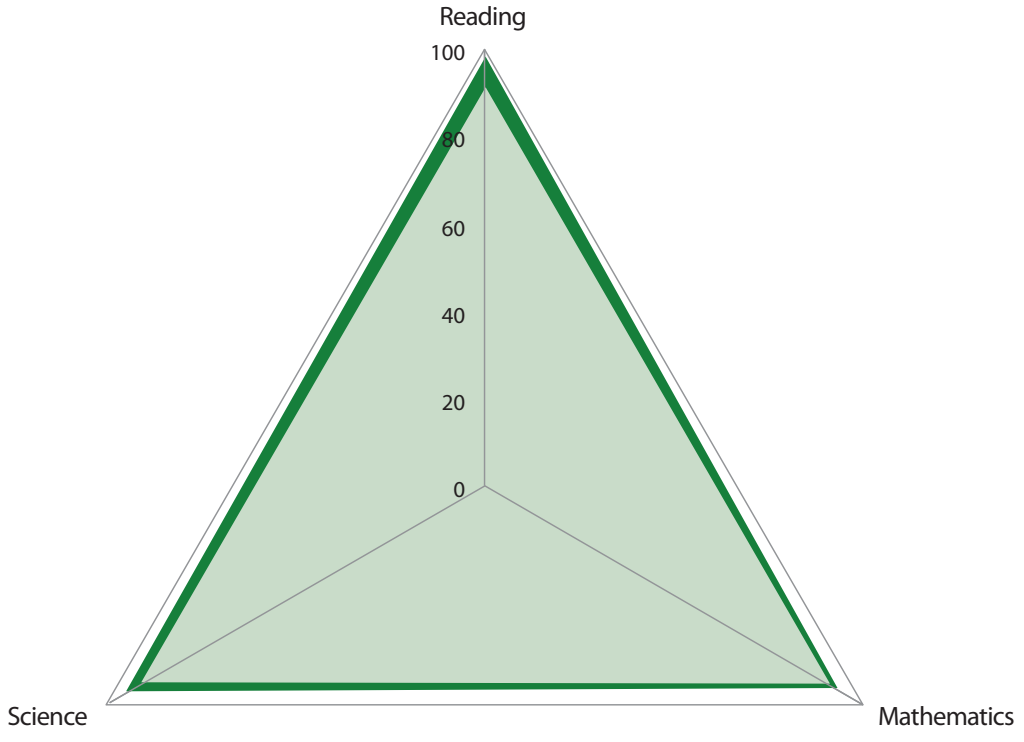
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	91 (0.7)
Reading	98 (0.3)
Mathematics	93 (0.6)
Science	95 (0.5)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

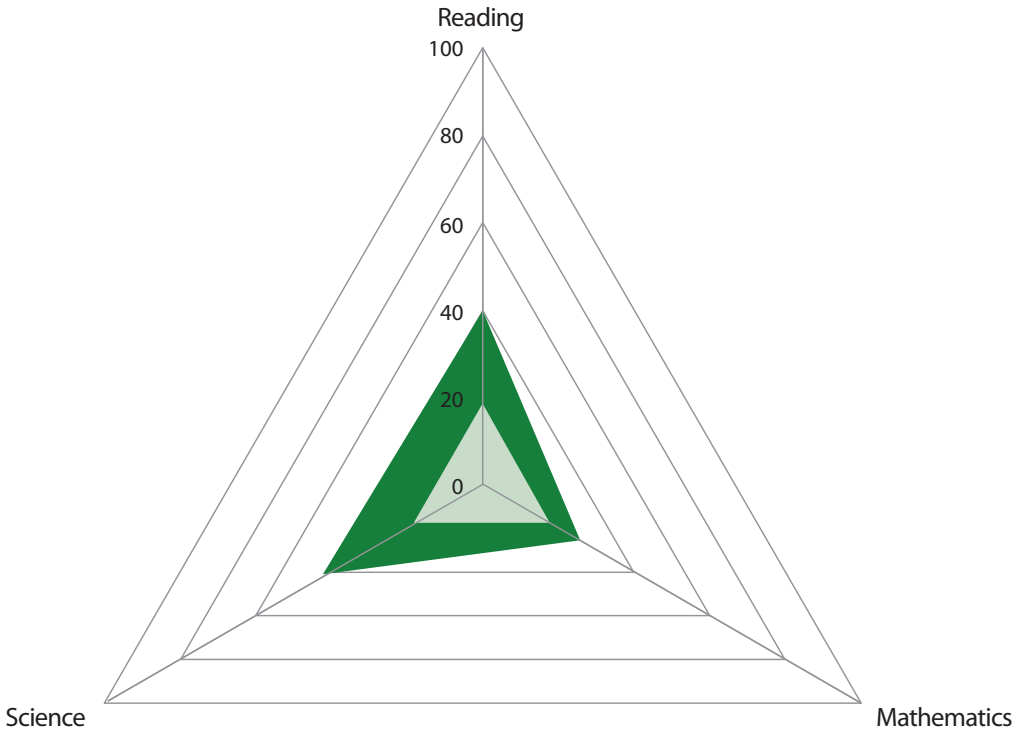
Exhibit 1.20: Austria

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	18 (1.2)
Reading	39 (1.5)
Mathematics	26 (1.5)
Science	42 (1.7)

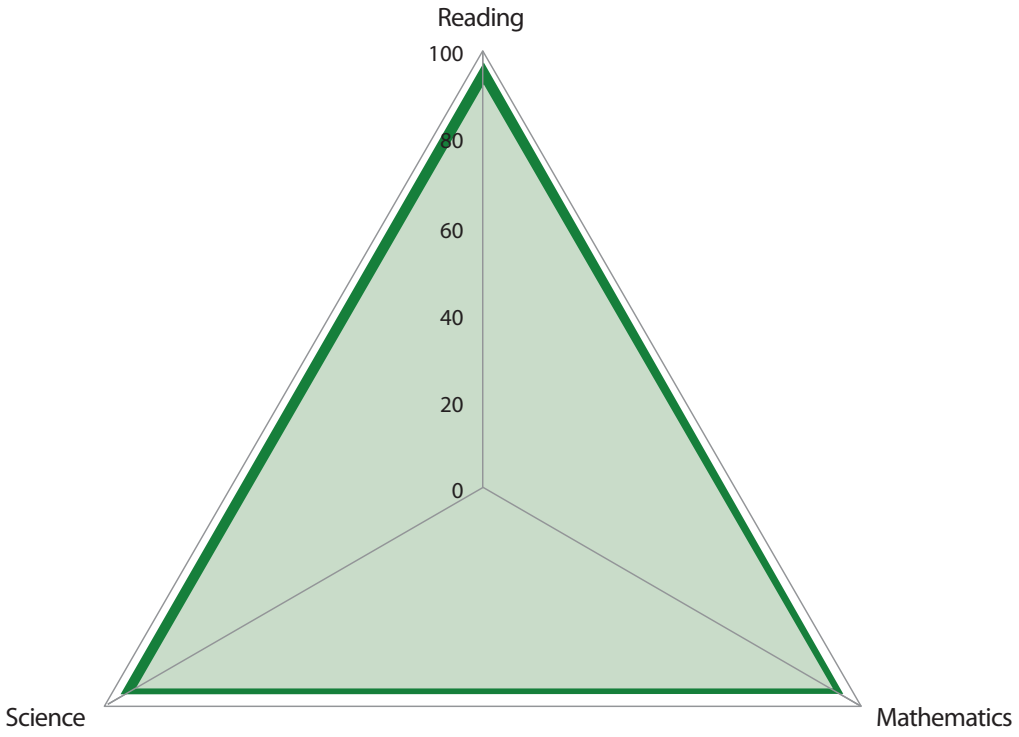
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	92 (0.8)
Reading	97 (0.4)
Mathematics	95 (0.7)
Science	96 (0.6)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

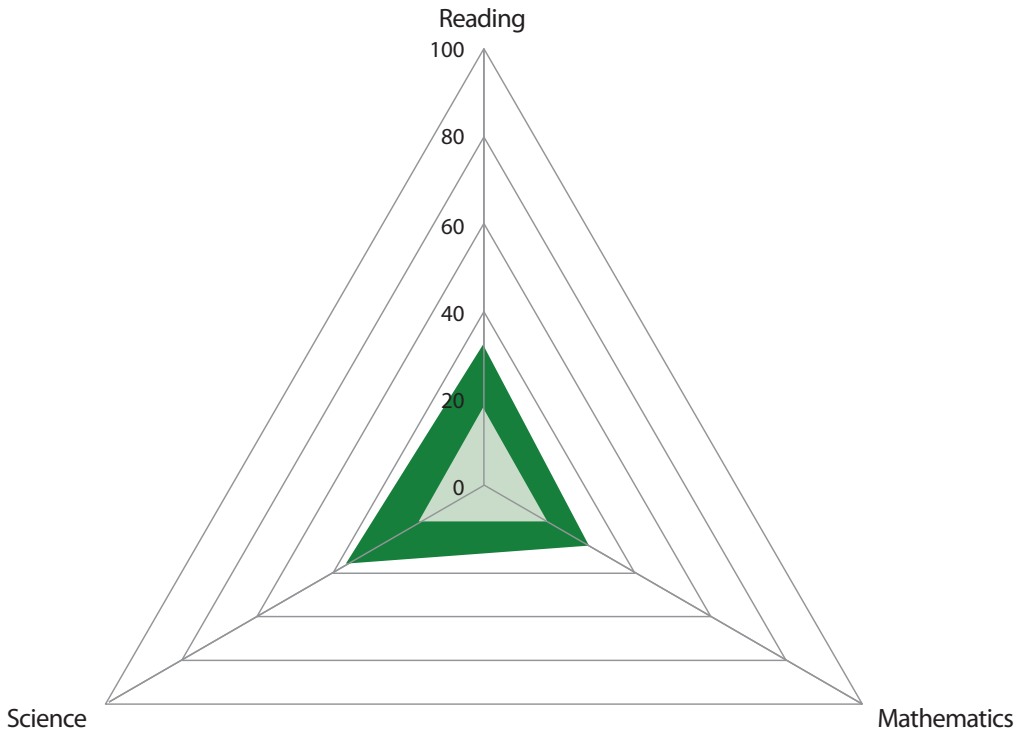
Exhibit 1.21: Romania

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	17 (1.2)
Reading	32 (1.6)
Mathematics	28 (1.7)
Science	37 (2.2)

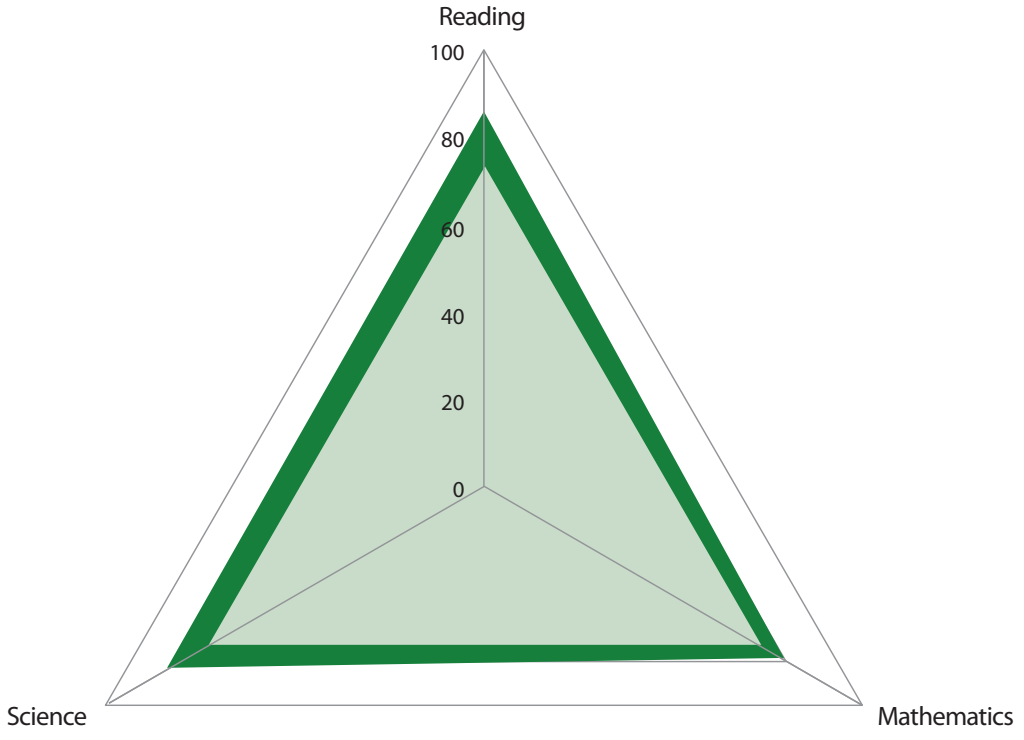
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	73 (2.1)
Reading	86 (1.5)
Mathematics	79 (2.0)
Science	84 (1.8)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

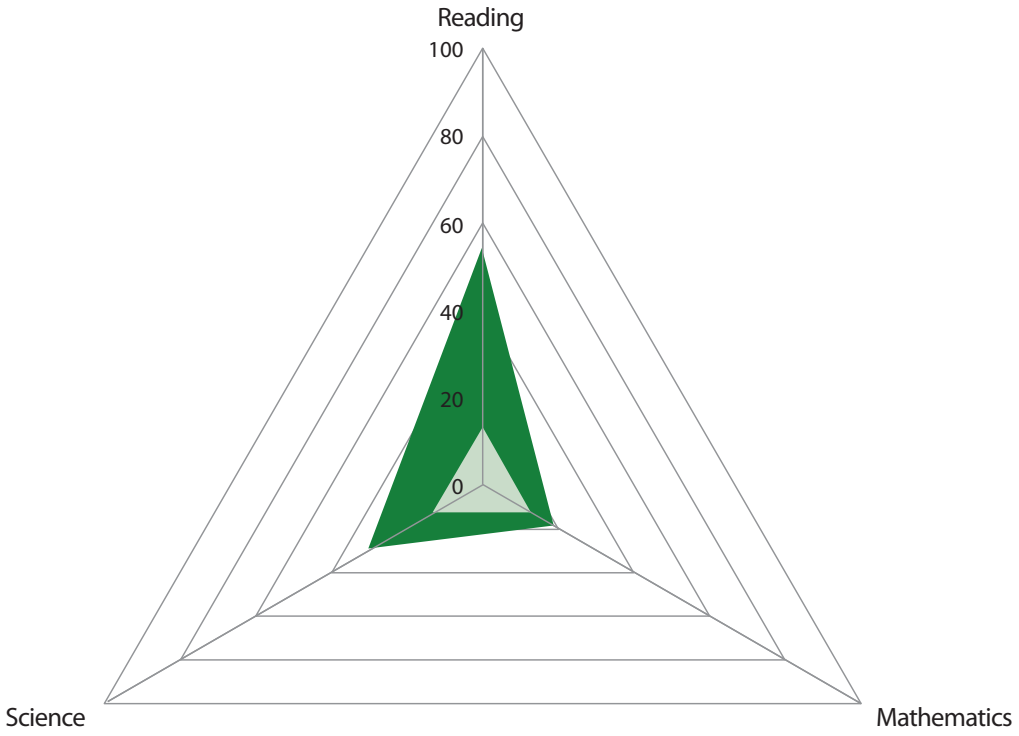
Exhibit 1.22: Croatia

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	13 (0.7)
Reading	54 (1.3)
Mathematics	19 (1.0)
Science	30 (1.1)

