What Works? Research into Practice

A special edition of *What Works? Research into Practice* produced by The Literacy and Numeracy Secretariat

The Literacy and Numeracy Secretariat
Le Secrétariat de la littératie et de la numératie

Ontario

Learning Blocks for Literacy and Numeracy

Learning blocks give classroom teachers scope to implement the components of effective literacy and numeracy programs, including ongoing assessment, targeted or differentiated instruction, and student-based, open-ended activities that encourage higher-order thinking (Ontario Ministry of Education, 2004a, p. 29). Although teachers and administrators in Ontario are in a variety of places in the development of learning blocks, early research suggests that the most effective school districts are demonstrating a commitment to uninterrupted time for learning (Campbell, Fullan, & Glaze, 2006, p. 23).

Effective instruction begins with careful planning as well as an understanding of what learners need. One of the basic needs for elementary students is time. Learning cannot be rushed; students require adequate amounts of time to consolidate their skills and reflect on their accomplishments. Research on cognitive functioning (or how the brain works) supports this notion and recognizes that significant learning takes major investments of time (Bransford, Brown, & Cocking, 2000; Davis, 2005). Research about time on task also says that "the more opportunity students have to learn, the more likely it is that they will do so" (Ross, 2002).

Usually 100–120 minutes in length for literacy and 60–75 minutes for numeracy, learning blocks allow teachers to optimize instruction. In mathematics, too, the provision of sufficient blocks of time as well as the threading of mathematics throughout the day play vital roles in student learning (Ontario Ministry of Education, 2003, p. 28).

Opportunities for Student Engagement

Routinely planned learning blocks mean that students know what is expected of them. They also know that their learning will not be interrupted by announcements, computer labs, assemblies, and other activities. When they feel that they have enough time to explore a topic, they are able to develop a sense of independence and self-direction (Fountas & Pinnell, 2001, Stigler & Hiebert, 1999).

Blocks allow teachers to differentiate learning. For students who need extra time to learn certain skills, longer periods will provide them with ample opportunity to do so without the stigma of having to stay after school (Meyer, 2001). Children with special needs often require additional time (Ontario Ministry of Education, 2005, p. 72), whereas students who learn quickly will be able to make use of their time to deepen their understanding.

In today's classroom, where having enough time is a common challenge, learning blocks provide teachers with such opportunities as:

- combining subjects that were previously taught in smaller units of time, facilitating new connections and new learning across the curriculum;
- exploring innovative instructional practices (e.g., bansho, shared reading); and
- spending less time transitioning from subject to subject.

WHY LEARNING BLOCKS?

"Attempts to cover too many topics too quickly may hinder learning. ... Providing students with time to learn also includes providing enough time for them to process information. ... The implication is that learning cannot be rushed; the complex cognitive activity of information integration requires time."

■ Bransford, Brown, & Cocking, 2000, p. 58
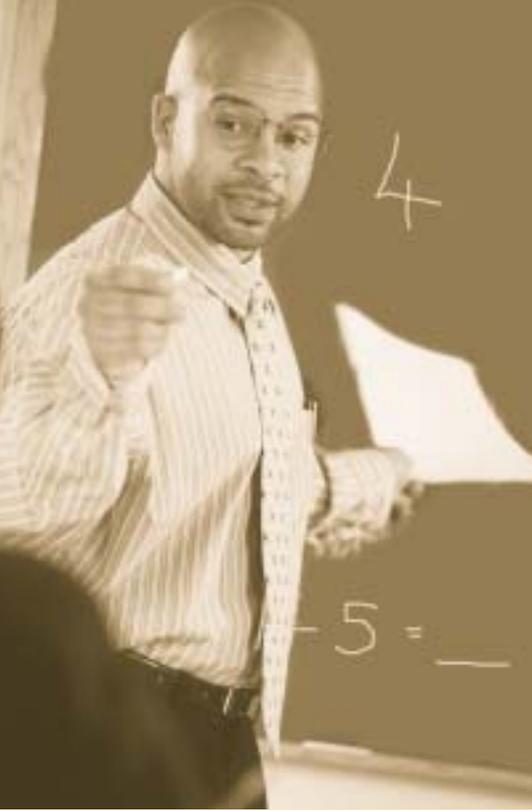
TIPS FOR PLANNING THE SCHOOL TIMETABLE

> The school timetable should maximize each teacher's effectiveness and assure coherence and consistency in the implementation of classroom, divisional, and school instruction.

