Primary level (Grade 3)

During the primary grades, children begin to develop specific skills and strategies necessary for mathematical problem solving. These skills form the foundation older students build upon as they learn about numbers, mathematical operations, geometric concepts, spatial relations, measurement processes, and basic statistical techniques.

The primary level mathematics CRT is made up of three sections. In the first section, students complete constructed response questions to assess their ability to reason, communicate and solve problems. The second section assesses three strands of mathematics:

- Number operations – the ability of students to add, subtract, multiply and divide, as well as create and solve problems with these four operations;
- Number concepts – knowledge of number sense and place value. For example, a student's ability to compare and order whole numbers to thousands, estimate the size of numbers to the nearest ten or hundred, etc.; and,
- Shape and space – knowledge in measurement and geometry.

The final section is timed and consists of a series of facts. Students have two minutes to complete a series of addition and subtraction facts and one minute to complete multiplication. The following sections will discuss how the province's primary students performed in the each of these areas.

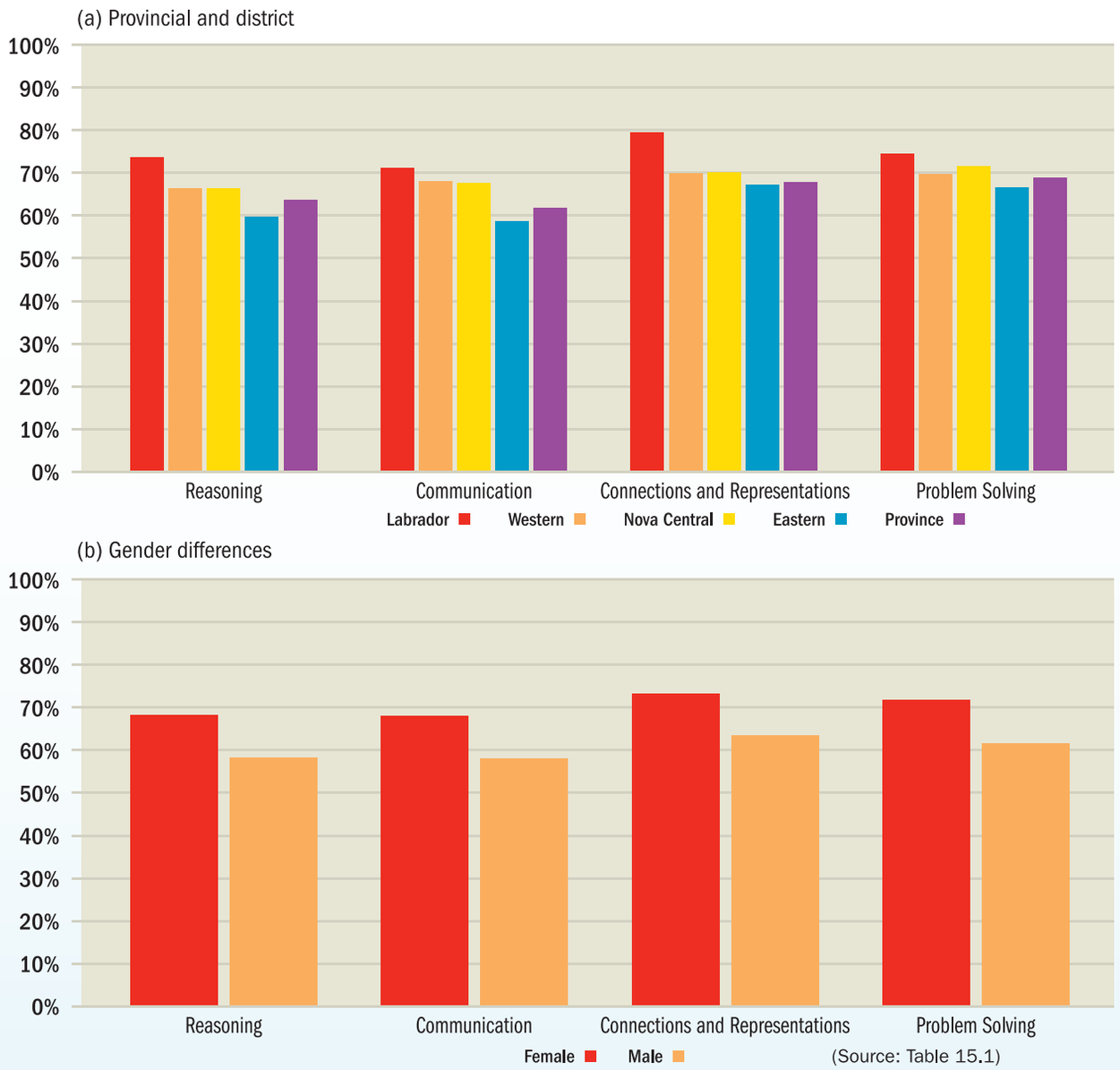
Student performance on the constructed response section (2009/10)

Grade 3 students completed a series of constructed response questions to assess their ability in number operations. These questions can be grouped into four components – reasoning, communication, connections and representations, and problem solving. As shown in Figure 15.1a, a slightly higher percentage of students achieved level 3 or above on the connections and representations and the problem solving components (68.1% and 68.3%, respectively) compared to the other two components (62.1% in reasoning and 61.6% in communication).

At the district level, a similar pattern was seen in student performance on each of the four components. In general, Labrador had the highest percentage of students achieving level 3 or above. Similar percentages of students were found in the Western and Nova Central districts. Finally, the lowest percentage of students at or above level 3 was in the Eastern school district.

Along gender lines, a higher percentage of girls achieved level 3 or above on each of the four components assessed. This percentage was approximately 10.0% higher than the boys in each case (see Figure 15.1b).