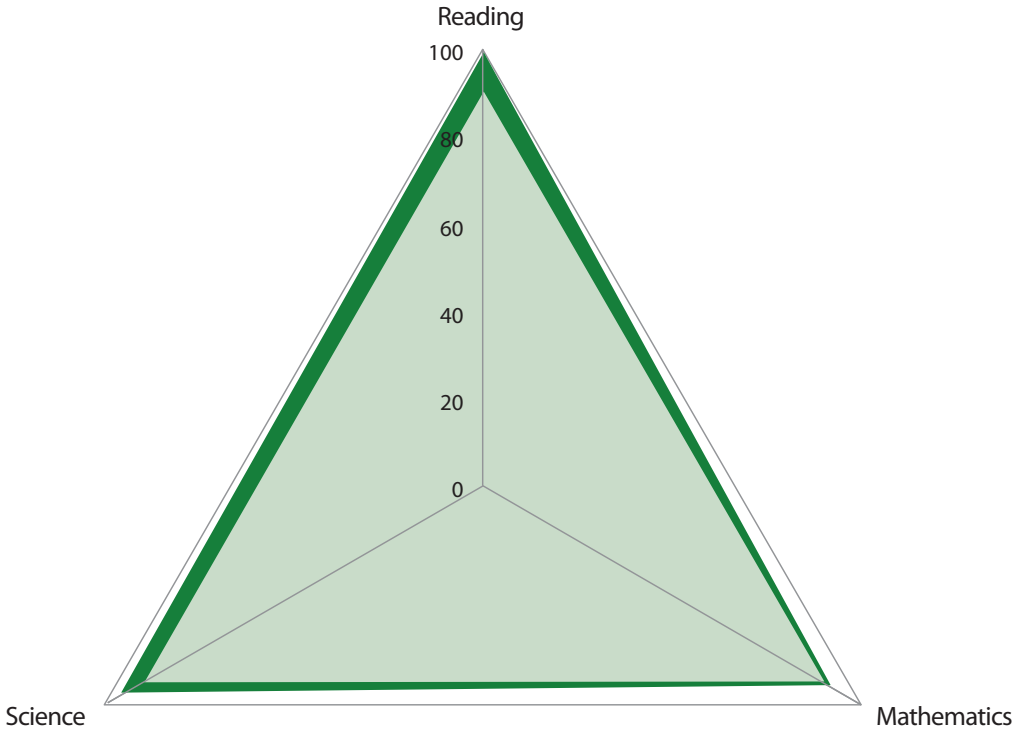
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	90 (1.0)
Reading	99 (0.2)
Mathematics	91 (0.9)
Science	96 (0.5)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

POLAND There also was considerable variation in achievement in Poland. In reading, 39 percent reached the high benchmark and 29 percent did in science, while only 17 percent reached that level in mathematics. Twelve percent reached the high benchmark in all three subjects, and 83 percent reached the low level in all three subjects. The relative weakness in mathematics also was emerging at the low benchmark. While 95 and 91 percent of the students reached the low level in reading and science, respectively, 87 percent did in mathematics.

SPAIN Similar to the pattern in Croatia and Poland, the Spanish students also showed a relative weakness in mathematics. Similar percentages of students reached the high benchmark in reading (30%) and in science (28%), while only 17 percent did in mathematics. Nine percent reached the high benchmark in all three subjects, and 82 percent reached the low benchmark in all three subjects. The relative weakness in mathematics was noticeable at the low benchmark, with 94 and 92 percent of the students reaching the low benchmark in reading and science, but 87 percent in mathematics.

NORWAY Norway had relatively similar percentages of students reaching the high benchmark in reading (25%), mathematics (21%), and science (19%). Interestingly, only 8 percent of those were the same students reaching the high benchmark in all three subjects. Also, high percentages of students reached the low benchmarks, more than 90 percent in each of the subjects. However, again somewhat fewer (86%) reached the low benchmark in all three subjects.

MALTA The Maltese fourth grade students showed a relative weakness in science. One-fourth of the students reached the high benchmark in mathematics and reading, but only 14 percent in science. Seven percent reached the high benchmark in all three subjects, and 64 percent reached the low benchmark in all three subjects. At the low benchmark, the percentages indicated a relative strength in mathematics (88%), compared to 78 percent in reading and 70 percent in science.

UNITED ARAB EMIRATES Fourteen percent of the students reached the high benchmarks in reading and science, and 12 percent did in mathematics. Six percent reached the high benchmark in all three subjects, and about half (48%) reached the low benchmark in all three subjects. Achievement also was similar across the three subjects at the Low Benchmark (61-64%).

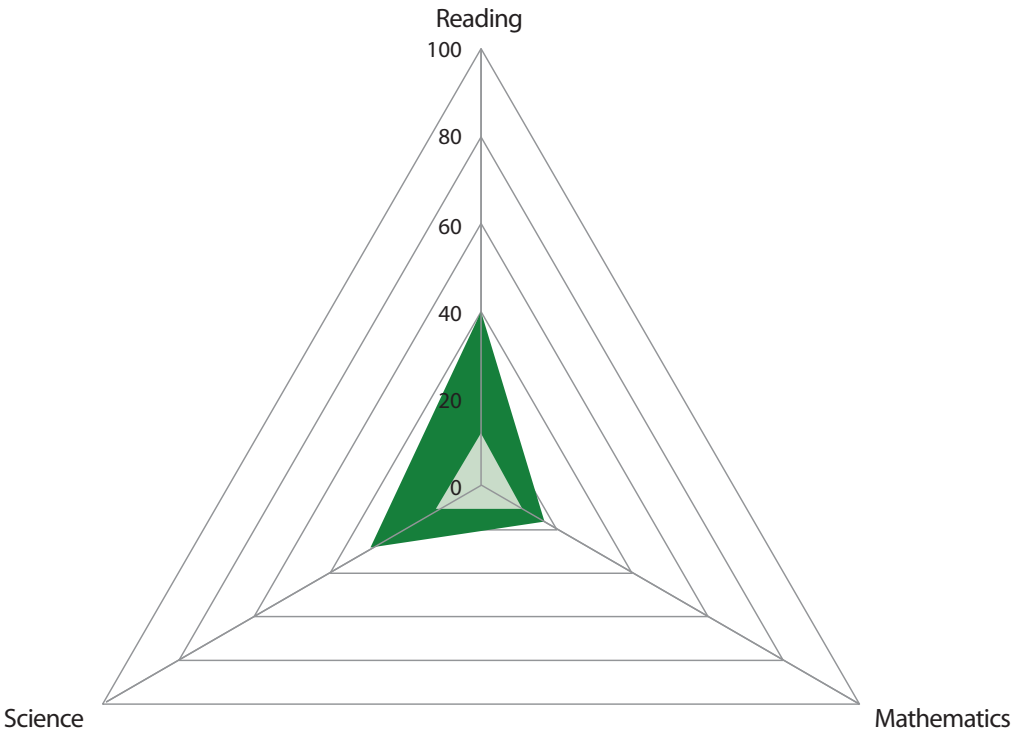
Exhibit 1.23: Poland

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	12 (0.8)
Reading	39 (1.2)
Mathematics	17 (1.0)
Science	29 (1.5)

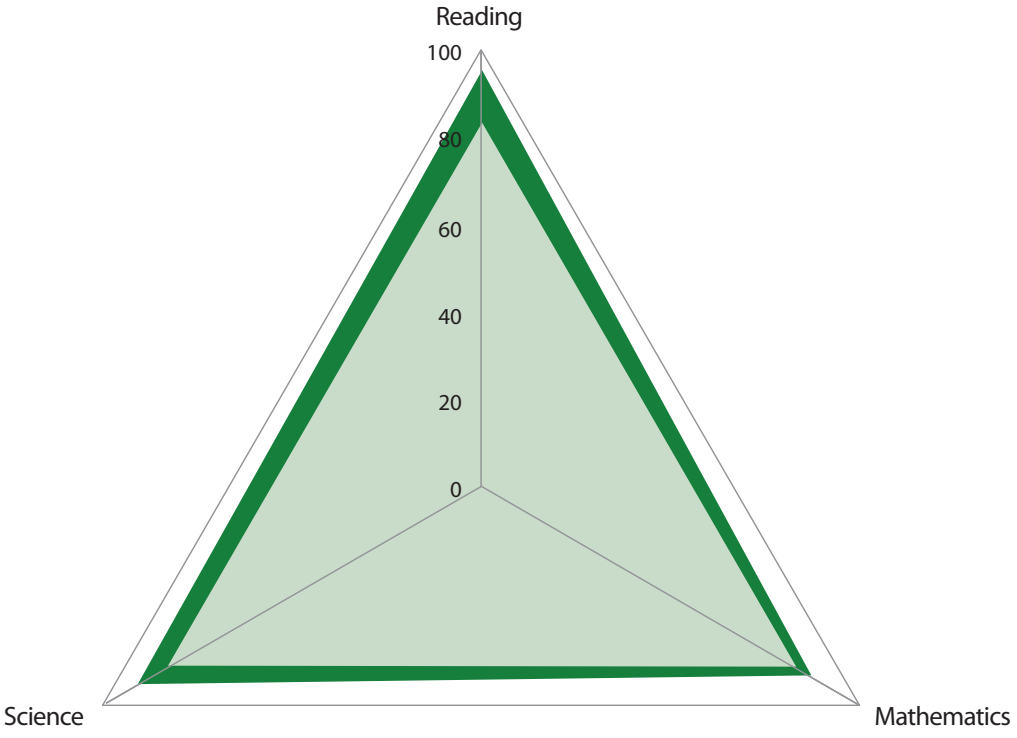
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	83 (1.0)
Reading	95 (0.5)
Mathematics	87 (0.9)
Science	91 (0.8)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

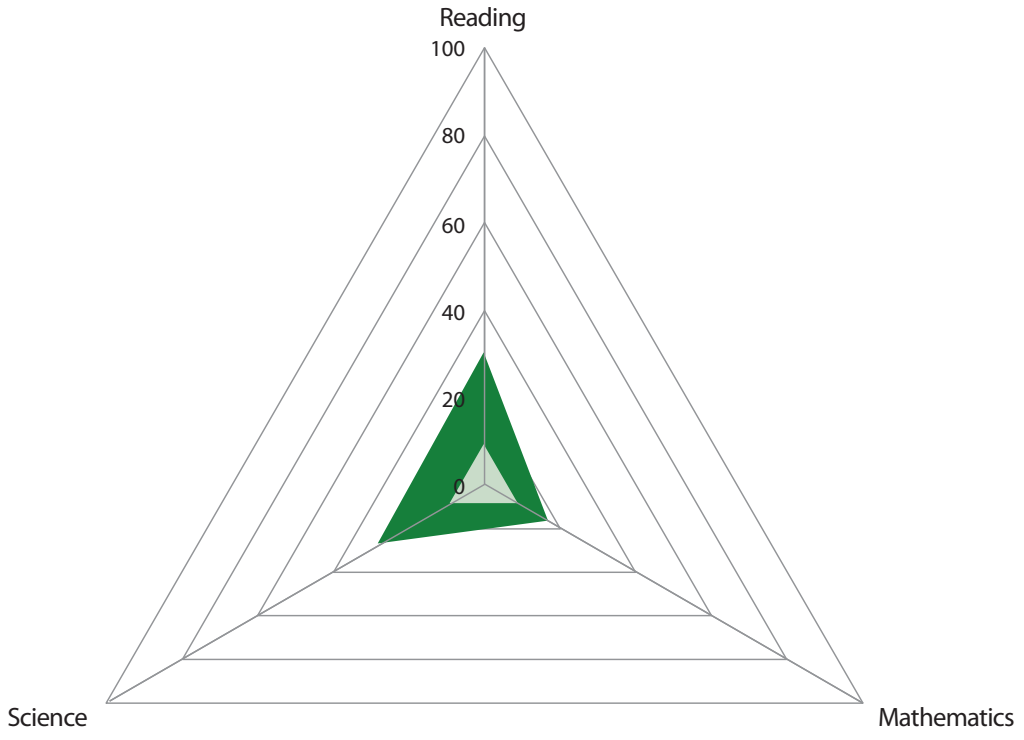
Exhibit 1.24: Spain

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	9 (0.8)
Reading	30 (1.7)
Mathematics	17 (1.1)
Science	28 (1.5)