1. *Learning blocks need to have priority in timetable planning.*

- Place the blocks for literacy and numeracy on the master timetable first. The two blocks do not have to be in sequence, though they could be.
- It is efficient and gives more flexibility if you schedule primary and junior blocks for literacy and numeracy at different times.
- When timetabling instructional options for the school's master timetable, ensure the prime learning components are the priority.
- Announcements should occur just before recess or before noon so that prime early morning time for student learning is maximized.

2. *Learning blocks should be uninterrupted. Planning time should be scheduled outside the literacy and numeracy learning blocks.*

CONSIDER:

- What are the variables that the principal and planning time committee should examine?
- How will you deliver preparation time outside the block times?
- Who will do the planning time?
- When can the planning time be delivered?
- How many teachers are optimal in the delivery of preparation time for students?
- "Uninterrupted" means no announcements or calls into rooms. Presentations for the division and trips (where possible) should be scheduled outside the learning block time

3. *Backward design is important for planning the timetable.*

CONSIDER:

- Frequency of planning periods
- Length of planning periods
- Gym availability
- Special education support
- Preparation coverage possibilities: devoted planning teacher/music teacher/physical education/drama/other
- Planning a shared preparation time for same-grade teachers
- Part-time staff — flexibility of time assignment may be beneficial in assuring best use of time

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"A schedule is a net for catching days."
- Allen, 2006, p. 138

"Schools should make every effort to convey the message that class time is sacred time and should be interrupted for important events only. ... The sanctity of instructional time might be communicated in a variety of ways:

1. providing teachers with a sign they can place outside their door when they wish no interruptions;

2. decreasing or eliminating announcements, and

3. referring to specific parts of class time as 'academic learning time' so students understand that these times require more attention than others."
- Marzano, 2003, p. 31

"Using data provides time for thinking, for reflecting, for new ideas, and for making meaning."
- Earl & Katz, 2006 p.64
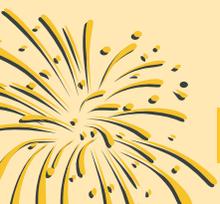
TIPS FOR PLANNING THE CLASSROOM TIMETABLE

> The purposeful activities in the learning block should contribute to maximizing student achievement.

1. *Premium learning time*

- Literacy and numeracy blocks are premium instructional time and should be uninterrupted for student learning.
- Individual timetables need to reflect the block times assigned to the grade or division.
- Timetables should be shared to assure that other staff, students, and parents know the instructional timing of the day.

2. *Responsive programming*

- In the literacy learning block: shared, guided, and independent instructional strategies are used on a consistent basis.
- In the numeracy learning block: the three-part lesson scaffolds student learning.
- The amount of time on the elements of a learning block will be determined through responsive curriculum programming based on assessment of student achievement over time.
- Block time is organized to meet the needs of students for instruction based on the time of the year, curricular expectations, and ongoing observation.

3. *Collaborative planning*

- Collaborative planning among teachers, administrators, and support staff to fine-tune their program support within the block will allow for targeted support to be offered at the optimum time.
- Working as a team to differentiate instruction to meet the needs of all students builds an instructionally inclusive environment where children can learn and grow at an optimal pace.
- Collaboration with support staff ensures that students move forward based on thoughtful assessment practices informing instruction for individuals and small groups of students (support staff: special education, English language learners, and other supports).

4. *Cross curricular integration*

The integration of social studies, science, media literacy. and technology in your instructional practice:

- deepens the student learning and understanding,
- broadens schema,
- makes connections among knowledge domains, and
- allows the teacher to teach the required curriculum in a timely and meaningful fashion.

ENGLISH LANGUAGE LEARNERS

English language learners may be overwhelmed by a language environment that is incomprehensible to them. They require particular attention, consideration, and support during the literacy learning block.