Figure 15.1: Proficiency in mathematics: Primary level (2009/10)



(Source: Table 15.1)

Student performance on the multiple choice section (2009/10)

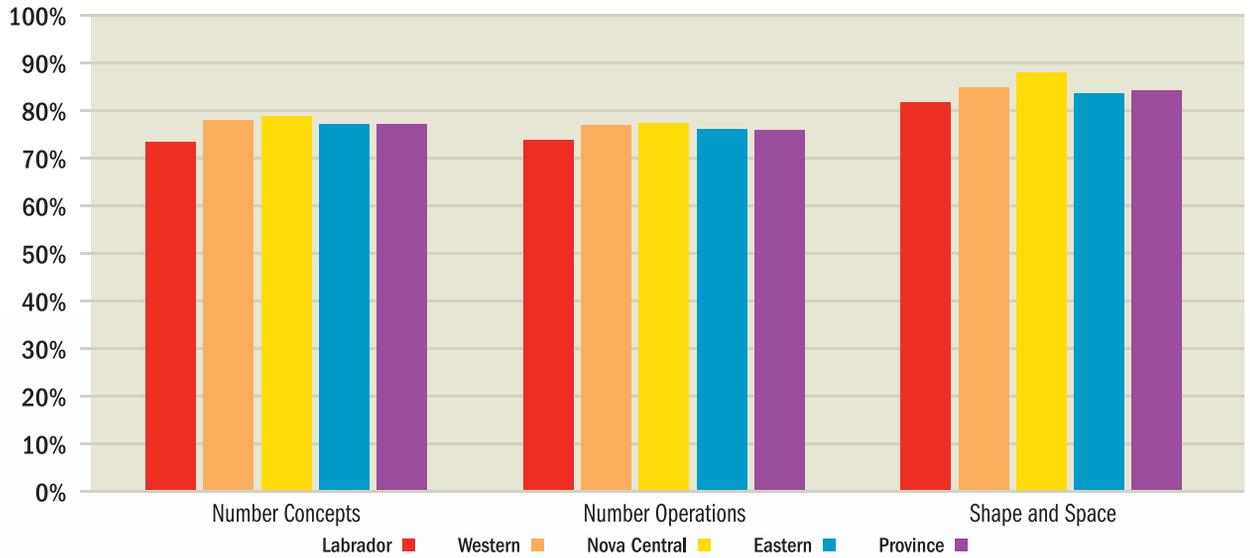
The multiple choice questions assessed student ability in number operations, number concepts, and shape and space. Provincially, students performed slightly better on the shape and space component as compared to the number concepts and number operations sections. The average scores on these components were 83.4%, 77.3% and 76.0% respectively.

At the district level, student performance was similar on each of the three components with less than 6.0% separating the high and low average marks. However, students in the Western and Nova Central districts performed slightly better than their peers on each of the four components (see Figure 15.2a).

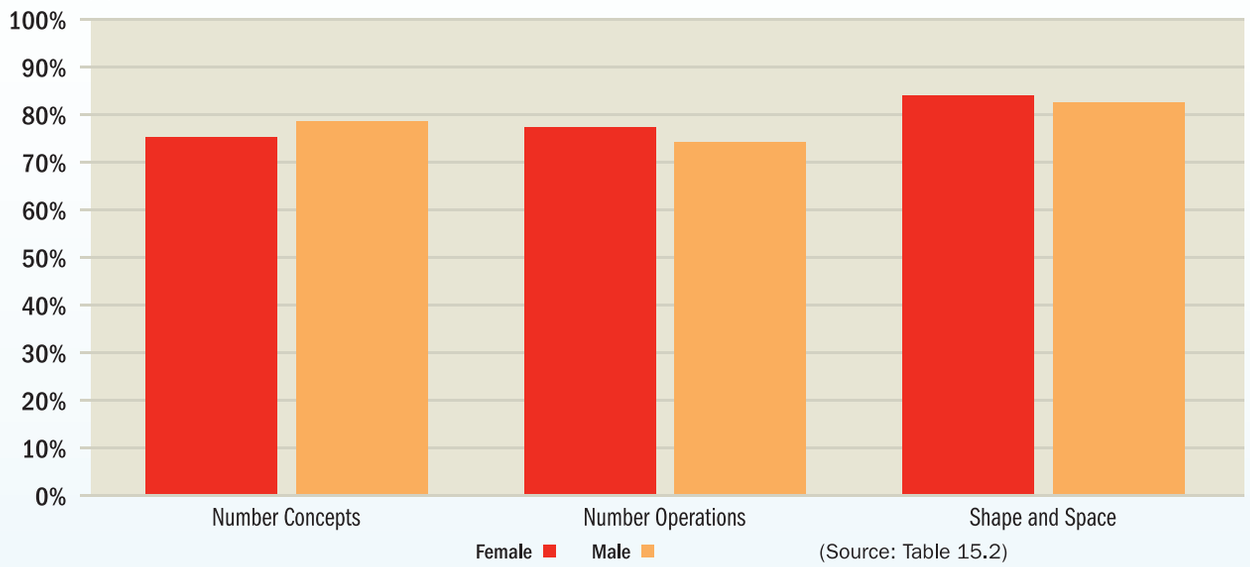
There was only a small difference present in the average scores of boys and girls with less than 3.0% separating the average scores. The only area where boys outperformed girls was on the number operations component where the average score for boys was 78.5% compared to 76.0% for girls (see Figure 15.2b)

Figure 15.2: Student performance on multiple choice questions (2009/10)

(a) Provincial and district performance



(b) Gender differences



(Source: Table 15.2)

Student performance on timed questions (2009/10)

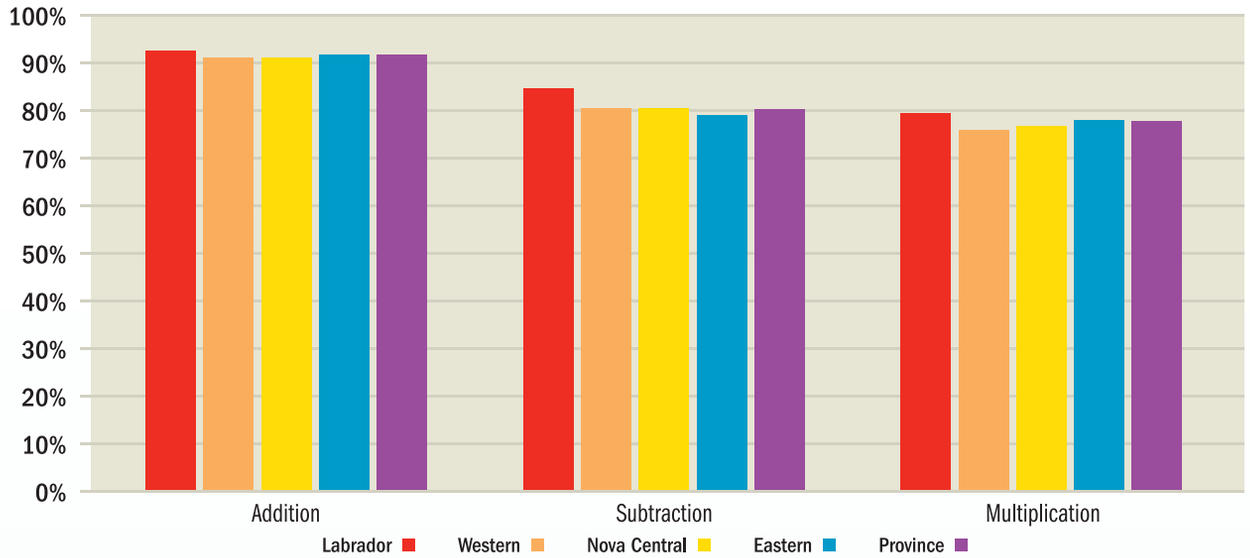
The timed section assessed student ability in addition, subtraction and multiplication. Provincially, students experienced the most success with the addition questions with an average score of 90.9%. This was approximately 10.0% higher than on the subtraction and multiplication questions.

