

An Annotated Learning Journey within a Junior Classroom

Setting the context: Grade 5/6

Ontario Catholic School Graduate Expectations: 2c, 3b, 3c, 4a, 4f, 5a
Gospel Values/Virtues: Excellence, Hope, Community, Love
Learning Skills and Work Habits: Responsibility, Organization, Collaboration, Initiative, Independent Work, Self-Regulation
Curricular Learning Goals:
 I can show an understanding of proportional reasoning through investigation (Gr. 5 whole number rates; Gr. 6: percents, ratios, unit rates).
 I can use a variety of strategies to add and subtract decimals (Gr. 5: 100ths; Gr. 6: 1000ths).
 I can use estimation when solving problems to help decide if a solution is reasonable.
 I can solve problems that relate to authentic money situations.
 I can collect, organize and describe primary data.
 I can generate, gather and organize ideas; and generate media texts for an intended purpose and audience.

Revealing the educator's thinking:
 "During the first week of school, we spent several days reviewing different strategies (i.e. mental self talk) for various computational operations and reflecting on which strategies we prefer using. It is now the second week of school. While students know who I am, they haven't all developed a trusting relationship with me and each other. How can I encourage them to be, not only risk-takers but eager to engage in learning and to seek new challenges?"

The educator wonders...
 "How might this experience strengthen each child's own self-efficacy toward mathematical thinking and establish a strong Catholic learning community?
 What are the learning goals for mathematics? Which cross-strand and cross-curricular learning goals can be connected to this experience?
 What learning task will allow students to know themselves as learners and be able to advocate for their needs?
 How might this task be designed to be accessible to everyone?
 How might free, literacy-rich resources be used for mathematics?
 How much time would be devoted to this learning experience?"

Planning with the end in mind:
 The purpose of designing an open-ended or open-routed task lies in a belief that every student in the classroom will be able to enter into the experience and engage with the problem. At the beginning of the year, establishing a learning community where the students and the educator grow as co-learners may be enhanced through an authentic task where everyone is working for the common good.
 The proposed task highlights these elements by creating an authentic purpose and audience, establishing roles for each student and allowing for flexible groupings of students to work with each other and get to know each others' interests.

Revealing the educator's intentional decisions to allow for student-centred collaborative inquiry:

- "Use free book club catalogues as a resource. It may also motivate students to become interested in a variety of text choices.
- Students work together to decide on classifying genres and sampling the interests of their peers. They may find students who like to read the same type of books. I'm watching! This will get the class ready for choosing literature circles!
- Cross-strand and cross-curricular tasks support anchoring on big ideas.
- All students can enter into this task. My role will be to observe and listen for pivotal moments where differentiation, direct instruction, small group or individual support will be needed.
- Learning goals of both Grades 5 and 6 can be uncovered through this task. Manipulatives and resources will be available to support learners."

Assessment for, as and of Learning:
 The educator has designed a rich task for learning; therefore a rich opportunity for gathering evidence of learning at the beginning of the year through observation and conversations. Learning goals come from cross-strand and cross-curricular content areas; therefore there will be opportunities, and a need for, co-constructing success criteria as the task evolves. The educator plans how to gather evidence across strands/content.
 Together the educator and the students know the learning goals and align the gathering of evidence of learning to these goals. Specific, descriptive feedback is aligned to the success criteria. Since the learning is transparent, feedback can be offered respectfully by peers in addition to the precise questioning of the educator to push the thinking forward.

The Learning Experience:

The Catholic School Council has offered to donate \$500 to the school Learning Commons (Library) and would like to purchase books that will appeal to a variety of student readers. You have been asked to conduct a survey of your peers and develop a proposal, based on evidence from the survey, listing genres of books and possible book titles. Your group proposal, showing how it meets the needs of your school through proportional distribution, will be presented to the library technician and a member of the Catholic School Council.
 This learning experience should take five 75-minute blocks.

The Instructional Task:
 Since this task is situated at the beginning of the year, it has been designed intentionally to establish a community of hope where each student is respected and his/her interests and ideas are validated. The task is designed to anchor on big ideas from both mathematics and literacy. Students will have opportunities to practice basic computational skills in mathematics, but the big idea of proportional reasoning is included to add, not only complexity but the human dimension of understanding the interests of others. Sampling is an important big idea from Data Management.
 Understanding media forms and genres is an overarching idea in literacy. Developing and presenting a proposal effectively to an authentic audience is a necessary lifelong skill.