During the learning block, ELLs should receive specific differentiated instruction from an ESL/ELD teacher and/or classroom teacher, including:

- Activation of the prior knowledge and language skills that ELLs bring from their cultural backgrounds, for example encouraging children to use their language as well as English in literacy activities

- Explicit instruction about essential cultural knowledge that is required for comprehension of a given text or lesson

- A selection of resource material that is designed or adapted for English language learners, is based on age-appropriate content, and is comprehensible at each student's present stage of development in English

- Additional scaffolding for accelerated development of vocabulary, beginning with high-frequency words that English-speaking children bring with them when they start school (e.g., *boy, girl, in, under, right, share, look*) and expanding into lower-frequency academic words that are required for participation in various curriculum subjects (e.g., *accurate, divide, observe*)

- Explicit instruction about specific grammatical forms and sentence patterns, beginning with the basic sentence structure that most English-speaking children have in place before they start school but using examples based on age-appropriate content (e.g., focusing on the language of comparison such as *bigger, smaller, greater than,* in a mathematics or geography lesson)

- Metacognitive instruction focused on language-learning strategies such as using basic knowledge of word order or using a bilingual dictionary

A SAMPLE INSTRUCTIONAL SEQUENCE FOR A LITERACY LEARNING BLOCK

1. **Instruction of the whole class.** The learning block can first be set up so that there is whole class instruction in a mini-lesson about an aspect of learning that is critical for the class as a whole.

2. **Instruction for small groups or individuals.** Students then are divided into small guided reading/writing groups, or they can go to a learning centre to do independent activities. They are expected to practise and apply critical skills with teacher input and feedback.

3. **Instruction of the whole class.** Finally, the class is brought together again for the purpose of sharing, reflecting on, and consolidating learning gained from the learning block.

The teacher first directs the lesson with the large group, then circulates among the groups to guide and support students' learning, and finally facilitates sharing, reflection on, and consolidation of learning.

This sample demonstrates one way to set up a learning block. For more ideas, see the expert panel reports and the guides to effective instruction published by the Ontario Ministry of Education as well as the professional resources listed in the annotated bibliography in this monograph. Adapted from Ontario Ministry of Education, 2007, pp. 24–25.

		Approximate Time
Whole Class	**Common modelled or shared mini-lesson** (e.g., focus on reading with fluency – reading a passage of non-fiction with phrasing; or focus on writing effective paragraphs)	**10–20 minutes**
Small Groups	**Small-group or individual instruction with strategies based on skill, interest, need, or grade** **Group 1** shared, guided, or independent practice and application (e.g., echo reading using activity-based strategies with same or different text, depending on level; or rewrite sample paragraph using a graphic organizer) / **Group 2** shared, guided, or independent practice and application (e.g., readers' theatre using cooperative strategies with the same or different text, depending on level; or rank order three paragraphs and justify ranking in writing) / **Group 3** shared, guided, or independent practice and application (e.g., recorded reading at a listening centre using thinking skills strategies with different text levels; or, given a topic sentence, complete an effective paragraph using cooperative group strategies)	**30–70 minutes**
Whole Class	**Sharing, Reflection on, and Consolidation of Learning**	**5–15 minutes**

A LITERACY BLOCK
TWO EXAMPLES

Diagnostic assessment is the starting point, and ongoing formative assessment is part of the feedback loop to inform daily instruction in the literacy learning block.

Example 1: *Many of your students cannot adequately make **inferences**.*

The primary teacher could choose a number of read-aloud books (books with strong characters are a good choice), then during the read-aloud, he or she would model (by thinking aloud) how to ask questions of text, how to infer from pictures and words, and how to give evidence from text. This would be done frequently until children seemed to understand the process. Then the teacher would create a T-chart with quotations from the text, and ask students what they had inferred about the character traits from each quotation. Again, there would be time for practice, and the teacher would move on to having children work in pairs. More practice would be given, using quotations, and if necessary, the teacher would continue to model, and continue to create T-charts.

Then, as part of the gradual release of responsibility, the teacher would encourage students to apply what they had learned in guided and independent reading. After two or three weeks she or he would re-assess, and find out who needed further coaching.