The average scores in these areas were consistent across each district with students experiencing the most success on the addition questions. The Labrador district recorded the highest average marks in each of the three areas assessed (see Figure 15.3a).

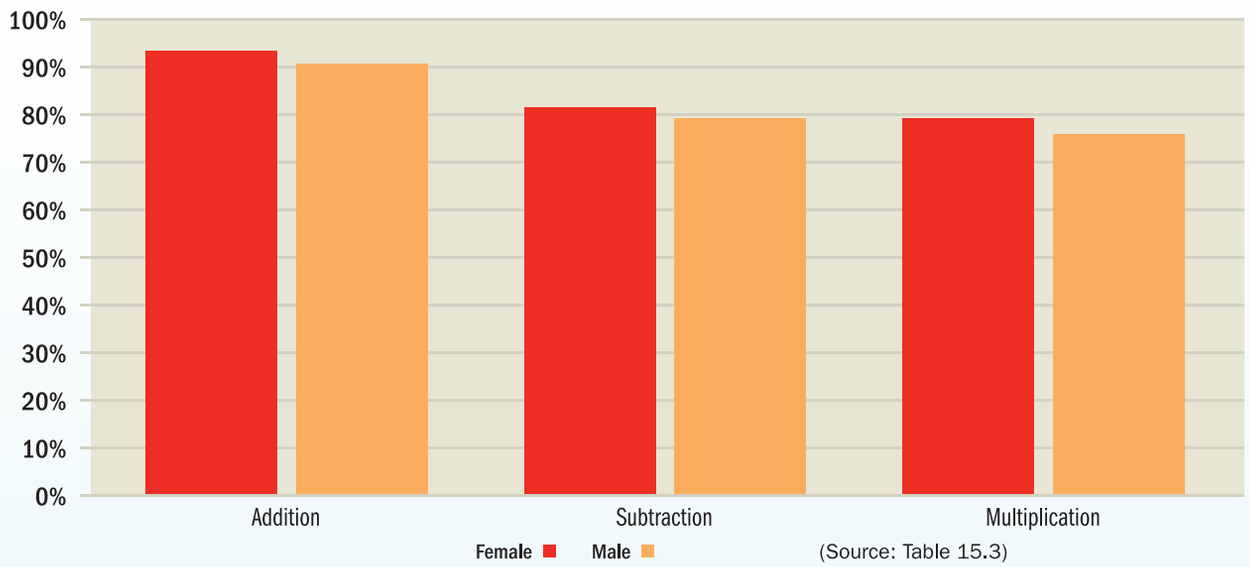
Girls performed slightly better than boys in each of the three areas with differences ranging from 1.6% to 3.2% (see Figure 15.3b).

Figure 15.3: Student performance on timed questions (2009/10)

(a) Provincial and district performance



(b) Gender differences



(Source: Table 15.3)

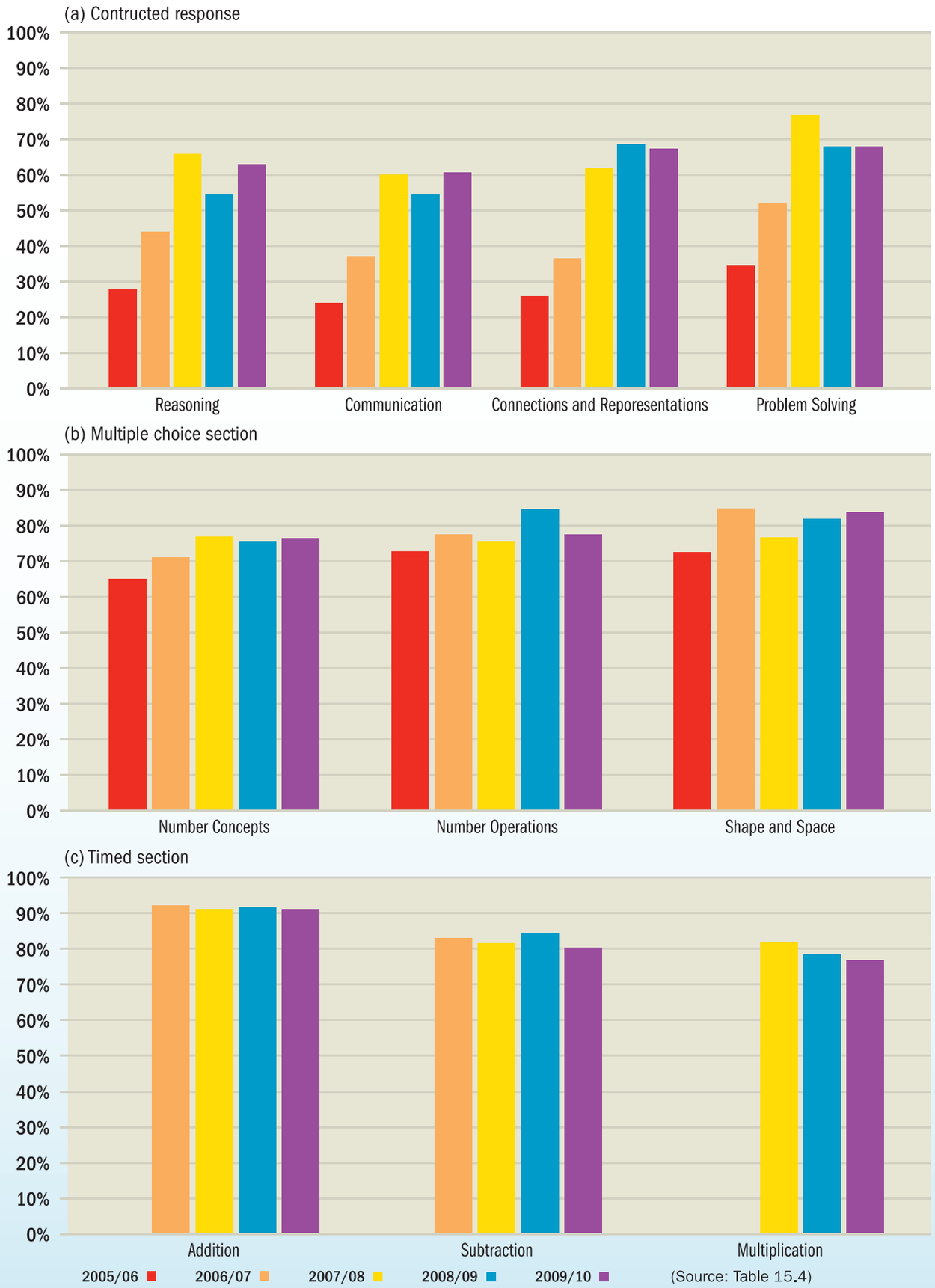
Five year trends in student performance (2005/06-2009/10)