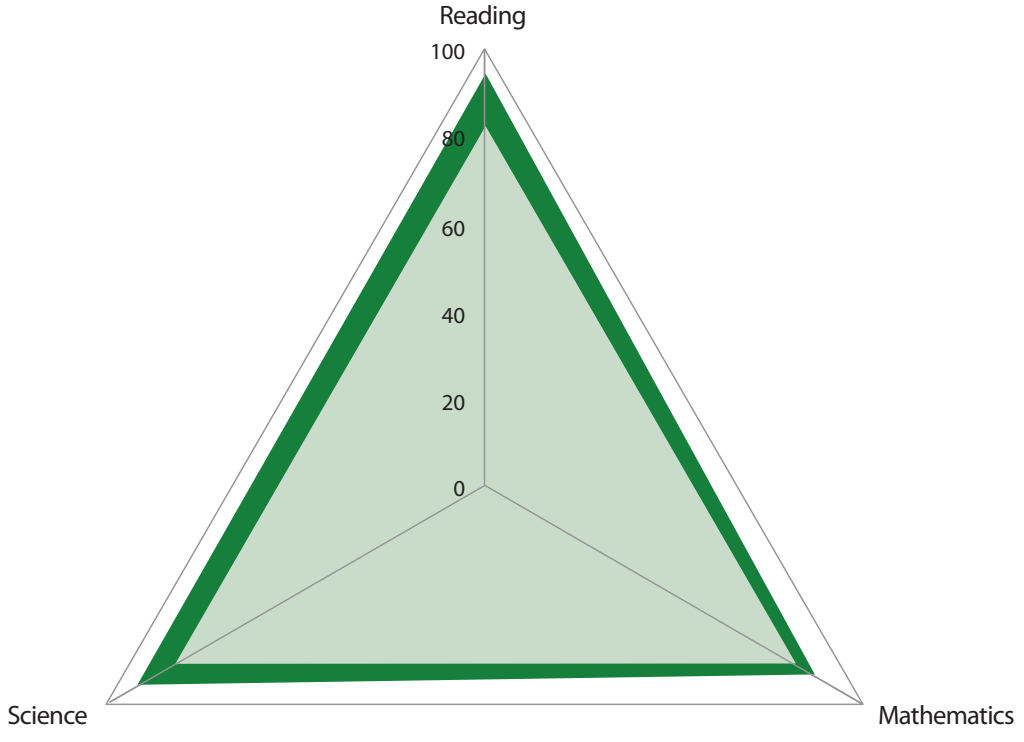
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	82 (1.4)
Reading	94 (0.9)
Mathematics	87 (1.2)
Science	92 (1.2)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

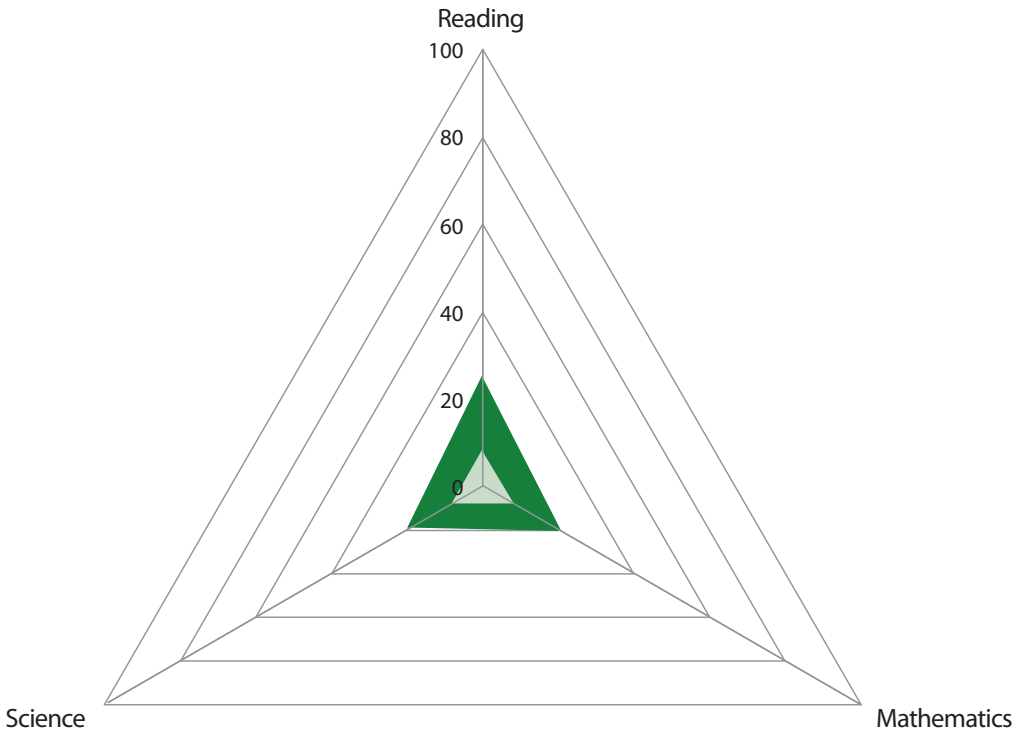
Exhibit 1.25: Norway

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	8 (0.9)
Reading	25 (1.6)
Mathematics	21 (1.6)
Science	19 (1.3)

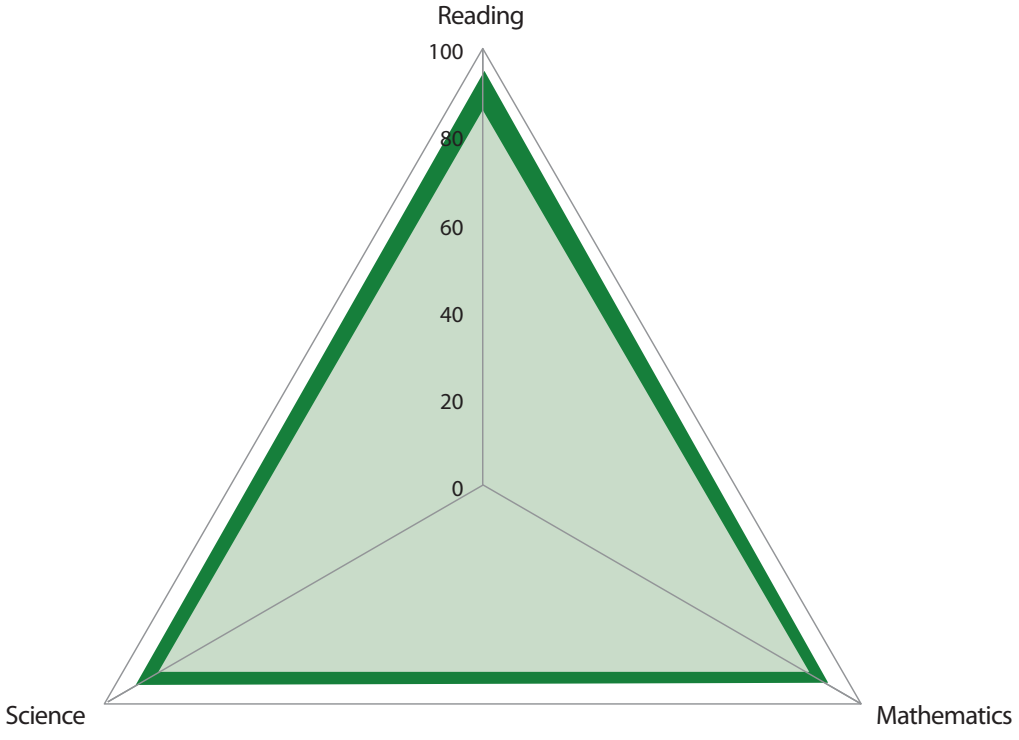
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	86 (1.2)
Reading	95 (0.8)
Mathematics	91 (0.9)
Science	92 (0.9)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

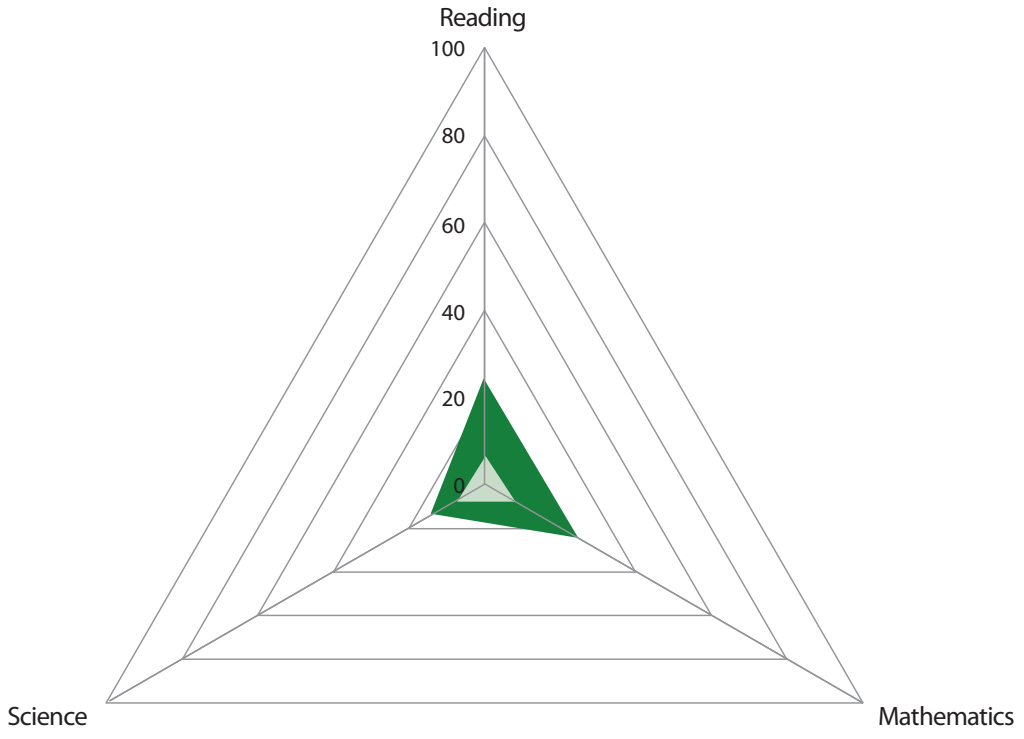
Exhibit 1.26: Malta

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	7 (0.4)
Reading	24 (0.7)
Mathematics	25 (0.9)
Science	14 (0.6)

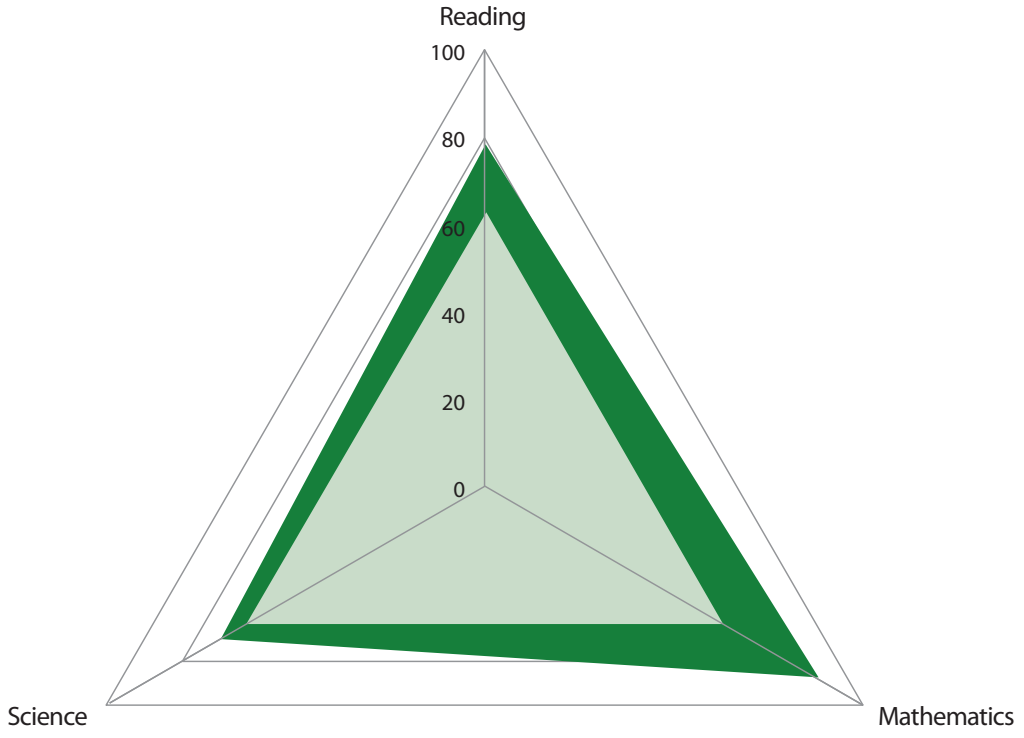
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	64 (0.9)
Reading	78 (0.7)
Mathematics	88 (0.7)
Science	70 (1.0)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

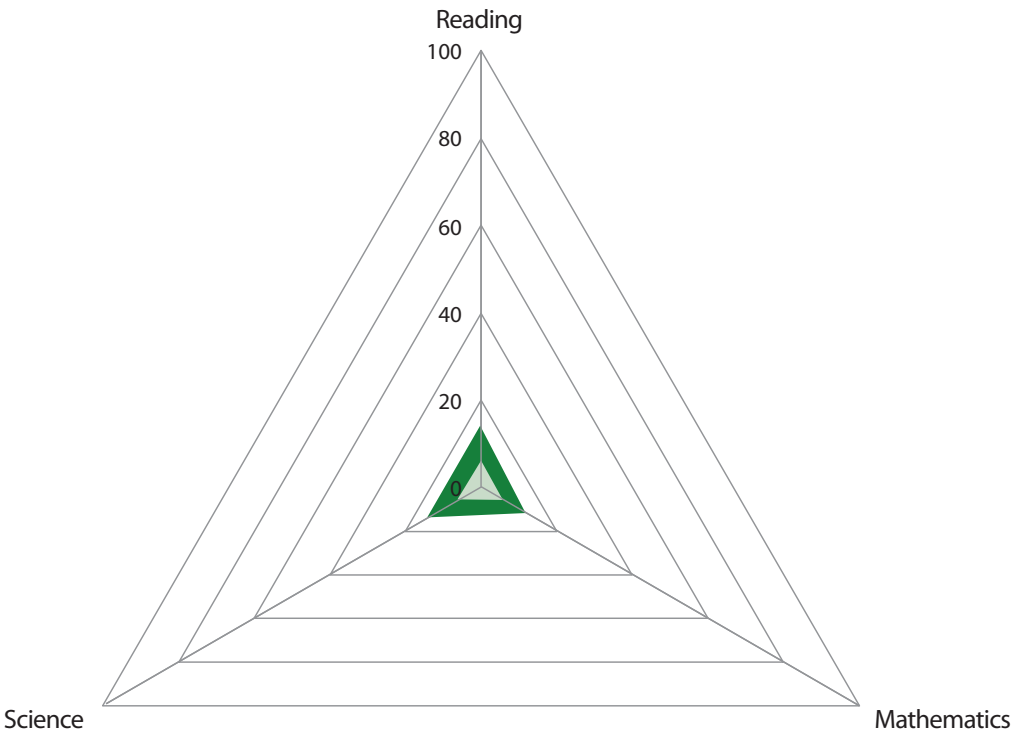
Exhibit 1.27: United Arab Emirates

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	6 (0.4)
Reading	14 (0.6)
Mathematics	12 (0.5)
Science	14 (0.5)