The junior teacher could begin by reviewing making inferences through character traits and than create a T-chart with quotations from a book recently read aloud, inviting students to respond by giving evidence from text. Then the teacher would work further with inference, looking at inferring author's purpose. This would be carried out in a guided reading group, so that instruction could be targeted and specific. The teacher would coach children so that in their independent reading they were able to make judgments about characters, events, theme, and plot. Finally, the teacher would give cross-curricular examples to help students infer the main idea in both fiction and nonfiction texts. There might need to be more teacher modelling, ongoing assessment, and review of student success.

Example 2: *Using running records/miscue analysis, you learn that many of your students are having a problem with **word accuracy** (primary) or **fluency and phrasing** (junior).*

The primary teacher could create a small group based on a problem with word accuracy, and instruct students to focus on the meaning of the text and self-monitor by asking the question, "Does this make sense?" (Modelling examples, reading "horse" for "house" does not make sense, but "home" for "house" does make sense; reading "android" for "anchor" does not make sense.) The teacher would also draw attention to the composition of the word ("spell" has a 2-letter blend at the beginning, the vowel "e", and two "l's" at the end – how is that different from "spill", "sell"?).

The junior teacher could create a small group based on a problem with fluency and phrasing and determine first of all if the text was too difficult and if so, change the text level. If the text was not too difficult, then the teacher would instruct the group on using punctuation to convey meaning and on choosing expression to interpret meaning. This would prevent the student from mindlessly decoding the text, and guide the student to interact with, and think about, text. The goal would be to improve fluency and phrasing by creating meaning in the mind of the reader.

"[An] effective timetable will provide large blocks of time – ideally two hours – for students to develop their literacy skills, explore topics thoughtfully and thoroughly, engage in research and inquiry in all subject areas, and apply their learning in new contexts. These learning blocks give teachers scope to implement the wide-ranging components of an effective literacy program, including ongoing assessment, targeted instruction to address specific learning needs, and open-ended reading and writing activities that promote higher-order thinking."
  ■ Ontario Ministry of Education, 2004a, p. 29

"In classrooms in which . . . children are transformed into readers and writers, teachers do whatever is in their power to help children make connections. They take whatever time is allocated to them and create a schedule that allows for as much integrated learning as possible."
  ■ Cunningham & Allington, 1999, p. 238

For further, detailed information on teaching inference skills, please refer to the DVD *Comprehending in Action: Inferring,* which should have arrived in your school from the Literacy and Numeracy Secretariat. Also available at http://www.curriculum.org/LNS/coaching/profresources.shtml

STRUCTURING A MATHEMATICS LEARNING BLOCK
A MATHEMATICS PROGRAM BASED IN PROBLEM SOLVING

Problem solving is central to learning mathematics. By learning to solve problems and by learning through problem solving, students are given numerous opportunities to connect mathematical ideas and to develop conceptual understanding.

The teacher begins by selecting a problem that focuses on the mathematics students will learn during the lesson. A "good" problem enables multiple entry points for the students so that they can apply their prior knowledge, skills, and strategies within an unfamiliar mathematics context. Such problems are just within students' mathematical reach, provoking them to struggle to develop solutions, and to examine the different solutions in terms of the type of mathematics, models of representation, methods, and/or strategies they used. A three-part lesson is sketched below.

1. **Before**
   Getting Started: 10–15 minutes
The purpose of this first part of the lesson is to get the students to be cognitively prepared for the lesson problem by having them think about ideas and strategies that they have learned and used before. The teacher organizes a revisit of a concept, procedure, or strategy that is related to the lesson's learning goal. A revisit might be a class discussion of the previous lesson problem, students demonstrating methods or strategies that were developed to solve previous problems, or students solving a smaller problem that evokes prior knowledge, skill, and strategies.

2. **During**
   Working on It: 30–40 minutes
For this part of the lesson, the students are actively solving the problem. Students work in small groups, in pairs, or individually to solve a problem and record their mathematical thinking used to develop solutions to the lesson problem. Students develop independence and confidence by choosing methods, strategies, and concrete materials that they will use, as well as ways to record their solutions. When students are provided sufficient time to solve the problem, they also learn to develop perseverance and come to expect that solutions to problems are never immediately apparent, so it takes time to solve a math problem.