Looking back over the past five years shows the degree of change in student proficiency in mathematics. Less than half the students assessed during the 2005/06 and 2006/07 assessments were at or above level 3 in any of the four areas. The results of the 2009/10 assessment showed an improvement in student achievement with the percentage of students at or above level 3 increasing by between 33.8% and 42.7% depending on the individual components (i.e., reasoning, communications, connections and representations, and problem solving) (see Figure 15.4a).

On the multiple choice section, provincial average scores have gradually increased over the past five years on the number concepts component with the exception of a slight drop in the 2008/09 assessment. A similar trend is seen in the scores on the shape and space component where a gradual increase happened between 2005/06 and 2009/10 with the exception of 2006/07 where the score was approximately 10.0% higher than the 2005/06 and 2007/08 scores. For number operations, the average mark has remained fairly constant with the exception of 2008/09 where the average mark was approximately 9.0% higher than the other scores (see Figure 15.4b)

Student performance on the timed section varied within each of the three components assessed. While the average scores on the addition and subtraction remained somewhat stable during this time, performance on the multiplication section gradually decreased from 81.4% in 2007/08 to 77.0% in 2009/10 (see Figure 15.4c). When reviewing Figure 15.4c, it must be noted that the components assessed on the timed section of the mathematics CRT has varied over the previous five years with not all components being assessed. For example, multiplication skills were not assessed during the 2005/06 and 2006/07 assessments.

Figure 15.4: Provincial trends (2005/06 – 2009/10)



(Source: Table 15.4)

Elementary level (Grade 6)

During the elementary years, the mathematics curriculum is designed to help students further develop and strengthen specific skills and strategies for mathematical problem solving. These skills and strategies are applied as part of the development of basic geometric concepts, spatial relations, measurement processes, and basic statistical techniques. The elementary CRT assessment is composed of multiple-choice and constructed response questions in four strands of mathematics – number concepts, number operations, shape and space, and mental mathematics.

Student performance on the constructed response section (2009/10)

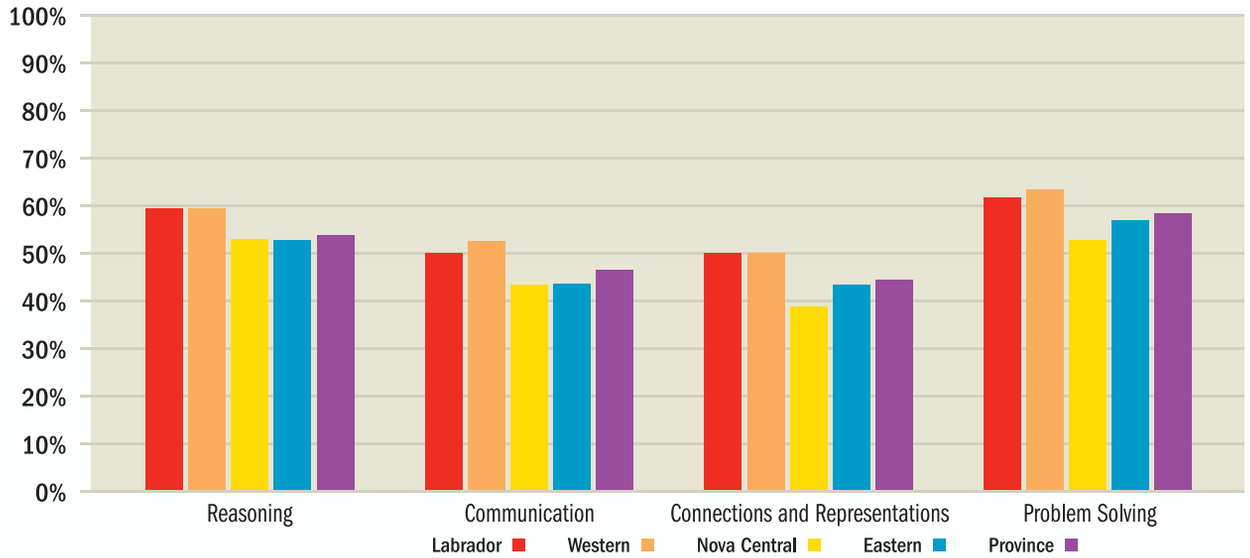
Grade 6 students completed a series of constructed response questions to assess their proficiency in number operations. These questions can be grouped into four components – reasoning, communication, connections and representations, and problem solving. Provincially, a slightly higher percentage of students achieved at least level 3 on the reasoning and problem solving components. However, less than half the students in 2009/10 achieved level 3 or above on the communications and connections and representations components.

At the district level, a higher percentage of students in the Labrador and Western districts achieved at least a level 3 in each of the four components. This percentage was on average about 7.0% higher than in the Nova Central and Eastern school districts (see Figure 15.5a).