Activation:

Part A: What are our reading interests?
 Groups of students work together to design a survey based on one book club resource. There are four book club catalogues and two e-book websites. Each group designs a survey using one resource. Each group of students administers the survey to all junior students and works together to tally the results, ranking the genres/books.
 Students are introduced to the task. As a whole class, students discuss how to break down the task into manageable chunks. To begin, the class co-constructs a list of reading interests. Using turn and talk, students discuss how to classify types of reading material into genres.
 'Expert' groups are formed randomly to correspond to the six available resources: four book club catalogues; two e-book catalogues. Students explore the genres found in this resource and discuss the ratio of books per genres. Their wonderings are collected for future discussion.

The **activation** is a way to uncover students' prior knowledge of genres as well as a way to begin to know students. Introducing the learning experience provides a vision of the learning destination and provokes thinking. Even though they may not know how to get there yet, the group becomes committed to the common task of being willing to help the school. They will have a voice in the books purchased for them!
 The educator is setting up 'expert' groups by intentionally using a jigsaw method of learning. (Playing cards may be used to 'randomly' form groups, but the educator may make sure that students are grouped to maximize the assets of all students.) In Part A, students work together on a survey and become **experts** on the needs of the students based on one resource. In Part B, groups are reformed so that one or two experts from each catalogue resource is represented. This creates the decision-making group. The jigsaw method validates every member of the class. Everyone has important information to contribute! Students get an opportunity to work and get to know the strengths of their peers.

Working on it:

Part B: How does the survey data inform our decisions?
 The groups are reconfigured including at least one representative from each of the resource catalogues. Share gathered information. Look at the trends of interests. Debate which books you think should be purchased to reflect the proportional interests of the entire group. Develop a proposal to share with the class by estimating costs and capturing all calculations to defend your reasoning.
What questions are students considering as they are working on the task?

- "I think surveying our class is too small a sample. Could we go and survey the other junior students in the school?"
- "Do we have to calculate tax? What is HST? Why is it that children's books and other children's products are exempt from provincial tax?"
- "When I look in the magazine, the prices are \$9.99, but when I go to the order form, the price is more. Why?"
- "Look for these bubbles in the text! They tell you how much each book is in that package, I think that is the unit price—right? We don't have to figure it out ourselves."
- "How do we organize our calculations to keep track of what we are intending to spend? May we use a spreadsheet or an APP to record our thinking?"
- "Everything ends in 99 cents – that's really annoying. Why do they do that?"
- "We don't use pennies any more so why do the prices include amounts that need pennies?"
- "Is it easier to keep a running total of what we spent or what we have left?"
- "Should we do both to check to see if we are making any mistakes?"

A Glimpse of Student Thinking:

What types of books do we read?

- comic books
- magazines
- humour
- science fiction
- fiction
- non-fiction
- information books
- fantasy
- mystery
- graphic novels
- historical fiction
- story stories
- adventure
- horror
- detective (crime)
- suspense
- textbooks
- bible
- picture books
- biographies
- catalogues
- reference books
- poetry
- fairy tales
- legends
- myths
- romance
- puzzles
- crafts
- thrillers
- history
- science topics
- fables
- hobbies

To honour the thinking of each student, it is imperative that they be given multiple opportunities to demonstrate their learning in a variety of ways in order to show growth over time. Observations, conversations and written products, aligned to learning goals and success criteria, are gathered and documented by educators and students.

What types of books do we read?

fiction

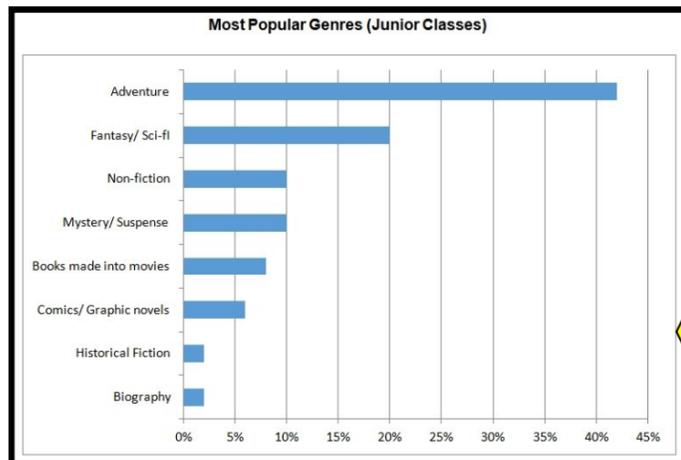
- comic books/graphic novels
- magazines
- fantasy/science fiction
- mystery/thriller/adventure/suspense/horror
- detective/crime
- historical fiction
- story stories
- picture books
- poetry
- fairy tales/fables
- legends/myths
- humour
- romance