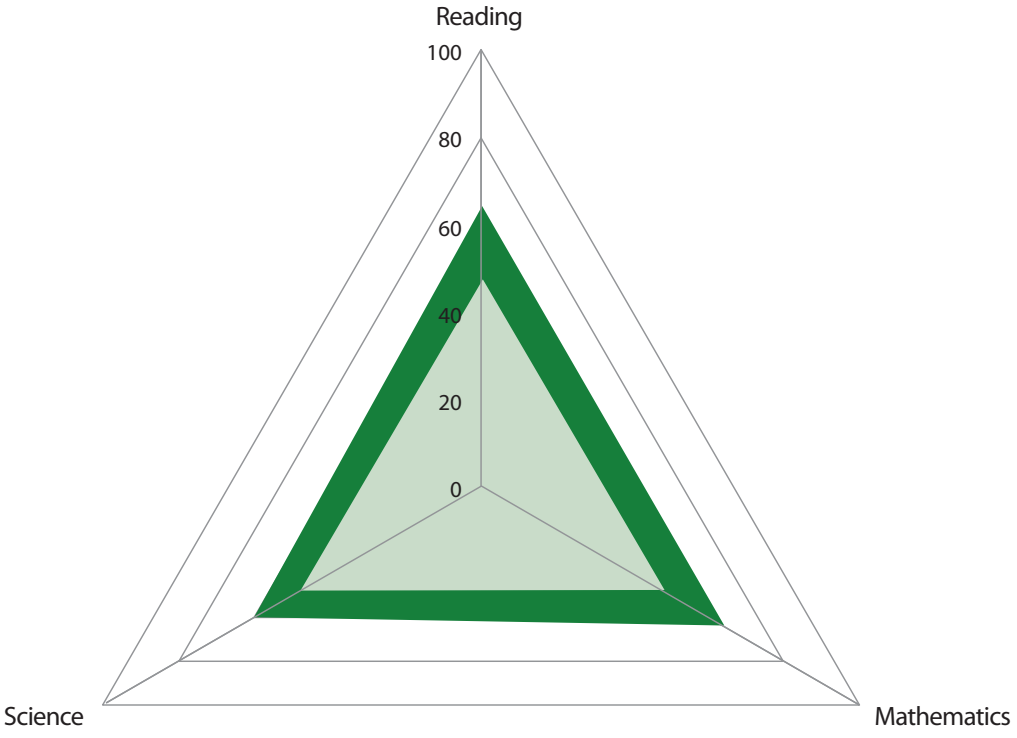
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	48 (1.1)
Reading	64 (0.9)
Mathematics	64 (1.0)
Science	61 (1.1)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

GEORGIA The Georgian students found the assessments difficult, but showed a relative strength in reading. While 21 percent of the fourth grade students reached the high benchmark in reading, only 12-13 percent did in mathematics and science. Similarly, 87 percent reached the low benchmark in reading, compared with 72 percent in mathematics and 75 percent in science. Five percent reached the high benchmark in all three subjects and 65 percent reached the low benchmark in all three subjects.

IRAN In Iran, students showed a slight comparative weakness in mathematics. Sixteen percent of the students reached the high benchmark in science and 13 percent in reading, compared to 9 percent in mathematics. Four percent reached the high benchmark in all three subjects, and 57 percent reached the low benchmark in all three subjects. The pattern of mathematics being a relative weakness was noticeable at the low benchmark, 76 and 72 percent reaching this level in reading and science, respectively, but 64 percent in mathematics.

QATAR Similar percentages (10-12%) reached the High International Benchmark in each of the three subjects, and 4 percent reached the high benchmark in all three subjects. Forty percent reached the Low International Benchmark in all three subjects, with 60 percent reaching this level in reading, 55 percent in mathematics, and 50 percent in science.

AZERBAIJAN Interestingly, students in Azerbaijan showed a relative strength in mathematics at the high benchmark, and relative strength in reading at the low benchmark. The percentages of students reaching the high benchmark were 21 percent in mathematics, but only 13 percent in science and 9 percent in mathematics. Three percent reached the high benchmark in all three subjects, and 55 percent reached the low benchmark in all three subjects. However, 82 percent of the students reached the low benchmark in reading, compared to 72 percent in mathematics and 65 percent in science.

SAUDI ARABIA Twelve percent of the students reached the high benchmark in science, 8 percent in reading, and 7 percent in mathematics. Two percent reached the high benchmark in all three subjects and 43 percent reached the low benchmark in all three subjects, with performance in reading and science (63-65%) at the low benchmark relatively stronger than in mathematics (55%).

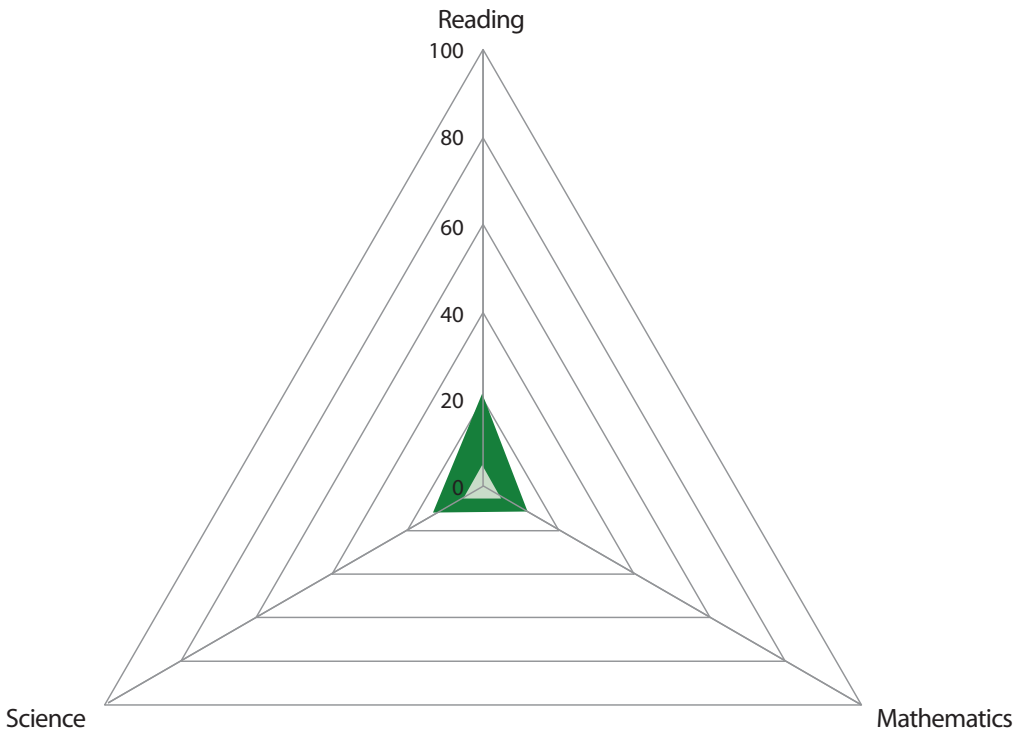
Exhibit 1.28: Georgia

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	5 (0.7)
Reading	21 (1.2)
Mathematics	12 (1.0)
Science	13 (1.2)

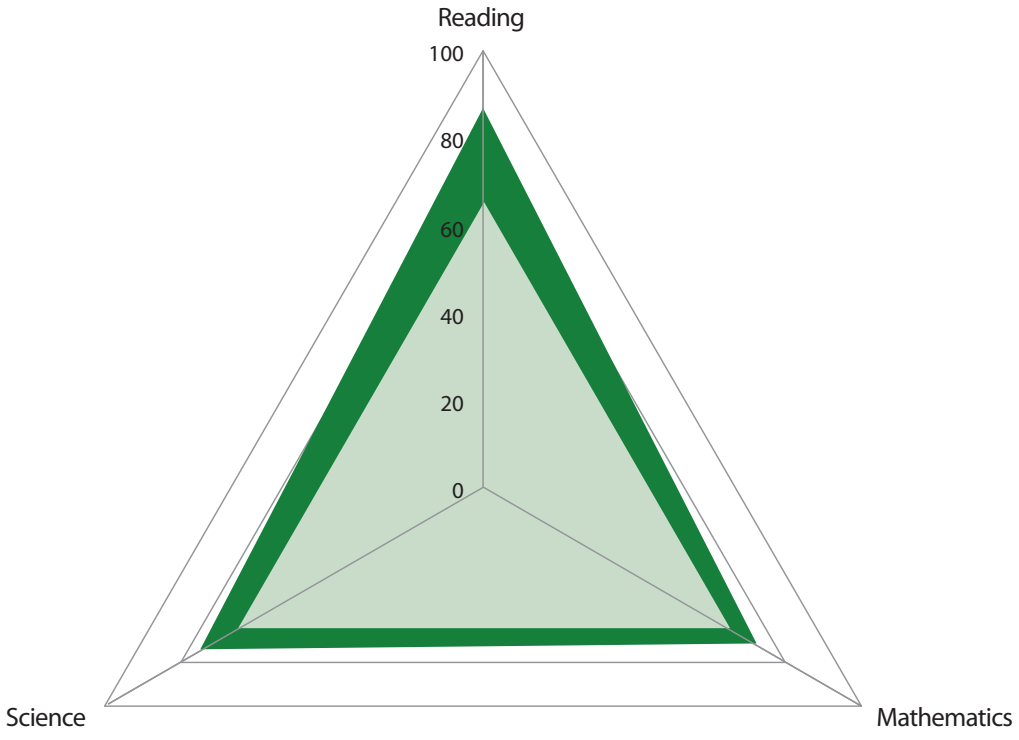
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	65 (1.6)
Reading	87 (1.4)
Mathematics	72 (1.7)
Science	75 (1.6)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

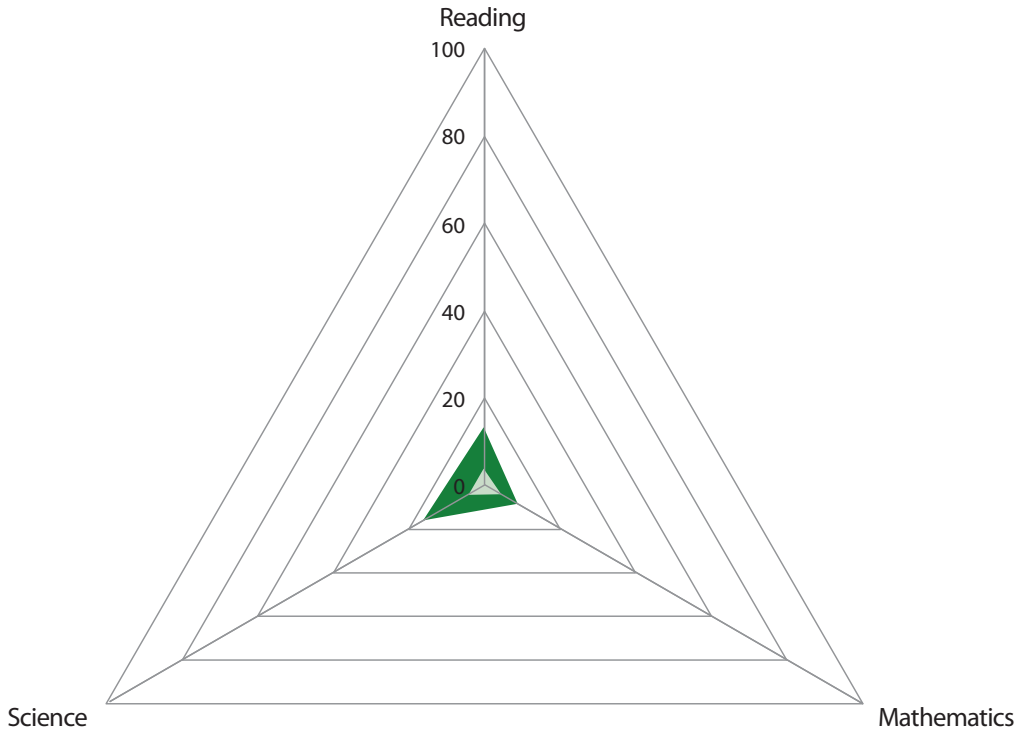
Exhibit 1.29: Iran, Islamic Republic of

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	4 (0.5)
Reading	13 (0.9)
Mathematics	9 (0.8)
Science	16 (1.1)

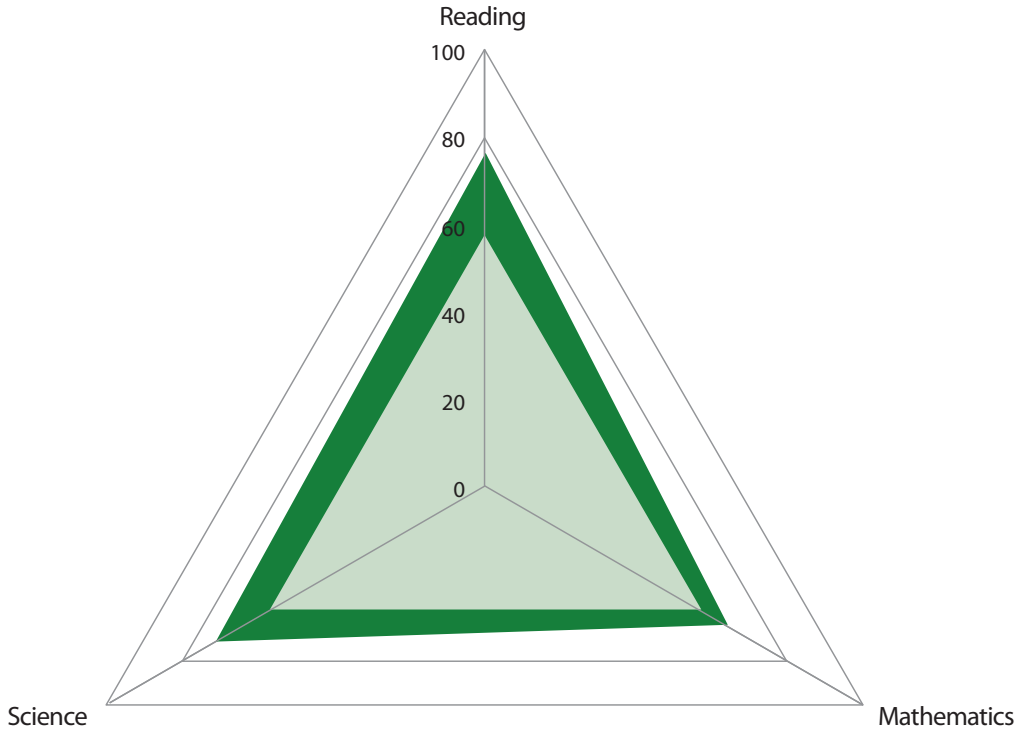
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	57 (1.6)
Reading	76 (1.2)
Mathematics	64 (1.5)
Science	72 (1.5)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