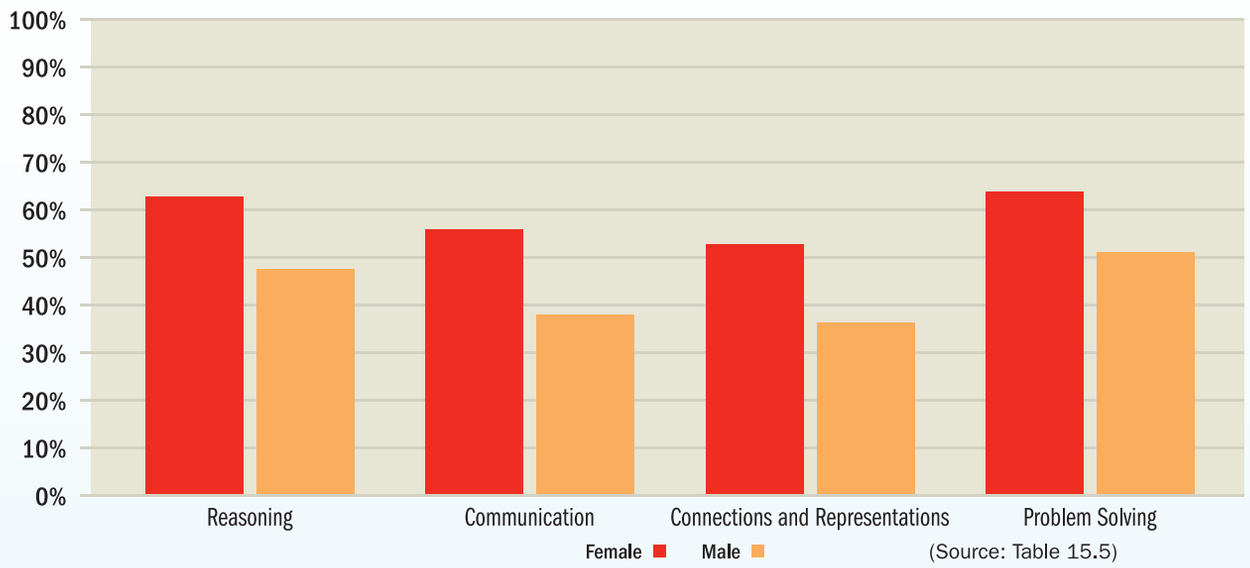
A higher percentage of girls than boys achieved at least level 3 on each of the four components assessed. This gender difference ranged from a low of 13.8% on the problem solving component to a high of 17.2% on the connections and representations component (see Figure 15.5b).

Figure 15.5: Proficiency in mathematics: Elementary level (2009/10)

(a) Provincial and district performance



(b) Gender differences



(Source: Table 15.5)

Student performance on the multiple choice and timed sections (2009/10)

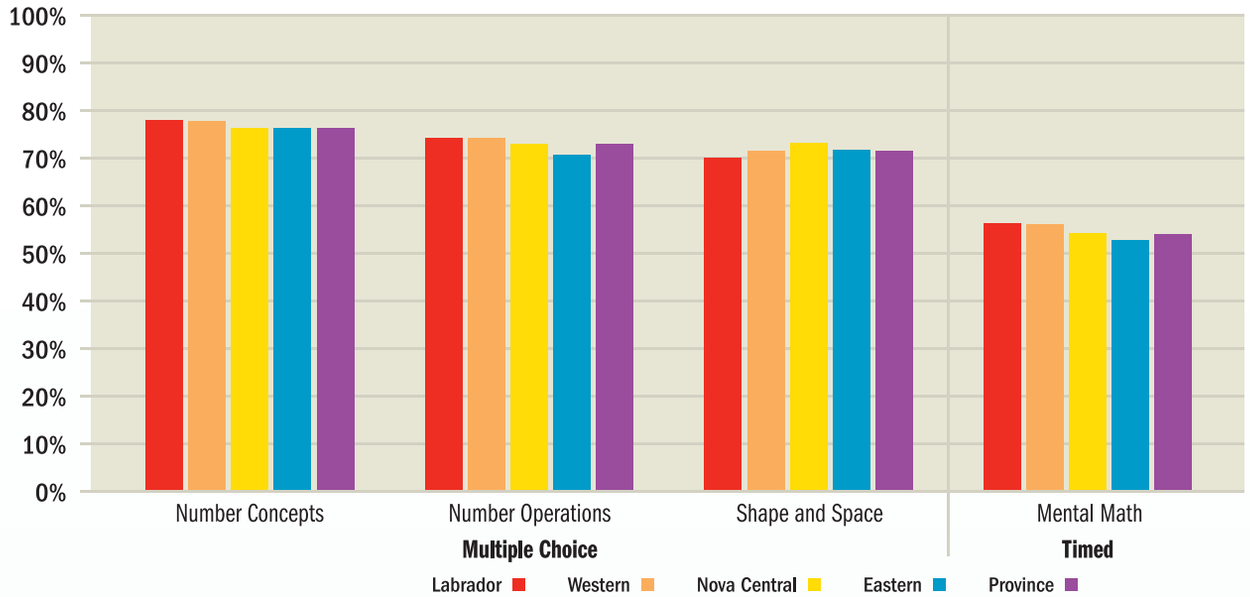
Provincially, students performed better on the number concepts component where the average mark was 76.9% compared to 72.3% on number operations and 71.0% on shape and space. Students earned the lowest average mark in the mental math section where the average score was 53.4%.

A similar pattern was present at the district level with students scoring slightly higher on the number concepts component and experiencing the most difficulty with the mental math questions. Within each component, district scores were fairly consistent with less than 3.5% separating the high and low marks (see Figure 15.6a).