non-fiction

- reference books
- magazines
- information books
- ie. historical accounts
- science, some picture books
- biographies/autobiographies
- catalogues
- bible
- puzzles/crafts/hobbies
- textbooks

Part A: Activation
Co-constructing a list of books. Looking for similarities and differences.

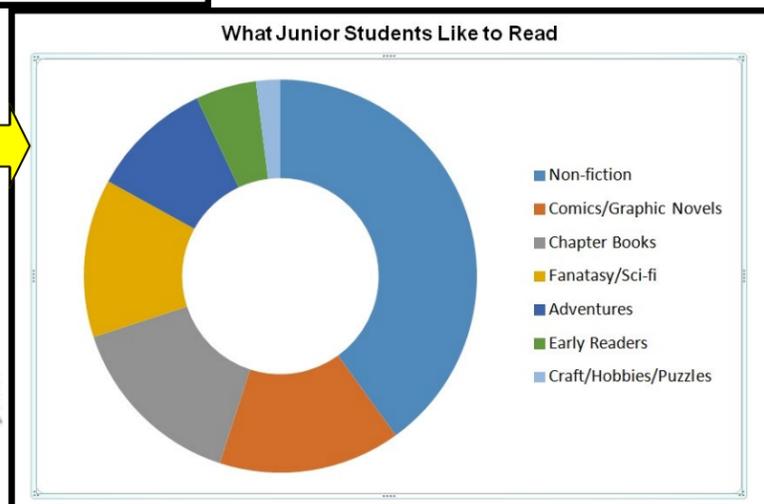
Part A: Activation
Reorganizing the list into categories



Getting ready for Part B.
Group A represented the survey data using a bar graph.

This information was used in order to decide, proportionally, which books to order.

Getting ready for Part B. Group B represented the survey data using a donut graph. This information was used in order to decide, proportionally, which books to order. The results from this group's survey were very different. During a whole class consolidation, students pondered and debated the discrepancies.



Consolidation:

There were many consolidation points for different purposes along this learning journey.

Part A: Consolidating our learning about constructing surveys led to discussions about bias, sample size, ways to gather data and ways to represent the data. At times, we discussed as a whole class; at times, with each group or with individual students.

We used the previous year's samples of student work to co-construct success criteria for how to gather and organize information. We discussed issues stemming from working together and co-constructed criteria on what effective collaboration and responsibility looks like, sounds like and feels like in the classroom.

During consolidation students supported each other in helping every member of the group feel 'like an expert' since the groups would be reconfigured in order to compare their findings.

Part B: Multiple consolidation points were needed for this portion of the task as well. After one consolidation period, it became clear that short explicit instructional sessions needed to be inserted to address misconceptions or concept gaps with a few students. All students benefited from discussions about tax as well as proportional reasoning.

A final consolidation point allowed teams to practise their presentations in front of their peers before presenting to the adult group. Students had already established criteria and were able to give specific descriptive feedback to each group. Time was given for groups to respond to the feedback and make adjustments.

After the presentations to the adults, it was important for students to reflect on their learning. How they grew as a community was just as important as the curricular learning.

Consolidation: where the true learning for both the students and the educator(s) resides

Rich learning experiences are important sources of assessment *for*, *as* and *of* learning, but without explicit reflection and consolidation of ideas, rich learning opportunities are lost. Consolidation is a time to listen to each other's thinking in a respectful way that allows each member of the group to learn from each other. Misconceptions, errors, brilliant ideas and not so brilliant ideas are all equal sources of constructing meaning for students.

For educators, consolidation is a time to question, to extend and to challenge the thinking of the group. This assessment *for* learning information forms the basis of professional judgement and provides relevant and meaningful information for next steps for the class. Personalizing next steps for each student comes, in part, from this stage of the learning journey.

