

# Assessment Features in *Nelson Mathematics 10*

## Assessment Features in Each Chapter

The following chart summarizes the assessment support in every chapter.

Feature	Purpose and Description	Location
<i>The Chapter Problem</i>	<ul style="list-style-type: none"> <li>requires the use of skills and knowledge that correspond to the essential outcomes of the chapter</li> <li>developed incrementally throughout the chapter</li> <li>upon completion, provides a model for approaching the case studies</li> <li>provides formative assessment information as students work through the problem</li> <li>an ongoing opportunity for consolidation and review of skills, knowledge, and processes</li> </ul>	<p>In the student text:</p> <ul style="list-style-type: none"> <li>a statement of the <i>Chapter Problem</i></li> <li>related questions at the end of relevant sections</li> </ul> <p>In the <i>Teacher Resource</i>:</p> <ul style="list-style-type: none"> <li>suggestions for preparation, management, and assessment</li> <li>a blackline master of a generic rubric whose categories match those of the Achievement Chart in the mathematics curriculum (just before the teaching notes for the chapters)</li> </ul>
<i>The Challenges</i>	<ul style="list-style-type: none"> <li>summative assessment of knowledge, skills, and understanding for the unit</li> <li>context is similar to problems done in the chapter</li> <li>address the most important Expectations of the unit</li> </ul>	<p>In the student text:</p> <ul style="list-style-type: none"> <li>a statement of the <i>Challenge</i></li> </ul> <p>In the <i>Teacher Resource</i>:</p> <ul style="list-style-type: none"> <li>performance expectations</li> <li>solution guidelines</li> <li>a discussion of the problem and suggestions for assessment, use, and management</li> <li>a blackline master of a rubric whose categories match those of the Achievement Chart in the mathematics curriculum</li> </ul>
<i>Practise, Apply, Solve</i>	<ul style="list-style-type: none"> <li>questions and problems that relate to each section in a chapter</li> <li>may be used as review or extra practice exercises or as a bank of assessment tasks</li> <li>four questions keyed to the Achievement Chart categories</li> </ul>	<p>In the student text:</p> <ul style="list-style-type: none"> <li>all of the questions and problems</li> <li>answers to all questions and problems in the Answers section</li> </ul> <p>In the <i>Teacher Resource</i>:</p> <ul style="list-style-type: none"> <li>worked solutions to more challenging questions</li> <li>for the four Achievement Chart category questions: <ul style="list-style-type: none"> <li>connection to the Achievement Chart</li> <li>management/assessment suggestions</li> <li>description of possible Level 3 performance</li> </ul> </li> </ul>
Extension and Enrichment Activities	<ul style="list-style-type: none"> <li>allow students to extend their understanding of the chapter concepts in a somewhat different context</li> </ul>	<p>In the student text:</p> <ul style="list-style-type: none"> <li>in the C-section questions</li> </ul> <p>In the <i>Teacher Resource</i>:</p> <ul style="list-style-type: none"> <li>a discussion of extension activities and suggestions for assessment, use, and management</li> </ul>
<i>Chapter Review Test</i>	<ul style="list-style-type: none"> <li>represents the level of performance expected of most students after completing the chapter</li> </ul>	<p>In the student text:</p> <ul style="list-style-type: none"> <li>the test itself</li> <li>answers to all questions in the Answers section</li> </ul> <p>In the <i>Teacher Resource</i>:</p> <ul style="list-style-type: none"> <li>blackline masters of additional sample tests including answers, scoring guides, and marking schemes (at the end of the Chapter teaching notes)</li> </ul>

## Performance Tasks in Nelson Mathematics 10

Three sets of nine *Performance Tasks* provided in the textbook give students the opportunity to attempt a rich problem related to the Curriculum Expectations of the preceding two chapters. The *Performance Tasks* allow students to demonstrate their achievement of the Expectations as related to several of the categories of the Achievement Chart.

*Performance Tasks* will appear:

Covering:	Following:	Topics:
Chapters 1 & 2	Chapter 2	Linear Systems and Analytic Geometry
Chapters 3 & 4	Chapter 4	Quadratic Models
Chapters 5 & 6	Chapter 6	Solving Problems with Trigonometry

### How to Use the Performance Tasks

The *Performance Tasks* can be used as:

- a summative assessment task.
- an investigation or inquiry toward the end of a unit.
- a group problem solving activity.

Teachers may select one or two of the *Performance Tasks* for students or they may have students choose a Performance Task that interests them. The *Performance Tasks* can be assigned to individual students or groups of students. Often it is helpful to have students begin working in groups to brainstorm and investigate the problem and then move apart to develop their own solutions. You may want to have students come back together for a second group discussion before refining their solutions.

### Support for the Performance Tasks

The *Teacher Resource* provides teachers with information for each task including:

- Recommended Time, Materials/Technology, Curriculum Expectations
- Overview
- Description of Task
- Management Suggestions
- Assessment Suggestions (rubric included)
- Extension Suggestions
- Guidelines for Solution

### Suggestions for Carrying out the Performance Tasks

There are many different ways that students could be organized to work on a task. Some of the possible scenarios are provided below.