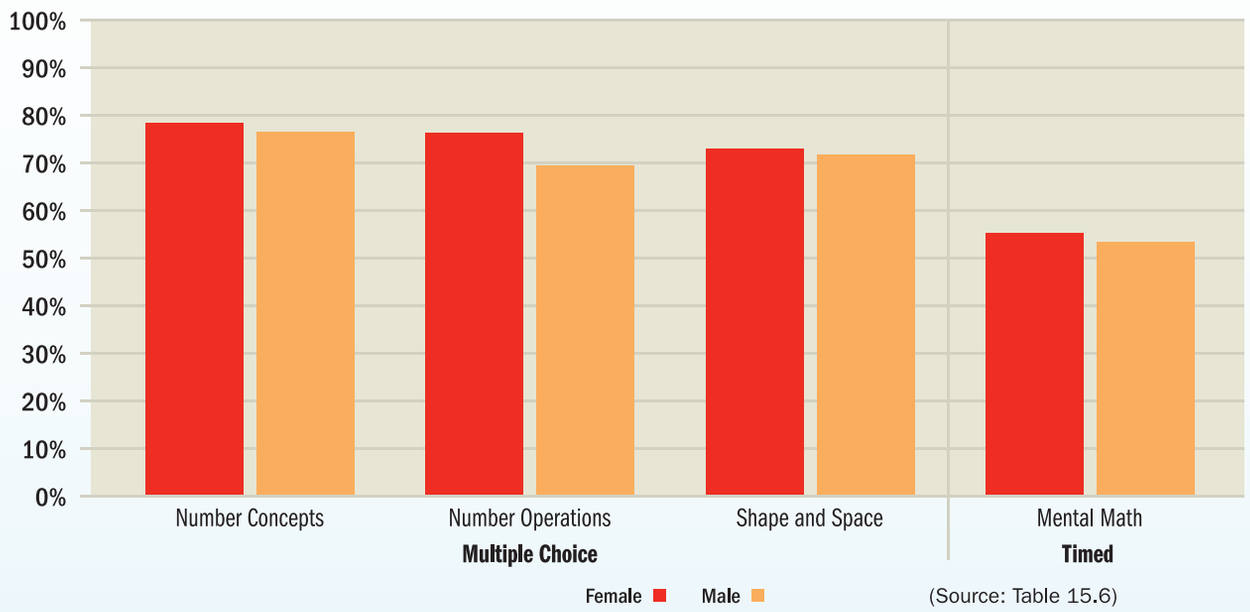
Along gender lines, girls had slightly higher average scores on both the multiple choice and timed sections than the boys. The largest difference was present on the number operations section where the girls' average score was 6.1% higher. In the other areas, this difference was about 2.0% (see Figure 15.6b).

Figure 15.6: Student performance on multiple choice questions (2009/10)

(a) Provincial and district performance



(b) Gender differences



(Source: Table 15.6)

Five year trends in student performance (2005/06-2009/10)

In general, the percentage of students at or above level 3 has steadily increased on each of the components. There were two exceptions to this general trend. First, student performance in 2008/09 declined from the previous year but rebounded in 2009/10. Also, the increase from year to year in the percentage of students at or above level 3 was not as evident on the connections and representations component compared to the others (see Figure 15.7a).

On the multiple choice questions, scores fluctuated from year to year with no clear pattern existing. However, the average score on the number concepts and shape and space questions in 2009/10 increased by at least 10.0% from the previous year. On the number operations questions, average scores decreased by 4.8%. On the mental math questions, the average score has steadily decreased from 73.7% in 2005/06 to 53.4% in 2009/10 (see Figure 15.7b).

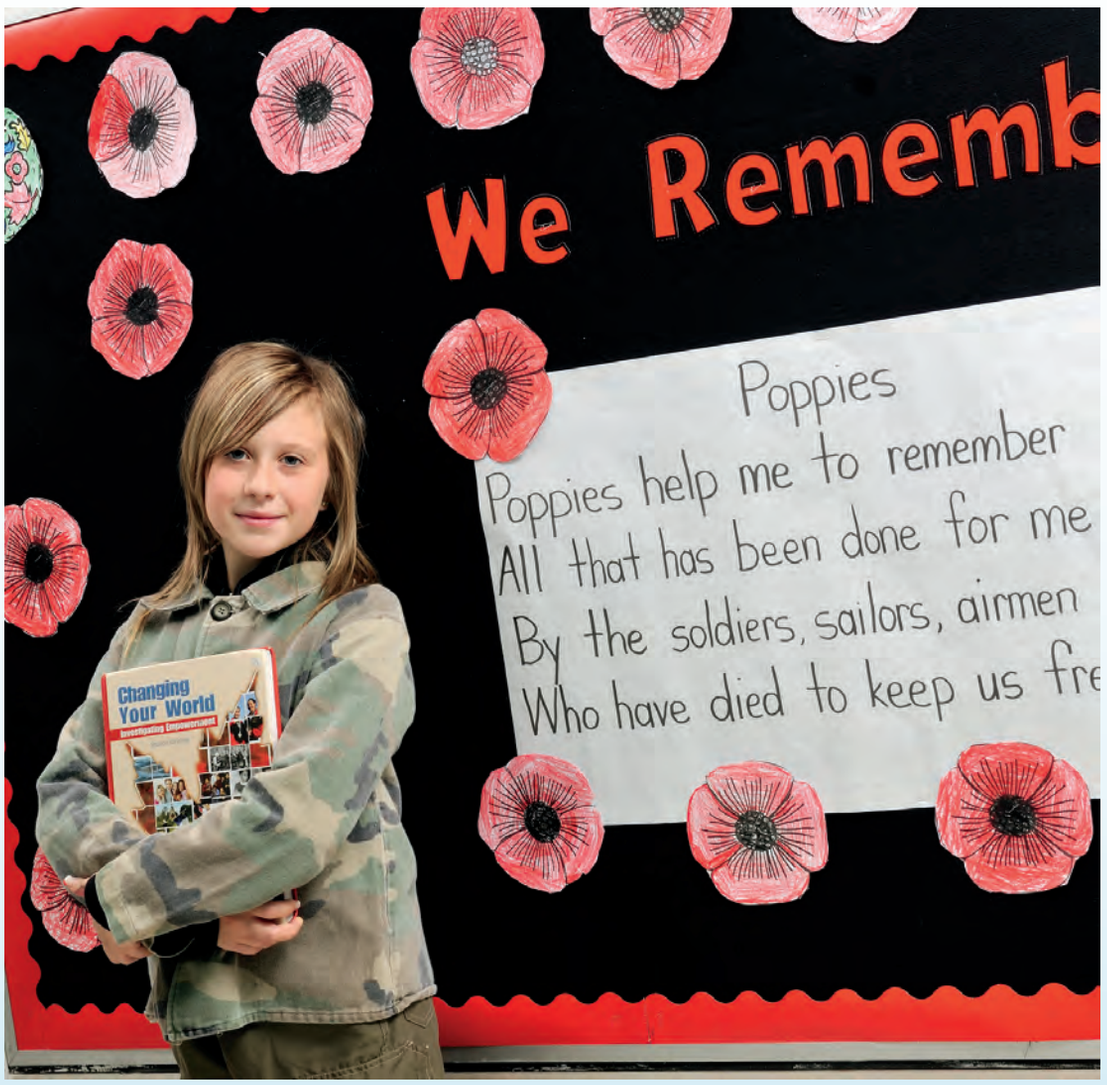
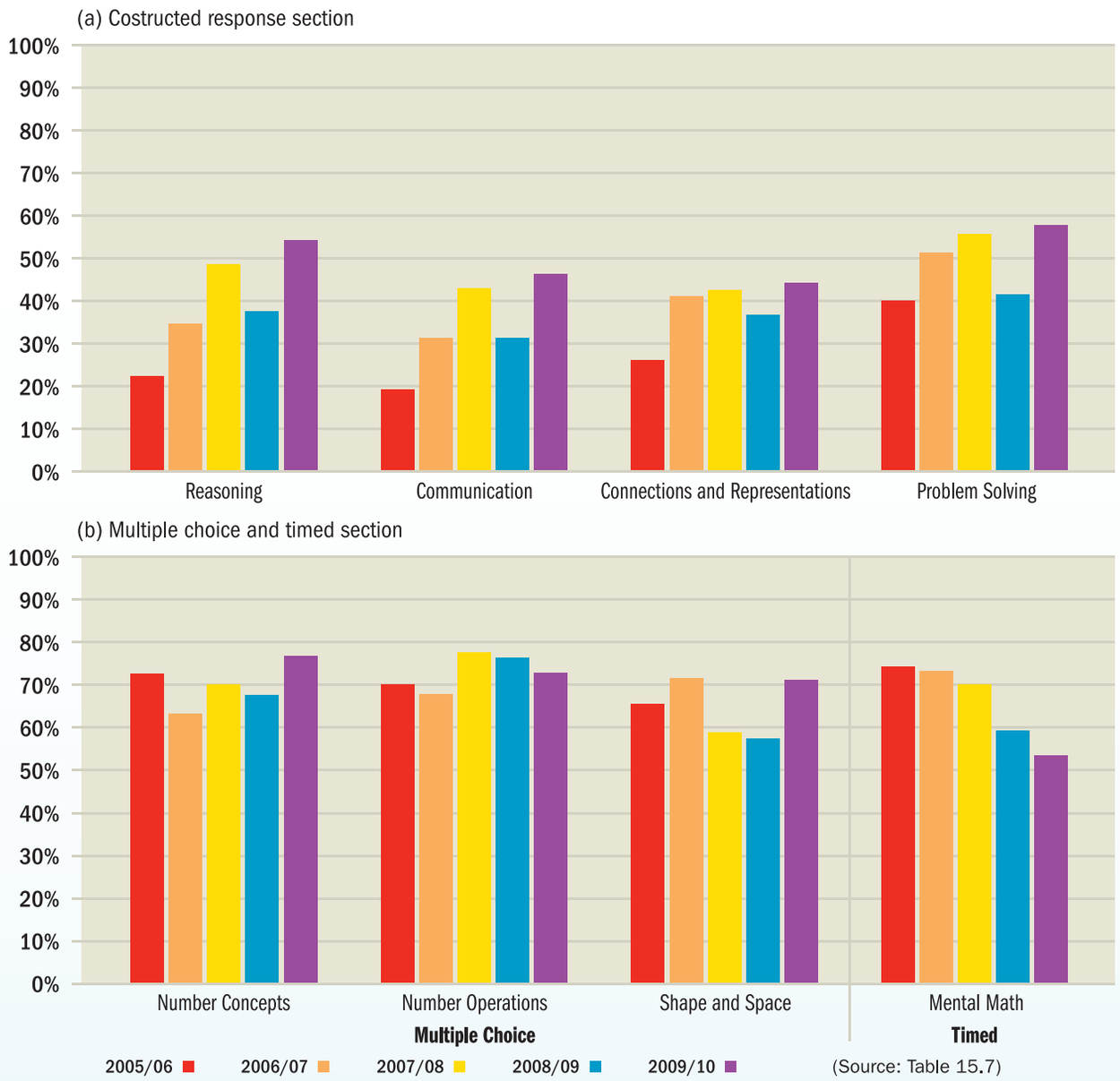