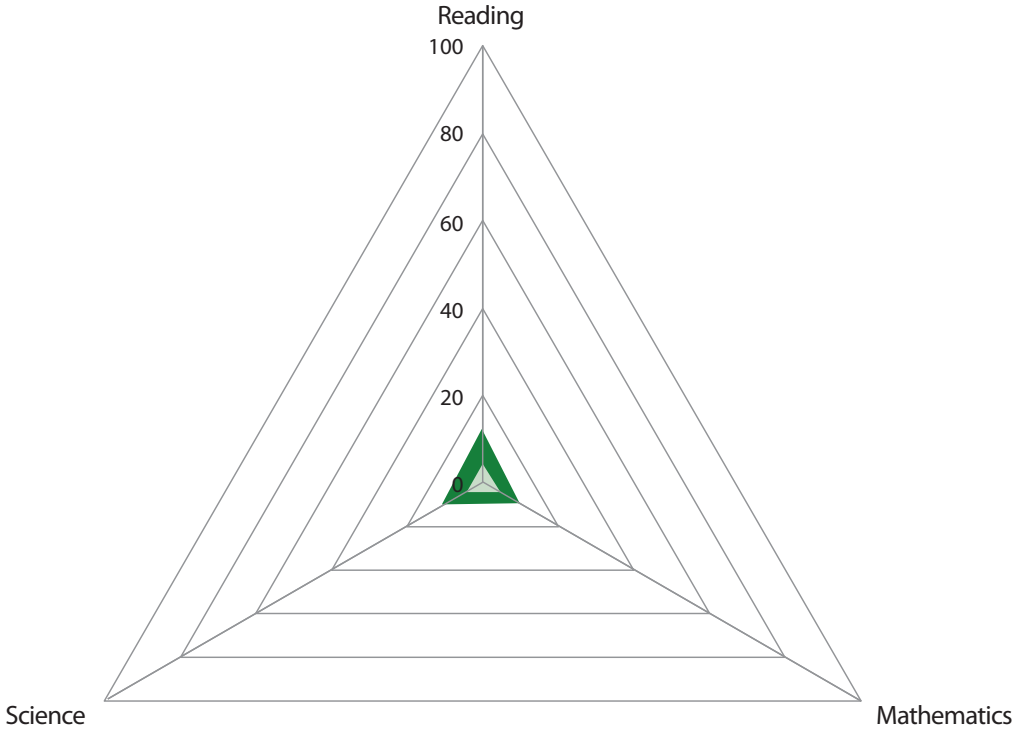
Exhibit 1.30: Qatar

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	4 (0.7)
Reading	12 (1.1)
Mathematics	10 (0.9)
Science	11 (1.0)

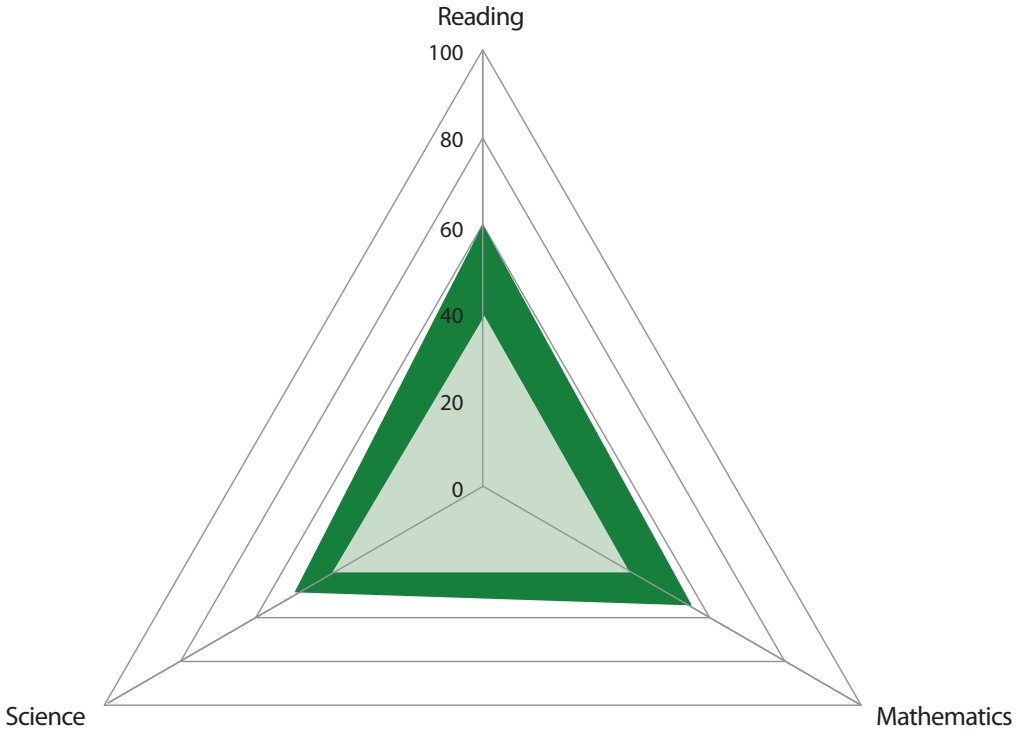
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	40 (1.6)
Reading	60 (1.5)
Mathematics	55 (1.5)
Science	50 (1.5)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

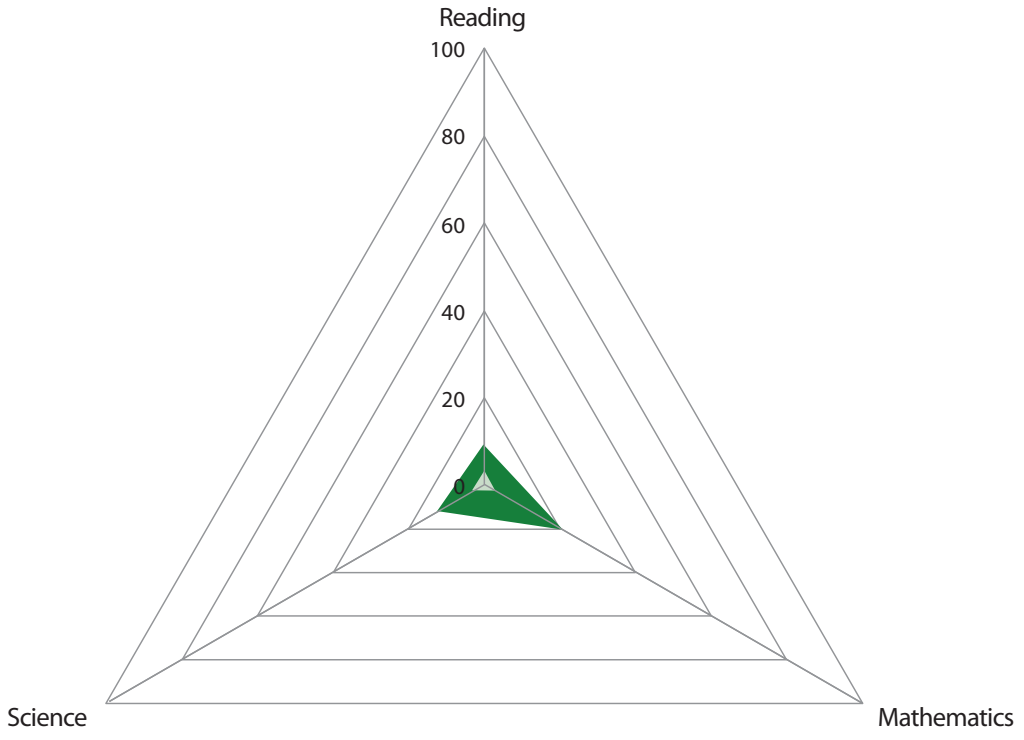
Exhibit 1.31: Azerbaijan

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	3 (0.7)
Reading	9 (0.9)
Mathematics	21 (2.3)
Science	13 (1.7)

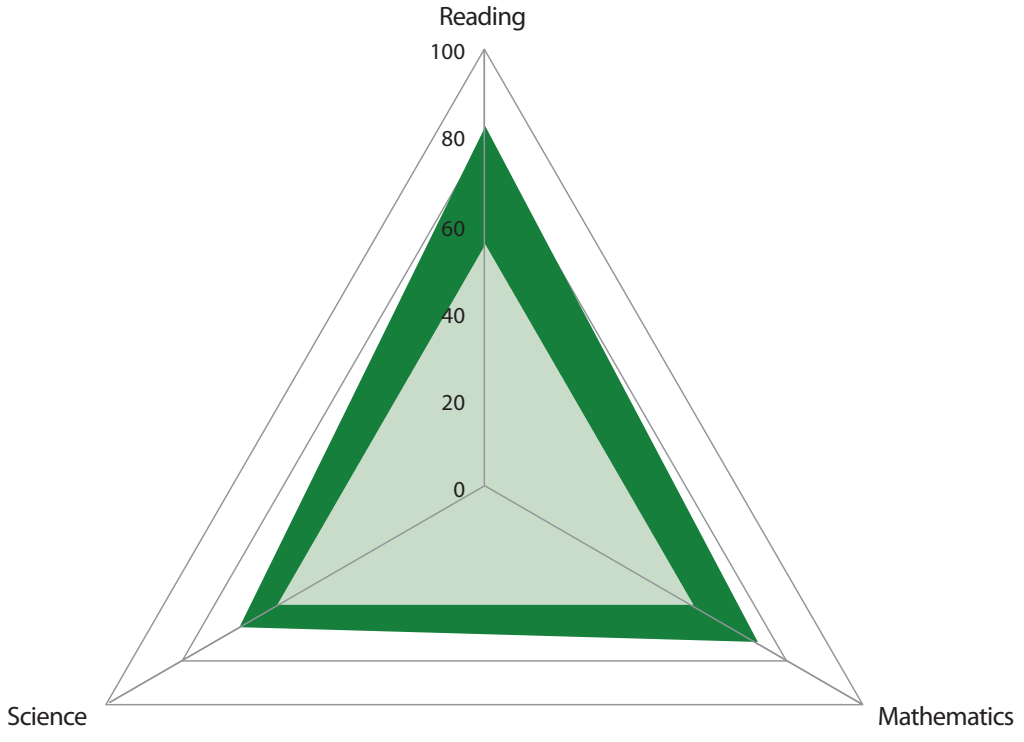
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	55 (2.3)
Reading	82 (1.6)
Mathematics	72 (1.9)
Science	65 (2.0)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

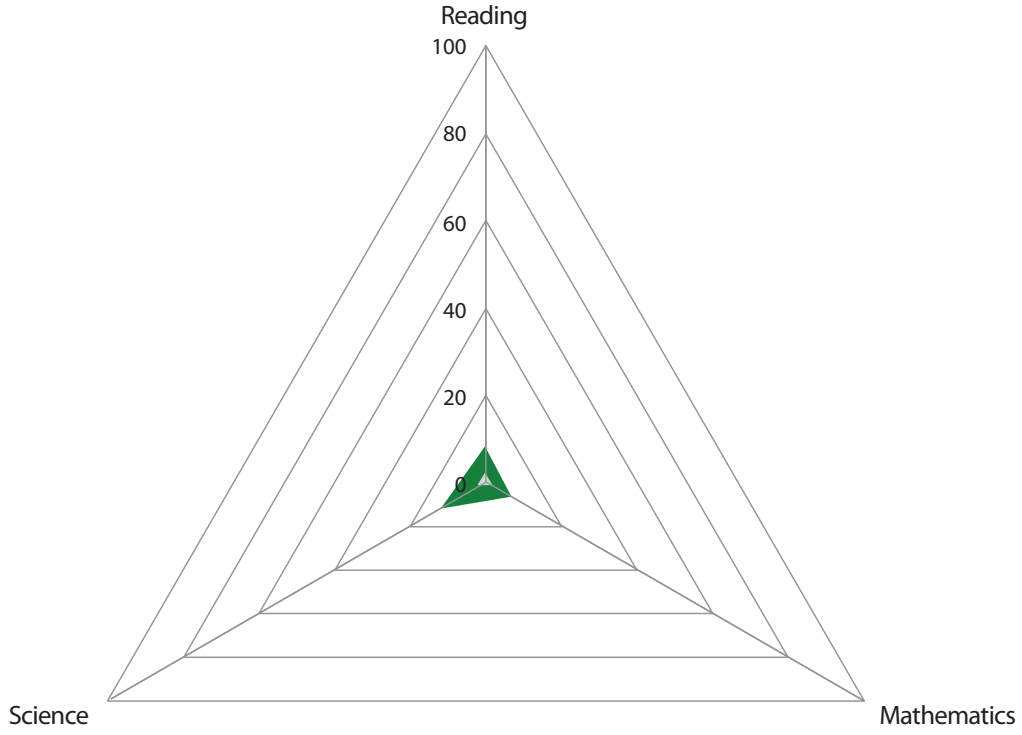
Exhibit 1.32: Saudi Arabia

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	2 (0.7)
Reading	8 (1.0)
Mathematics	7 (1.2)
Science	12 (1.4)

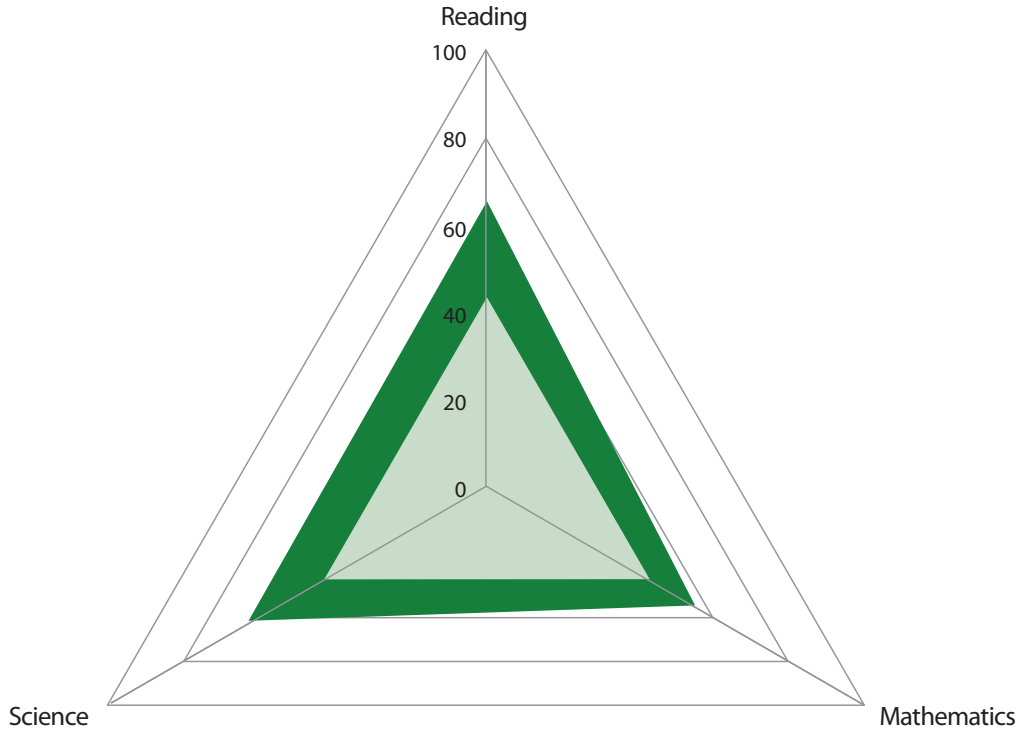
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	43 (1.8)
Reading	65 (1.8)
Mathematics	55 (1.8)
Science	63 (1.9)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

OMAN Performance was similar across the three subjects in Oman. Relatively small percentages (5-7%) of students reached the High International Benchmark in each of the three subjects, with 1 percent reaching the high level in all three subjects. Thirty percent reached the low benchmark in all three subjects, although nearly half (45-48%) reached the low level in each subject.