#### Individual Work

An individual task could be presented to the whole class with clear procedural instructions given. Students could then work individually on the task. This is like a typical testing situation.

#### Cooperative Group Work

Most of the *Performance Tasks* lend themselves to some form of group work. A cooperative group could be structured so that each student within a group of three or four has a particular assignment task that contributes to the solution of the problem. For instance, one student could investigate the problem using graphing technology, another using dynamic geometry software, and yet another by building physical model. Results would be shared and discussed and then conclusions formulated.

Another way to structure a cooperative group is to assign a role such as recorder, observer, reporter, time keeper, and materials manager to each student. The roles and the teacher's expectations should be outlined before the task is attempted.

### **Group Work for the Purpose of Collecting and Sharing Data**

In this type of group work, students begin the initial stages of the task working together to collect data and/or brainstorm a difficult problem. After sharing data or ideas, students work on the task individually. In the middle of the task, students may regroup to share what they have learned. Then students separate to refine their work or incorporate new ideas into the solution. Each student's work is assessed individually.

### **Breaking a *Performance Task* into Stages**

The teacher may use a *Performance Task* to lead students through the inquiry or problem solving process: exploring, modelling, transforming and manipulating, inferring and concluding, etc. Alternatively, a teacher may want to focus on one of the stages of problem solving. This approach can be used with individual students or groups.

### **How to Assess the *Performance Tasks***

The *Teacher Support* for each task includes general information about the task, suggested Achievement Chart categories for assessment with an accompanying rubric, suggested Learning Skills to be assessed, and guidelines for the solution of the problem.

As well as assessing the “product” of the *Performance Task*, teachers should also be assessing the process of solving the problem. This includes assessing problem solving skills as well as the Learning Skills such as Communication, Teamwork, and Independence that are involved in solving the problem. The assessment of these processes is best accomplished through teacher observation. While circulating and observing students on the task, the teacher should be asking probing questions such as:

- What is your plan?
- Why did you . . . ?
- What would happen if . . . ?
- What is your next step?
- How did you divide the parts of the problem among group members?

The final product is assessed once the students have completed and submitted their work. The rubrics provided for the *Performance Tasks* include criteria for both process and product.

The rubrics for the *Performance Tasks* are based on the generic rubrics for the Achievement Chart categories, and they have been made more task-specific where appropriate. The suggested Learning Skills can be assessed using suitable components from the generic Learning Skills rubrics found on page A–20. There are also suggested strategies for assessing Learning Skills with most activities.

## Assessment References and Resources

Bush, W.S. & Greer, A.S. (Eds.). 1999. *Mathematics Assessment: A Practical Handbook for Grades 9 - 12*. Reston, VA: NCTM.

Harper, M., O'Connor, K. and Simpson, M. 1999. *Quality Assessment: Fitting the Pieces Together*. Toronto, ON: OSSTF.

Lambdin, D.V., Kehle, P.E., and Preston, R.V. 1996. *Emphasis on Assessment: Readings from NCTM's School-Based Journals*. Reston, VA: NCTM.

Ontario Association for Mathematics Education (OAME) and Ontario Mathematics Coordinators Association (OMCA). 1995. *Linking Assessment and Instruction in Mathematics: Connecting to the Ontario Provincial Standards*. Toronto, ON: OAME and OMCA.

Shannon, A. (Ed.). 1999. *High School Assessment: Balanced Assessment for the Mathematics Curriculum*. White Plains, NY: Dale Seymour Publications.

(This is a set of four books based on the work of the Berkeley, Harvard, Michigan State, and Shell Centre Projects.)

*The Ontario Curriculum Grades 9 and 10: Mathematics, 1999*

*The Ontario Curriculum, Grades 9 and 10: Program Planning and Assessment, 1999*

*Guide to the Provincial Report Card, Grades 9-12*

## Assessment Blackline Masters

The following blackline masters are provided for teacher use within the classroom.

### Assessment of Curriculum Expectations Using the Achievement Chart Categories

- Generic Rubric for Knowledge and Understanding
- Generic Rubric for Thinking, Inquiry, and Problem Solving
- Generic Rubric for Communication
- Generic Rubric for Application
- Generic Rubric for *Chapter Problems*
- Mathematics Problem-Solving Worksheet
- Review Problem Evaluation Sheet
- Communication: Journal Evaluation Rubric

### Assessment of Learning Skills

- Generic Rubrics for Learning Skills
- Group Participation: Self-Evaluation Page
- Learning Skills Tracking Sheet
- Work Habits Self-Reflection Sheet
- Teamwork Self-Reflection Sheet
- Initiative Self-Reflection Sheet
- Independence Self-Reflection Sheet
- Notebook Organization Rubric
- Learning Skills Self-Evaluation Checklists