Figure 15.7: Provincial trends in mathematical proficiency (2005/06–2009/10)



(Source: Table 15.7)

Intermediate level (Grade 9)

During the intermediate years, students continue to develop and practice the specific skills and strategies necessary for mathematical problem solving. These skills and strategies are applied as part of the consolidation of the concepts and skills of the real number system and measurement, and the development of introductory algebra, informal geometry and basic descriptive statistics.

During the intermediate CRT, students complete a series of multiple choice and closed-constructed response questions assessing their proficiency in number operations and concepts, patterns and relationships, shape and space as well as in data management and probability.

Student performance on the constructed response questions (2009/10)

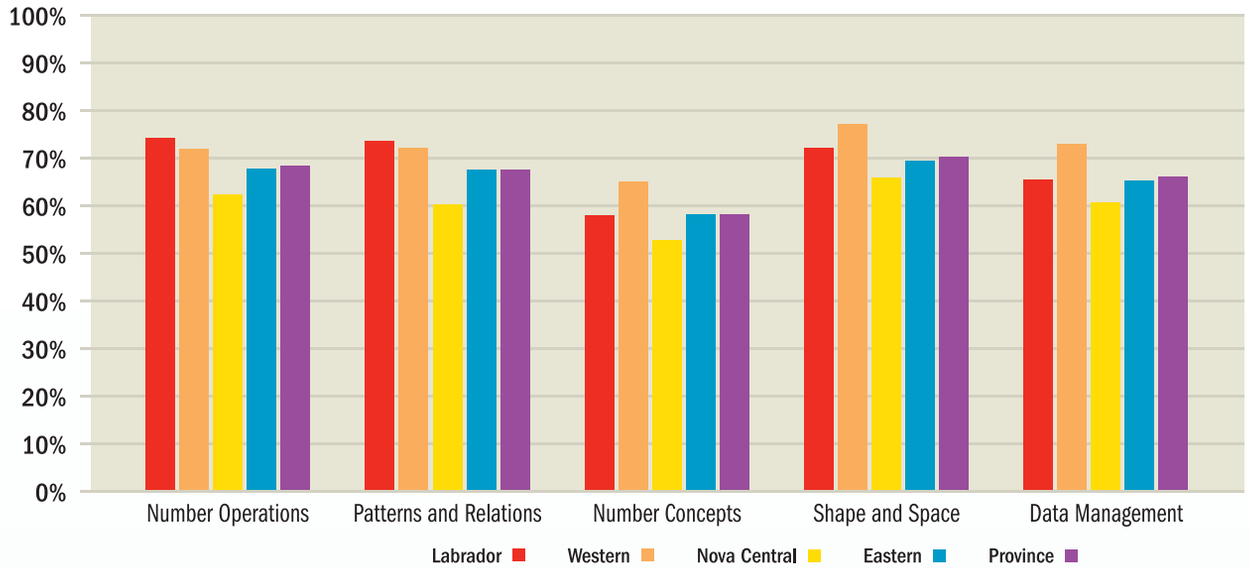
Provincially, students experienced the most success on the shape and space component where the average score was 70.0%. Students performed slightly below this on the number operations and patterns and relations components. Overall, students appeared to have the most difficulty on the number concepts component with an average score of 59.0%.