MOROCCO Performance was also similar across the three subjects in Morocco. Few students (1-2%) reached the high benchmarks in reading, mathematics, and science, but about one-fourth reached the low benchmark in mathematics, 21 percent in reading, and 15 percent in science.

Countries at the Sixth Grade

BOTSWANA At the high benchmark, performance in Botswana was similar across the three subjects. Nine percent of the sixth grade students reached the high benchmark in reading, while 7 percent did so in mathematics and science. Three percent reached the high benchmark in all three subjects. At the Low International Benchmark, students showed a relative weakness in science. Thirty-seven percent reached the low benchmark in all three subjects, with 60 percent reaching that level in reading and 56 percent in mathematics, but only 43 percent in science.

HONDURAS In Honduras, students showed a relative weakness in mathematics at both the high and the low benchmark. At the high benchmark, 11 percent of the sixth grade students reached the benchmark in reading and 8 percent did so in science, but only 3 percent reached this level in mathematics. Because the students performing well in mathematics mostly also did well in the other two subjects, 2 percent reached the high benchmark in all three subjects. Forty-three percent reached the low benchmark in all three subjects, with considerable variation across the subjects. Approximately three-fourths of the students (74%) reached that level in reading, two-thirds (66%) in science, and half (49%) in mathematics.

Benchmarking Participants

QUEBEC, CANADA The students in Quebec showed relative weakness in science, with 43 percent of students reaching the High International Benchmark in reading and 40 percent in mathematics, compared to 29 percent in science. Seventeen percent reached the high benchmark in all three subject and essentially all students (95%) reached the low benchmark in all three subjects.

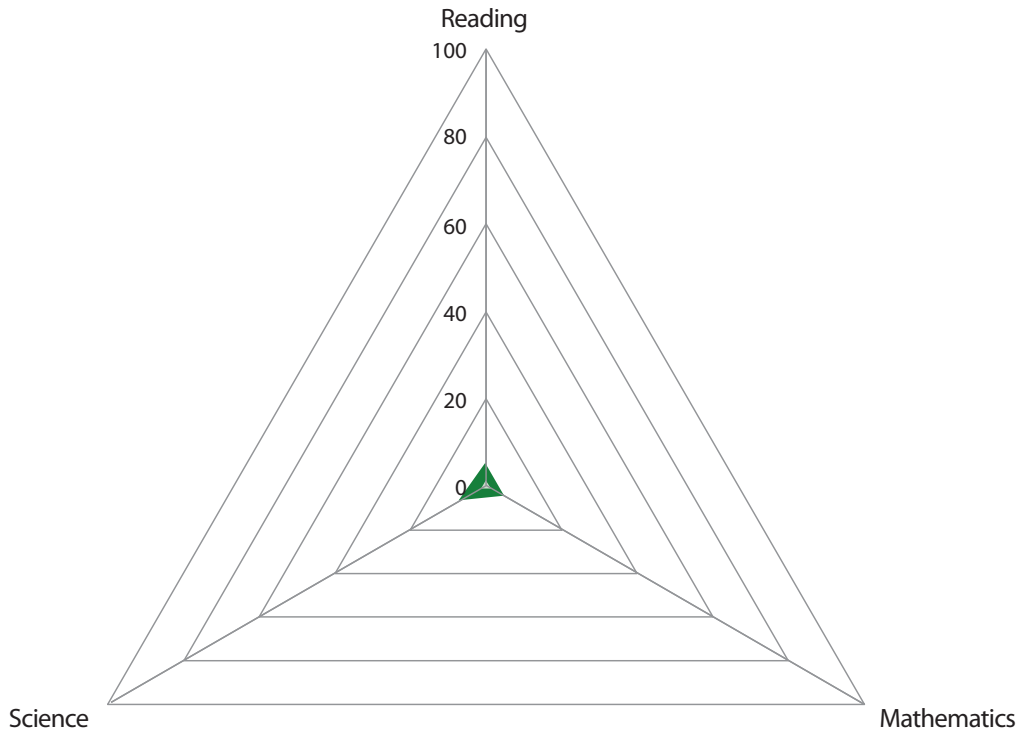
Exhibit 1.33: Oman

Profiles of High and Low Performance in Reading, Mathematics, and Science

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	1 (0.2)
Reading	5 (0.4)
Mathematics	5 (0.3)
Science	7 (0.7)

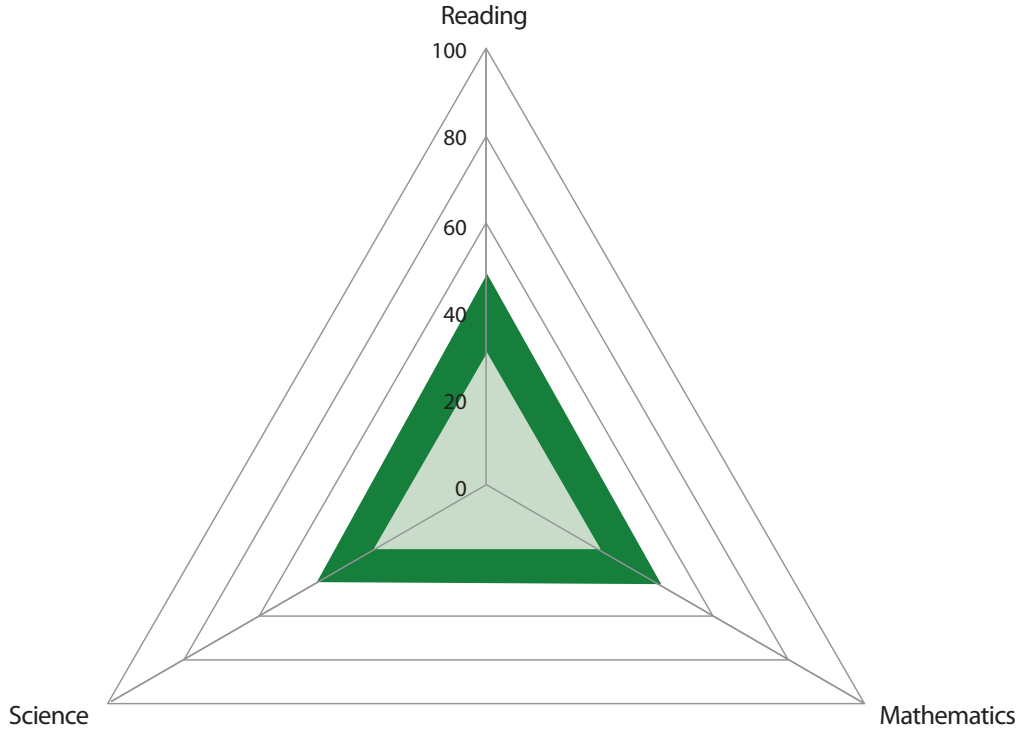
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	30 (1.0)
Reading	48 (1.2)
Mathematics	46 (1.2)
Science	45 (1.4)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

DUBAI, UNITED ARAB EMIRATES Performance was very similar across the three subjects. Approximately one-fourth of the students reached the High International Benchmark in each subject—26 percent in reading, 23 percent in science, and 22 percent in mathematics. Twelve percent of the students reached the high benchmark in all three subjects, and 63 percent reached the low benchmark in all three subjects. Approximately three-fourths of the students reached the Low International Benchmark in each subject—75 percent in both reading and mathematics, and 72 percent in science.

ABU DHABI, UNITED ARAB EMIRATES Performance in Abu Dhabi also was very similar across the three subjects. Ten percent of the students reached the high benchmark in reading and science, and 8 percent did in mathematics. Three percent reached the high benchmark in all three subjects and 43 percent reached the low benchmark in all three subjects. At the low benchmark, 60 percent reached this level in reading, 58 percent in mathematics, and 55 percent in science.

Summary

Students performing at the High International Benchmarks in all three subjects are very accomplished fourth grade students—able to read relatively complex materials with in-depth understanding, solve a variety of mathematics problems, and show familiarity with a range of scientific information. These students have developed a solid basis for further learning and are well positioned to take advantage of future educational opportunities. However, the TIMSS and PIRLS 2011 data provide evidence that it is a very challenging task to educate students to the level of the high benchmarks at the fourth grade. Only Singapore had more than half its students reach the high benchmarks in all three subjects, and only two more countries, Chinese Taipei and Finland, had at least half their fourth grade students reach the high benchmark in each subject separately. Chinese Taipei had 40 percent of its students reach the high benchmark in all three subjects and Finland had 39 percent, as did Hong Kong SAR. The Russian Federation had 35 percent reach the high benchmark in all three subjects, and the remaining participants had less than 30 percent.

More than half the countries, however, were successful in educating 90 percent of more of their students to the Low International Benchmark in all three subjects. These students showed that they can read and comprehend facts, read a variety of simple graphs and tables, know simple mathematics (such as adding, subtracting, and basic geometric figures), and know science

Exhibit 1.34: Morocco

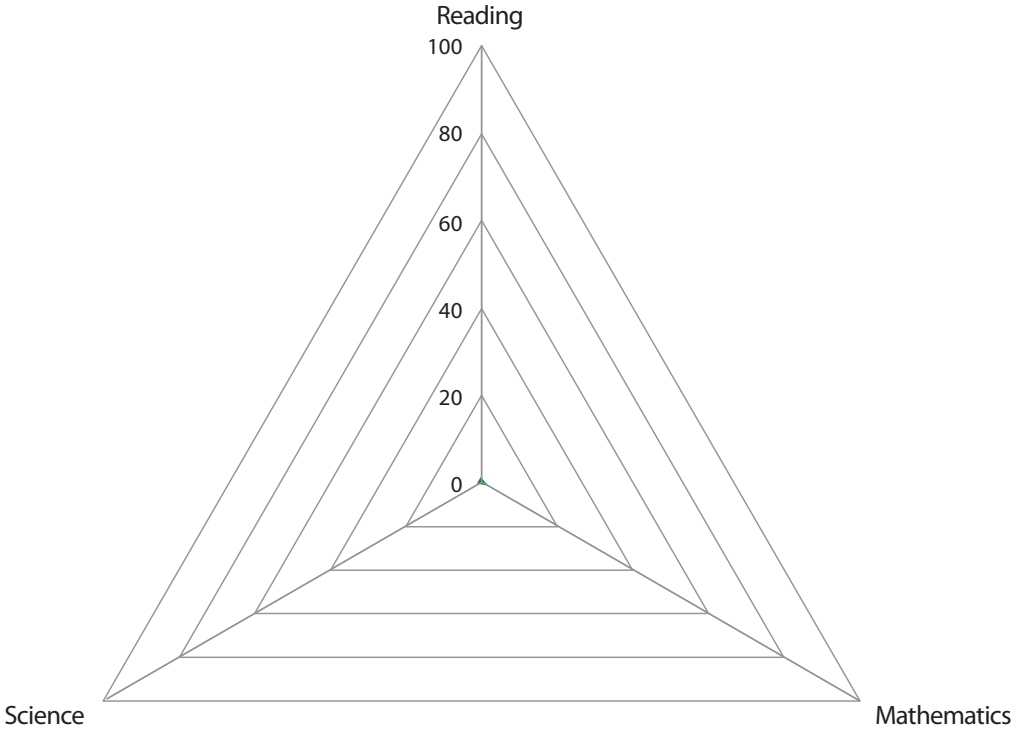
Profiles of High and Low Performance in Reading, Mathematics, and Science

Sixth Grade Participant

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	0 (0.1)
Reading	1 (0.2)
Mathematics	2 (0.6)
Science	1 (0.4)