Reflection:

Educator Reflection:

"I wasn't sure about this learning experience at first. This real life scenario presented itself and I wanted my students to have a voice in the purchasing of resources. I thought it would overwhelm some students, but it didn't. Actually we were able to handle challenges together. What powerful learning! I really got to know my students and we grew in relationship as a group."

Student Reflections:

"I never realized how many of my friends enjoyed the same type of books that I like. We've started sharing books and talking about them at recess."

"I thought it was really cool that the adults were listening to our recommendations. It didn't matter that we made a few calculation mistakes in our group. They wanted to know what we thought! The librarian said she was surprised what we found in our surveys and would definitely use the information! Cool!"

"I didn't know there were so many e-books to choose from. Stuff I like to read!"

How might we ensure that all students see themselves as capable learners?

Asking students to reflect on their learning (i.e. assessment as learning) adds to their ability to 'demonstrate a confident and positive sense of self and respect for the dignity and welfare of others' (CGE 4a). We know that a feeling of self-efficacy in mathematics stems from an asset-based model of thinking. Creating tasks linking to authentic purpose and action empowers students to feel they can make a difference. Highlighting students' work by name in school newsletters, at an assembly or showing video highlights of the Catholic School Council presentation in math class, validates the work and learning.

Next Steps:

"This task was big... but so rich. The students were really engaged and I had an opportunity to really watch the dynamics between students and groups of students. The two students who told me the first week of school that they don't "do" math had no problems with this task and their natural leadership qualities shone through during the presentation to the School Council representatives.

Many commented, "That was fun!" Many students became interested in different genres of books and wanted to invest in some books for their personal collection! When we debriefed as a class by reviewing the learning goals, picking out examples of evidence of learning and listening to my observations, they commented, "Really, we did all that?, You mean that was REAL math?, Can we do more math like this?" What a great way to start the year! Next steps? Do more!"

Establishing a learning community where each student has a growth mindset to 'tackle more math' is the greatest gift an educator can foster with students! Perseverance, resilience and a belief that he or she can do the mathematics will transfer to lifelong skills and feelings of efficacy.

Building relationships and working for a common cause cements the learning environment for an entire year of learning adventures!

An Annotated Learning Journey within a Junior Classroom

Contextual Information

Overall Expectations:

Mathematics: Grade 5 and 6 - Number Sense and Numeration

- Read, represent, compare, and order whole numbers to 100 000 (to 1 000 000 - Grade 6) decimal numbers to hundredths (to thousandths - Grade 6) proper and improper fractions, and mixed numbers;
- Demonstrate an understanding of magnitude by counting forward and backwards by 0.01;
- Solve problems involving the multiplication and division of multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to hundredths (to thousandths - Grade 6) using a variety of strategies;
- Demonstrate an understanding of proportional reasoning by investigating whole-number rates;
- Demonstrate an understanding of relationships involving percent, ratio, and unit rate (Grade 6).

Mathematics: Grade 5 and 6 - Data Management and Probability

- Collect and organize discrete or continuous primary data and display the data using charts and graphs.

Cross-Curricular Expectations:

Language:

Reading: Grade 5 and 6

- OE 1: Read and demonstrate an understanding of a variety of literary, graphic, and informational texts, using a range of strategies to construct meaning

Writing: Grade 5 and 6

- OE 1: Generate, gather, and organize ideas and information to write for an intended purpose and audience

Media Literacy: Grade 5 and 6

- OE. 3 Create a variety of media texts for different purposes and audiences, using appropriate forms, conventions, and techniques.

Connecting the Mathematical Processes to Curricular Goals:

Problem-Solving: develop, select, and apply problem-solving strategies as they pose and solve problems and conduct investigations, to help deepen their mathematical understanding;

Reflecting: demonstrate that they are reflecting on, and monitoring their thinking, to help clarify their understanding as they complete an investigation or solve a problem;

Connecting: make connections among mathematical concepts and procedures, and relate mathematical ideas to situations or phenomena drawn from other contexts;

Representing: create a variety of representations of mathematical ideas, make connections and compare them, and select and apply the appropriate representations to solve problems;

Communicating: communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions.

Developing Ontario Catholic School Graduate Expectations:

An Effective Communicator:

CGE2c Presents information and ideas clearly and honestly and with sensitivity to others.