At the district level, students in the Labrador and Western district achieved the highest average marks in the province for each of the components. On the other hand, the Nova Central district recorded the lowest average scores. The average marks of students in the Eastern school district were on par with the provincial average. Overall, students appeared to experience the most difficulty on the number concepts component where the average scores ranged from 53.1% in Nova Central to 64.7% in the Western district (see Figure 15.8a).

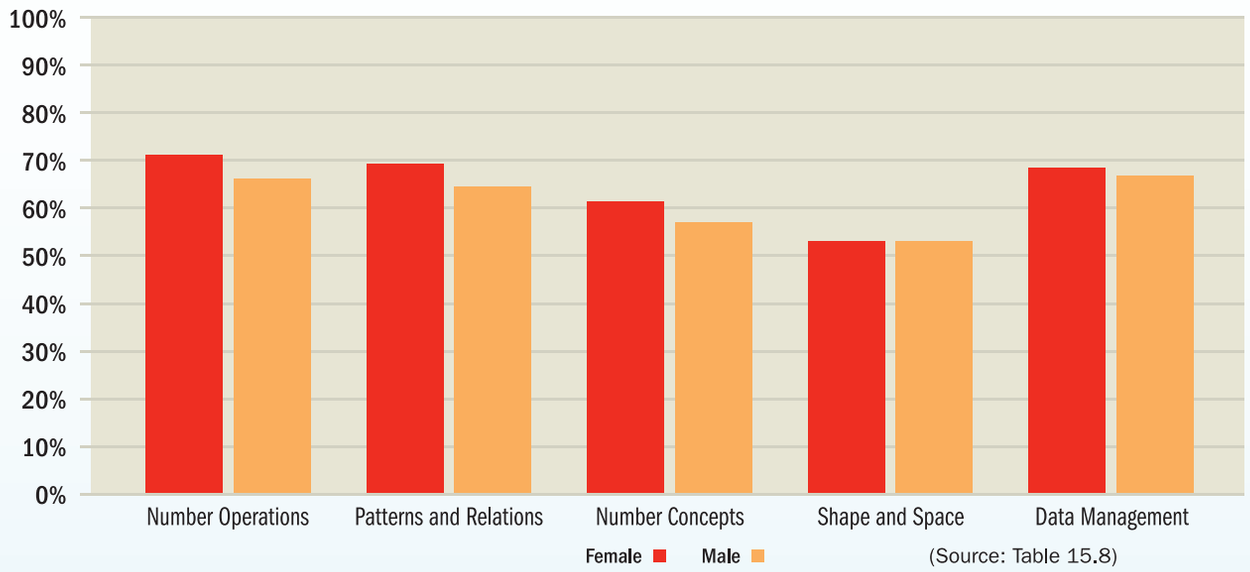
Girls performed slightly better on four of the five areas assessed. Their average scores were between 1.3% and 4.6% higher than boys. The exception occurred on the shape and space component where there was no gender difference present in the average score (see Figure 15.8b).

Figure 15.8: Student performance (2009/10)

(a) Provincial and district performance



(b) Gender differences



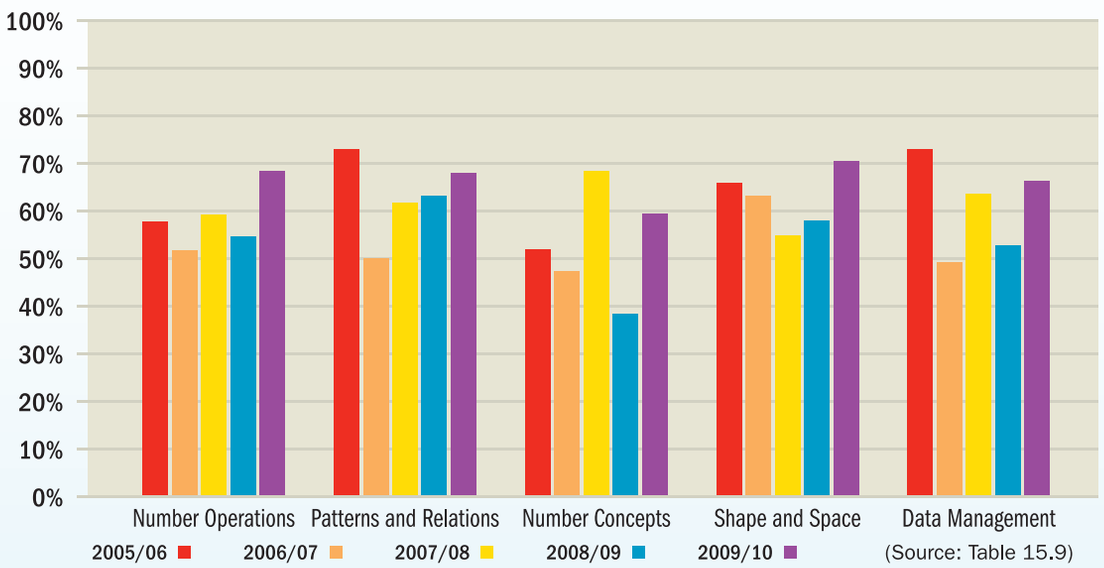
(Source: Table 15.8)

Five year trends in student performance (2005/06-2009/10)

There was variability in the average scores of grade 9 students on these components between 2005/06 and 2009/10. While there were no obvious year to year trends present, there are some general observations that can be made. For example, student performance was lower during the 2006/07 and 2008/09 assessments in all areas except shape and space.

The average score on the patterns and relations and data management components were at their highest in 2005/06 and dropped considerably (by over 20.0%) the following year. On the patterns and relations component, average scores gradually increased over the next four years. Also, the 2007/08 average scores on the number concepts component was an anomaly. It was over 20.0% higher than the previous or following year. The average score increased from 2008/09 to 2009/10 in each of the five areas with the largest gain seen on the number concepts component where the average scores increased by 19.7% (see Figure 15.9).

Figure 15.9: Provincial trends (2005/06-2009/10)



(Source: Table 15.9)