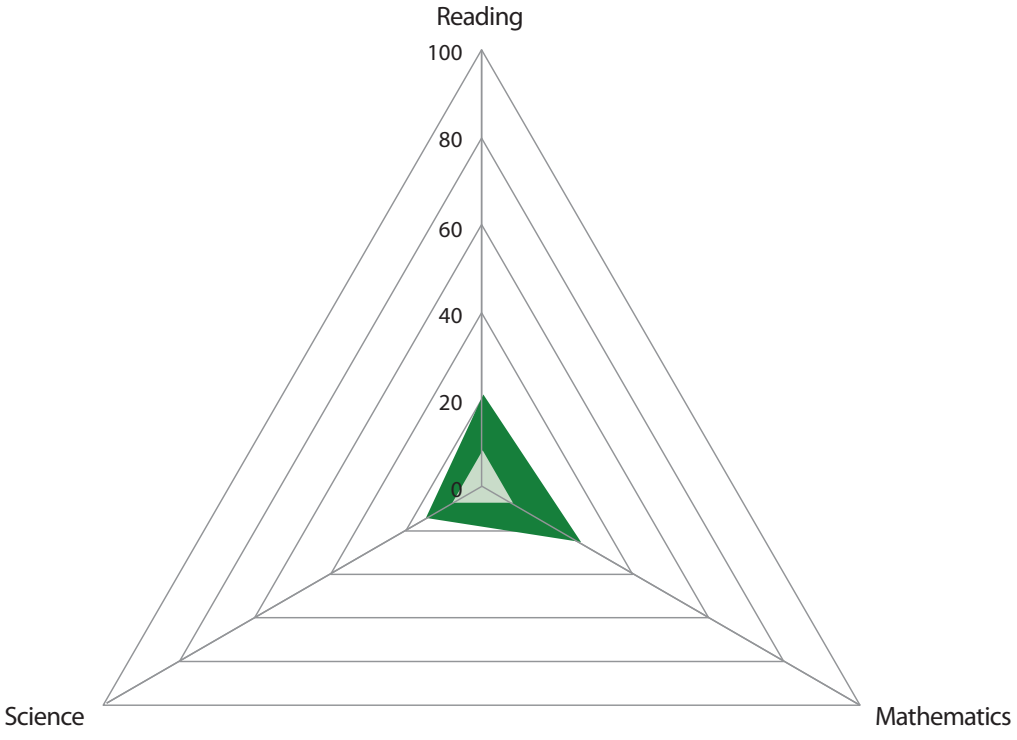
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	8 (0.9)
Reading	21 (1.3)
Mathematics	26 (1.5)
Science	15 (1.0)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.35: Botswana

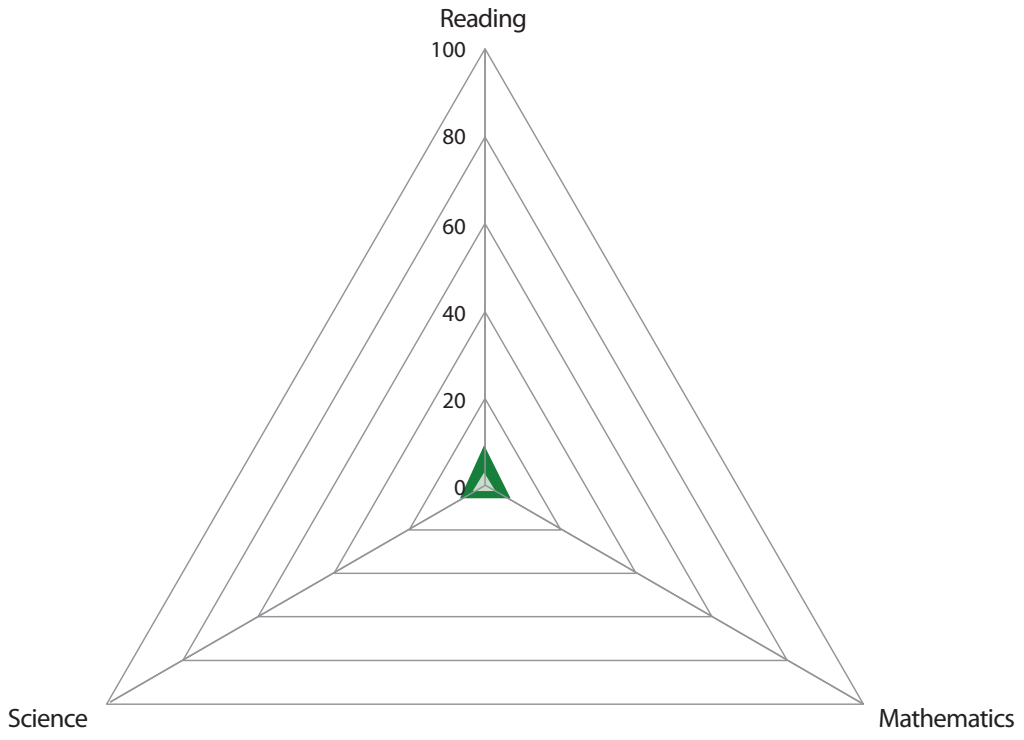
Profiles of High and Low Performance in Reading, Mathematics, and Science

Sixth Grade Participant

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	3 (0.7)
Reading	9 (1.3)
Mathematics	7 (1.0)
Science	7 (1.1)

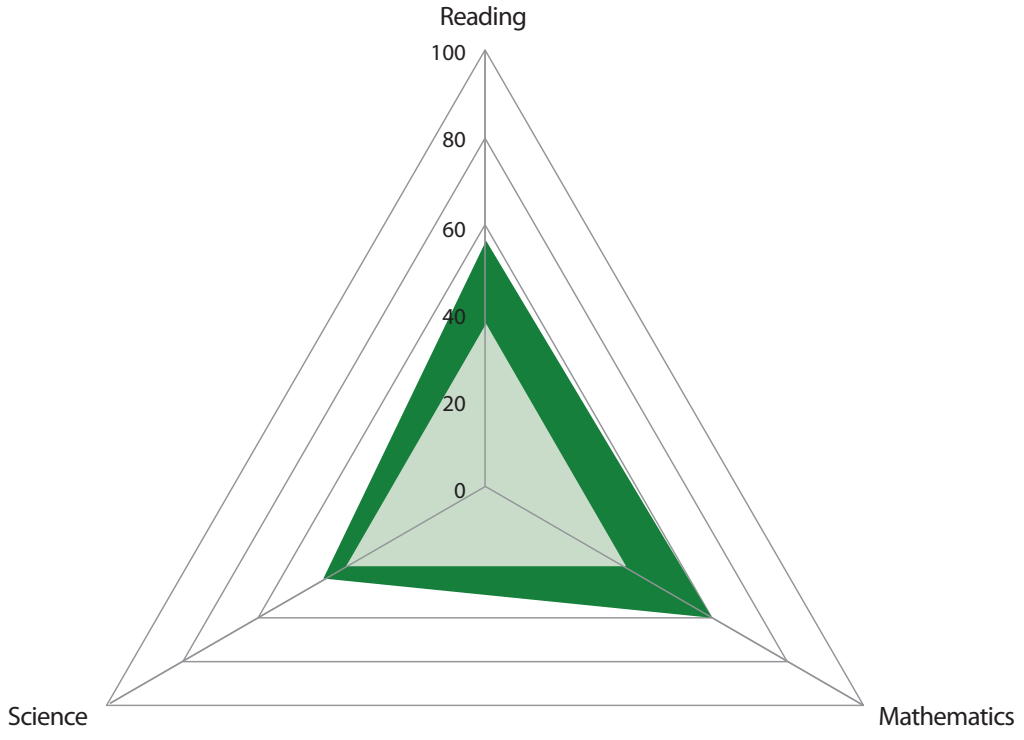
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	37 (1.8)
Reading	56 (1.8)
Mathematics	60 (1.6)
Science	43 (1.8)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.36: Honduras

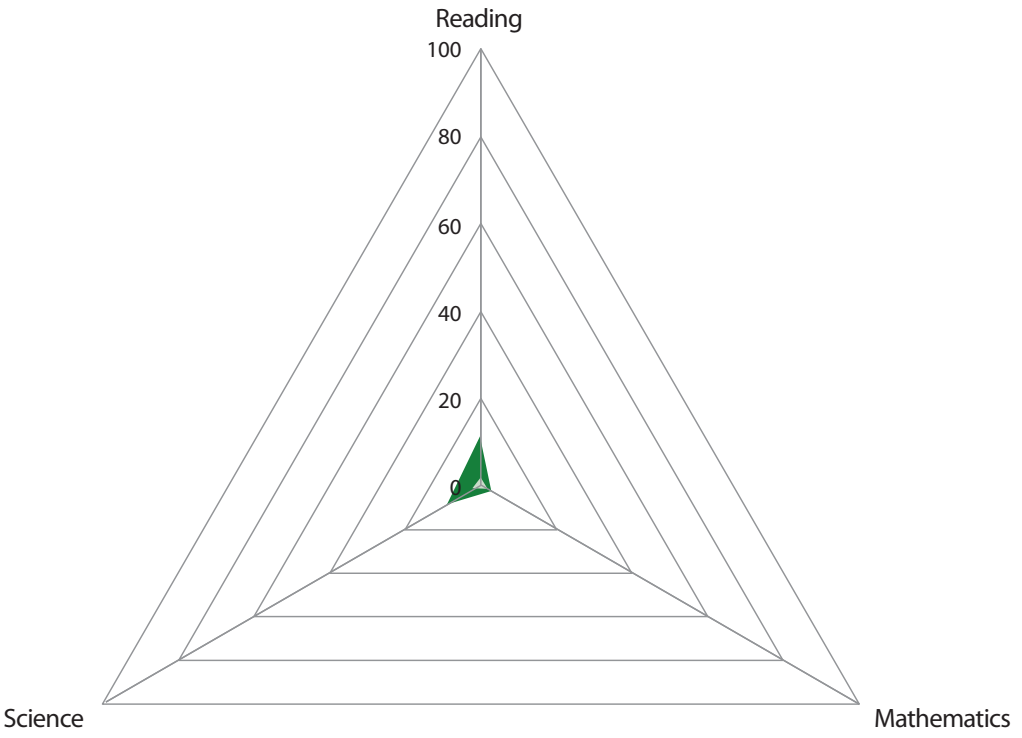
Profiles of High and Low Performance in Reading, Mathematics, and Science

Sixth Grade Participant

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	2 (0.6)
Reading	11 (1.5)
Mathematics	3 (0.9)
Science	8 (1.4)

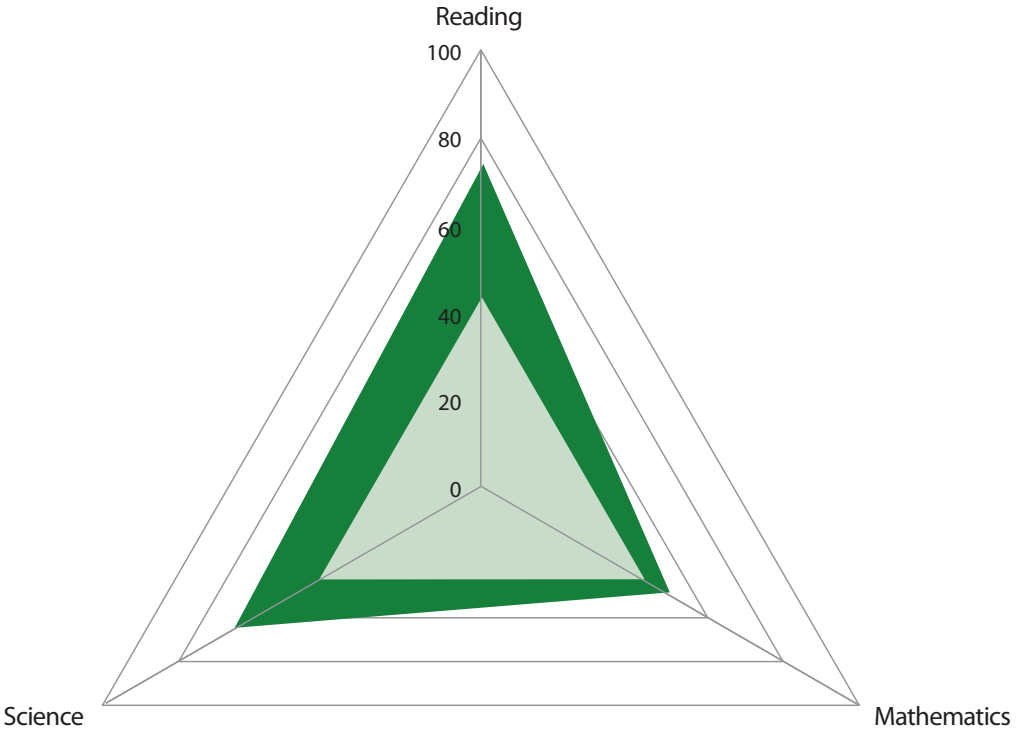
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	43 (2.5)
Reading	74 (2.2)
Mathematics	49 (2.5)
Science	66 (2.5)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.37: Quebec, Canada

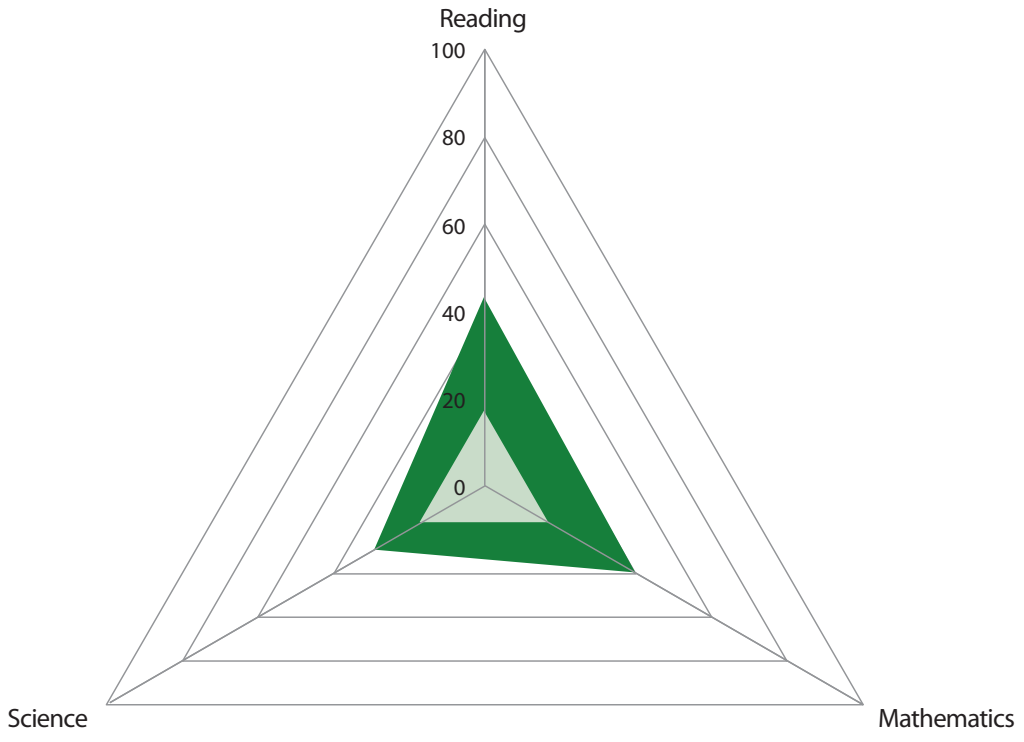
Profiles of High and Low Performance in Reading, Mathematics, and Science