A Reflective and Creative Thinker who:

CGE3b Creates, adapts, evaluates new ideas in light of the common good.

CGE3c Thinks reflectively and creatively to evaluate situations and solve problems.

A Self-Directed, Responsible, Lifelong Learner who:

CGE4a Demonstrates a confident and positive sense of self and respect for the dignity and welfare of others.

CGE4f Applies effective communication, decision-making, problem-solving, time and resource management skills.

Instructional Groupings

*Instructional Groupings:

“The [educator] in any program, including mathematics, provides a variety of learning situations to accommodate the various learning styles of the students. Students can be arranged for learning activities in a variety of ways: in large groups, in small groups, as partners, as individuals, working independently.”

“Small-group and partner work is particularly important in mathematics, where students benefit from hearing a variety of strategies and processes for problem solving. The [educator’s] role during group time is to interact with students, encouraging them to share their learning; to ask appropriate questions and make prompts that move students to a deeper level of understanding; and to celebrate students’ learning and strategies and see that they are shared with peers.”

Familiar Versus Flexible Groupings:

“[Educators] manage groups in a variety of ways, but ordinarily strive for a balance between permanent (or familiar) and flexible groupings. Familiar groupings are best used to establish community within a classroom; students will identify with a group and look to its members for encouragement and support. Most often, the composition of learning groups is more flexible; the make-up of the small groups in a classroom will change according to the task and the learning goals. At different times, groups may be based on friendship, a mix of abilities, concepts needing practice, interest, or random selection. Regardless of the type of group formed, students must have time to reflect and to share their discoveries, either in a small group, with a partner, or with the whole class.

The [educator] can use *small-group* and *partner work* to:

- give students opportunities to learn from one another;
- provide a structure that encourages students to do a great deal of talking and sharing;
- provide students with immediate feedback from their peers;
- promote risk-taking in students as their comfort level increases;
- provide students with opportunities to develop independence and confidence as they help one another;
- provide English language learners with opportunities to work with other students who speak the same first language;
- expose students to varying viewpoints; sharing and comparing strategies;
- reinforce students’ skills in cooperating with others (e.g., in listening actively to others, providing constructive feedback to others, and building acceptance and tolerance of others’ ideas);
- assess students’ learning skills (e.g., group participation, cooperation, abilities in conflict resolution);
- have students investigate and explore a mathematical concept;
- encourage students to formulate and defend conjectures.”

*Ontario Ministry of Education. *A Guide to Effective Instruction in Mathematics: Kindergarten to Grade 6 - Volume 3: Classroom Resources and Management*. pg. 40-42.

The Importance of Student Voice

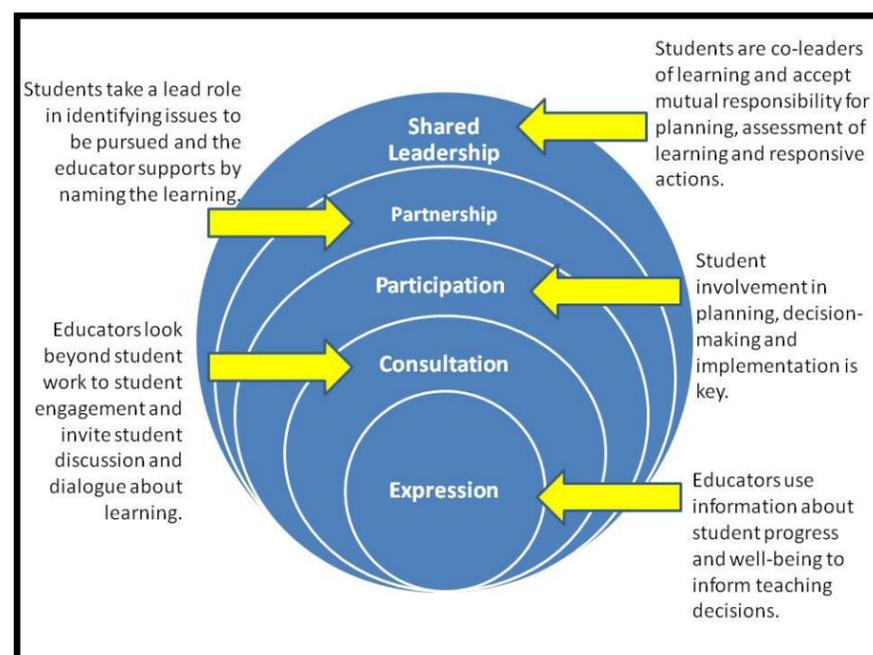
*Student Voice: Transforming Relationships

“Provincial collaborative inquiries are leading educators to become more keenly aware of student voice for younger children...They are discovering “how competent and capable of complex thinking” children are when they are deeply involved in the process of learning (Ontario Early Years Framework, 2013).”