Benchmarking Participant

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	17 (1.2)
Reading	43 (1.8)
Mathematics	40 (1.7)
Science	29 (1.5)

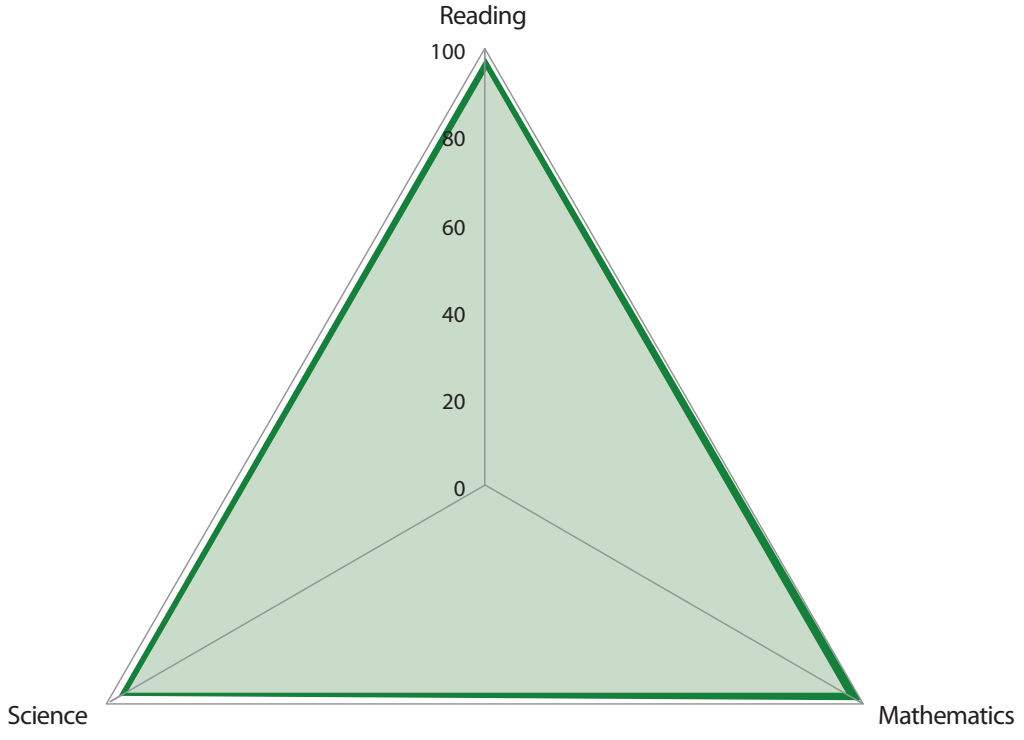
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	95 (0.5)
Reading	98 (0.3)
Mathematics	99 (0.3)
Science	97 (0.4)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.38: Dubai, UAE

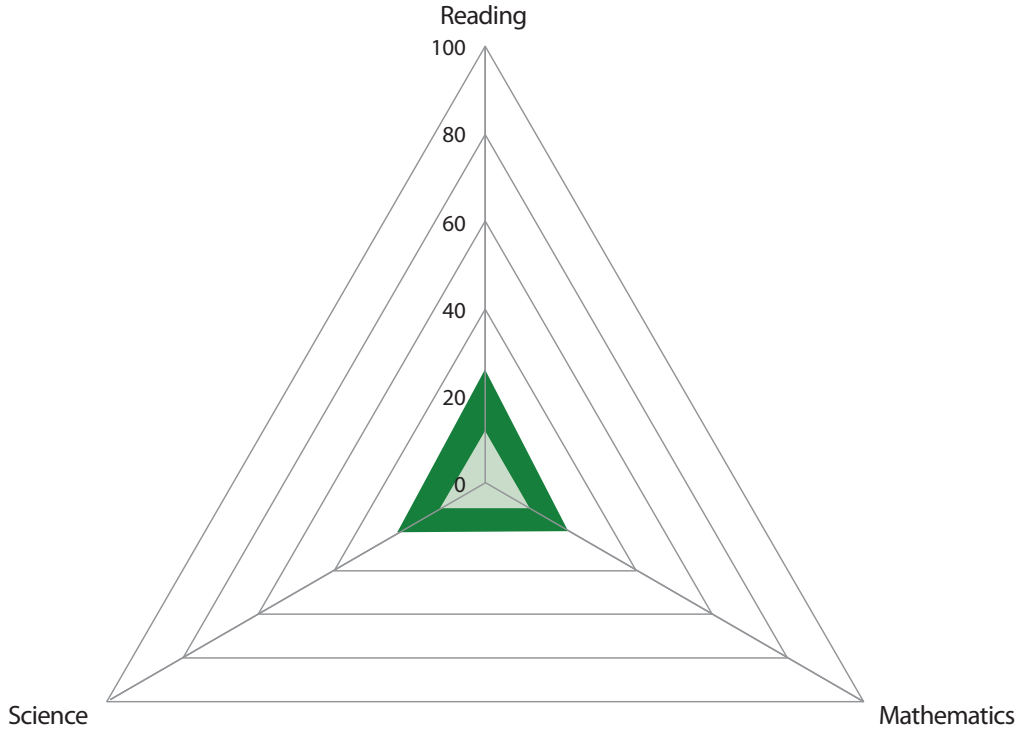
Profiles of High and Low Performance in Reading, Mathematics, and Science

Benchmarking Participant

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	12 (0.7)
Reading	26 (0.8)
Mathematics	22 (0.8)
Science	23 (0.9)

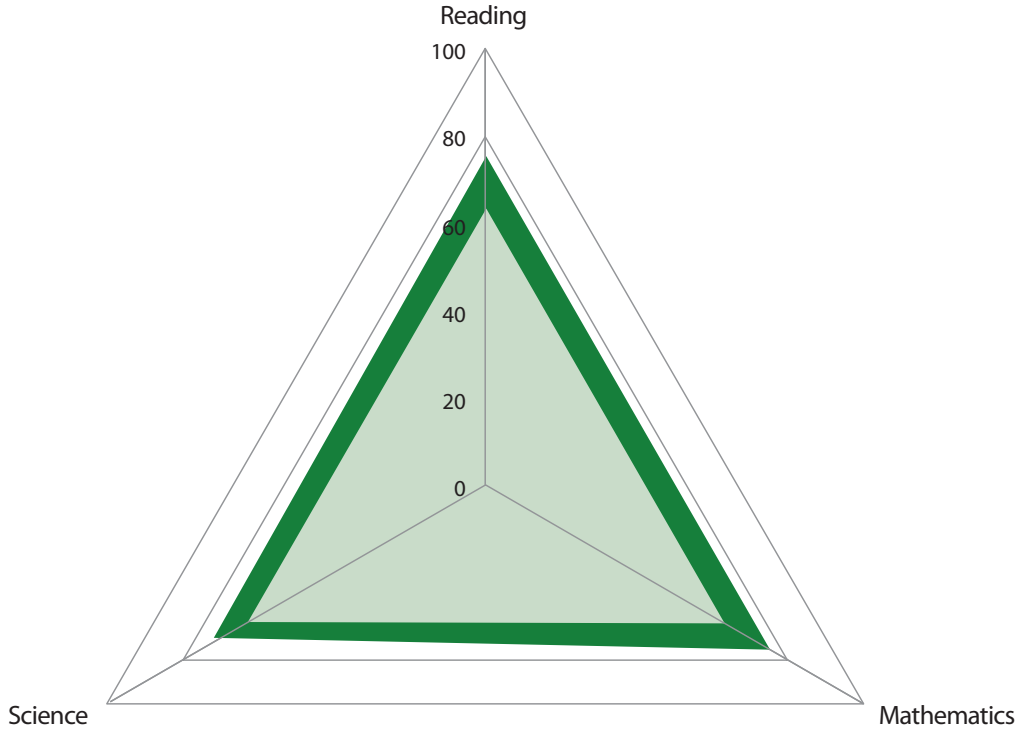
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	63 (1.2)
Reading	75 (0.8)
Mathematics	75 (0.8)
Science	72 (1.1)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

Exhibit 1.39: Abu Dhabi, UAE

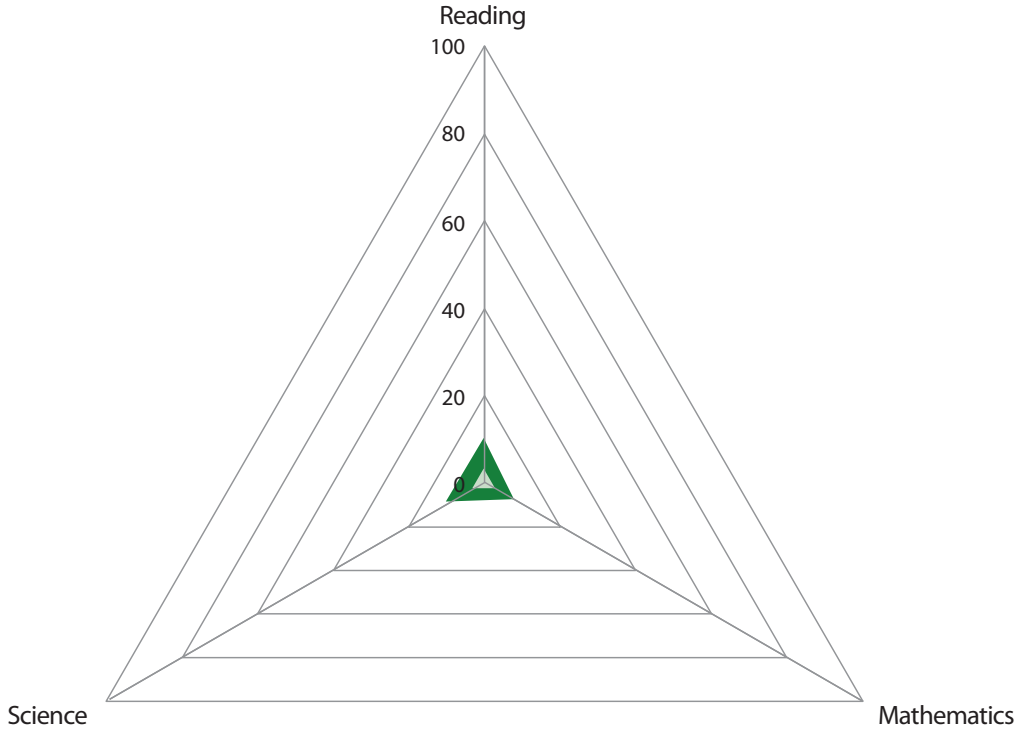
Profiles of High and Low Performance in Reading, Mathematics, and Science

Benchmarking Participant

High International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 High International Benchmarks	
Subjects	Percent of Students
All Three Subjects	3 (0.6)
Reading	10 (1.2)
Mathematics	8 (1.0)
Science	10 (1.0)

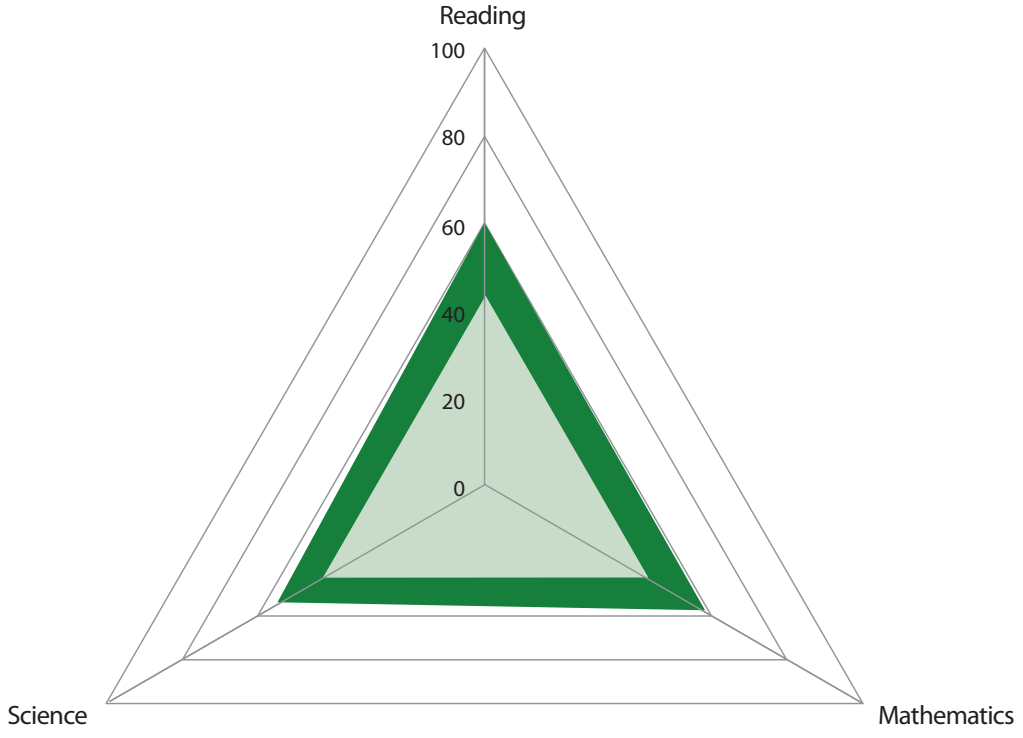
( ) Standard errors appear in parenthesis.



Low International Benchmarks

Students Reaching the TIMSS and PIRLS 2011 Low International Benchmarks	
Subjects	Percent of Students
All Three Subjects	43 (2.1)
Reading	60 (1.9)
Mathematics	58 (2.1)
Science	55 (2.2)

( ) Standard errors appear in parenthesis.



SOURCE: IEA's Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study – TIMSS and PIRLS 2011

facts about health, ecosystems, and animals. Although these students have lower achievement than those at the high level, they do have a well-rounded foundation in core concepts and skills that provides a good basis for further learning. In comparison, students who have not learned the basic fundamentals of reading, mathematics, and science by the end of their fourth year of schooling may be at some risk for future academic success.

Interestingly, most countries were more successful in educating their students in one or two of the subjects than in the others, especially when it comes to educating substantial percentages of students to high levels. For example, among the five countries with the highest percentages of students reaching the High International Benchmark, the three East Asian countries had a particular strength in mathematics—Singapore, Chinese Taipei, and Hong Kong SAR. In contrast, Finland had relative weakness in mathematics compared to its relative strengths in reading and science. The Russian Federation showed a particular strength in reading. Relatively few countries had similar percentages of students reach the benchmarks across all three subjects.