“An environment that supports student voice encompasses more than a classroom; it is all of the educators and caregivers that students interact with in the school setting. In building trusting and reciprocal relationships, traditional roles shift. As educators carefully listen and observe, they are providing responsive guidance rather than engaging in teaching without attending to listening. Educators are diligently working to find harmony in this way of working so that they can continually engage and motivate students. In these relationships, educator and student learning and efficacy are growing. In the words of an educator participating in a provincial collaborative inquiry, “A shift in the teacher-student relationship occurs when the teacher is listening, [honouring] the child’s voice. The child talks more and begins to share ideas more confidently. Finding the balance is critical, and requires ongoing reflection.”

“Educators are also seeing the value of peer interaction and providing opportunities for students to work together in various types of groupings so that they can explore common interests, share various perspectives and build on each other’s learning. Again, quoting from an Ontario educator, “[They] have learned to trust their students and trust that when children are given a degree of autonomy over their own learning they will work and learn, and that the children are capable of learning from each other (often more effectively than from the teacher). This transformative practice has seen all of these educators moving toward co-constructing learning with students and away from teaching students.”

*Envisioning Student Voice



Ontario Ministry of Education. (September, 2013). *Student Voice: Transforming Relationships*. pg. 1-8.

Cross-Curricular Connections

*Cross-Curricular and Integrated Learning

“The development of skills and knowledge in mathematics is often enhanced by learning in other subject areas. Teachers should ensure that all students have ample opportunities to explore a subject from multiple perspectives by emphasizing cross-curricular learning and integrated learning, as follows:

a) In **cross-curricular** learning, students are provided with opportunities to learn and use related content and/or skills in two or more subjects. Students can use the concepts and skills of mathematics in their science or social studies lessons. Similarly, students can use what they have learned in science to illustrate or develop mathematical understanding. For example, in Grade 6, concepts associated with the fulcrum of a lever can be used to develop a better understanding of the impact that changing a set of data can have on the mean.

b) In **integrated** learning, students are provided with opportunities to work towards *meeting expectations from two or more subjects* within a single unit, lesson, or activity. By linking expectations from different subject areas, teachers can provide students with multiple opportunities to reinforce and demonstrate their knowledge and skills in a range of settings. Also, the mathematical process expectation that focuses on connecting encourages students to make connections between mathematics and other subject areas. For example, students in Grade 2 could be given the opportunity to relate the study of location and movement in the Geometry and Spatial Sense strand of mathematics to the study of movement in the Structures and Mechanisms strand in science and technology. Similarly, the same students could link their study of the characteristics of symmetrical shapes in Visual Arts to the creation of symmetrical shapes in their work in Geometry and Spatial Sense.”

Using Literacy Skills to Support Mathematical Thinking:

Transfer highly effective strategies from a literacy approach to mathematics instruction. Use the power of reading comprehension skills to support students when solving problems.

- **Making connections:** activating relevant prior knowledge; linking what is in the problem to students’ experiences; discerning the context; relating what is in the problem to other things they’re read or experienced, things in the real world, to phenomena around them, gospel values and virtues,
- **Asking questions:** actively wondering, raising uncertainties, considering possibilities, searching for relationships, making ‘what if’ scenarios,
- **Inferring and predicting:** interpreting, drawing conclusions, hypothesizing,
- **Visualizing:** imagining the situation or the people involved; making mental images or pictures,
- **Determining importance:** analyzing essential elements; finding the main ideas,
- **Synthesizing:** finding patterns, summarizing, retelling,
- **Metacognitive monitoring:** actively keeping track of their thinking, adjusting strategies to fit what they are reading and attempting to solve.

*Ontario Ministry of Education. (2005). *The Ontario Curriculum Grades 1-8: Mathematics*. p. 26.