While the students are making a plan and carrying out their plan to solve the lesson problem, the teacher circulates among the students, making observations about the ways that students are interacting, and taking note of the mathematical models of representation, methods, strategies, and mathematical language used by the students to develop their solutions. If students are stuck, the teacher might pose questions to provoke further thinking or have other students explain their plan for solving the problem.

3. **After**
   Consolidation and Practice: 10–15 minutes
In this phase of the three-part lesson, the teacher strategically coordinates student sharing of their solutions to the lesson problem, using a mathematical instructional strategy like bansho, math congress, or a gallery walk. By using such a coordinating strategy, the teacher can facilitate a whole-class discussion, whereby students explain the mathematics in their solutions, methods, and strategies, and discern whether classmates used the same or different strategies.

Through such coordinated sharing and discussion, students can hear and analyse their classmates' mathematical thinking. Also, the students learn to discern similarities and differences between the mathematics, methods, and strategies inherent in the student solutions. Such discernments provoke students to make connections between their own mathematical ideas and the ideas of others, as well as understand the mathematics within and across math strands. Further,

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"Real learning is constructive and developmental. As children attempt to make sense of a situation and its context, they interpret, organize, and model it based on the ideas or strategies they have already constructed."

■ Fosnot & Dolk, 2001, p. 23

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"Students need enough time to engage in activities around a specific mathematical topic if they are to become proficient with it. When they are provided with only one or two examples to illustrate why a procedure works or what a concept means and then move on to practice in carrying out the procedure or identifying the concept, they may easily fail to learn. To become proficient, they need to spend sustained periods of time doing mathematics – solving problems, reasoning, developing understanding, practicing skills – and building connections between their previous knowledge and new knowledge."

■ Kilpatrick, Swafford, & Findell, 2001, p. 135

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For ideas on how to structure a mathematics program based in problem solving, please visit the Literacy and Numeracy Secretariat's coaching website where you can download powerpoint presentations and facilitator's guides to support the implementation of *A Guide to Effective Instruction in Mathematics, Number Sense and Numeration, Grades 4 to 6.*
http://www.curriculum.org/LNS/coaching/profresources.shtml

through such rich, mathematics classroom discourse, students are developing and consolidating their understanding of the learning goal of the lesson, in terms of making connections to prior knowledge and experiences and making generalizations.

New methods and strategies derived from student solutions are posted on the class's strategy walls or used to develop a class mathematics anchor chart. What the teacher learns from students about their understanding is directly related to the types of questions that are asked. What the teacher learns from this discussion will guide the direction of future lessons or activities.

ANNOTATED BIBLIOGRAPHY

Literacy

Better Answers, Ardith Davis Cole, Stenhouse Publishers, 2002

This book is based on Cole's work with students who have not met state standards in language. She has developed an easy-to-implement, step-by-step protocol – the Better Answer formula – that helps students focus on task. This will help teachers as they try to elevate student achievement within the literacy learning block.

Breakthrough, Michael Fullan, Peter Hill, & Carmel Crévola, Corwin Press, Sage Publication Company, 2006

This book synthesizes the best of current instructional models, and creates a framework based on 3 P's: Personalization – meaningful, student-centred classroom interactions; Precision – using formative assessments to monitor individual student progress; and Professional learning – daily ongoing learning for all educators. *Breakthough* establishes the "tipping point" for moving students forward, within the literacy learning block.

Critical Literacy, Maureen McLaughlin & Glenn L. DeVood (Foreword by Allan Luke), Scholastic, 2004

In this book, the authors explain critical literacy, and then describe theme-based critical literacy lessons, based on classroom practice. This book will help teachers to move their students towards deeper critical thinking, as they work with them in the literacy learning block.

Strategies That Work, Stephanie Harvey & Anne Goudvis, Stenhouse Publishers, 2000

This book looks at strategic thinking and strategic reading, and outlines, in detail, reading comprehension strategies: making connections, questioning, visualizing, inferring, determining importance, and synthesizing. For anyone who needs detailed information on reading comprehension strategies, this is a key book, and will help inform planning for the literacy learning block.

Teaching For Comprehending and Fluency, Irene C. Fountas & Gay Su Pinnell, Heinemann, 2006 (DVD included)

This book provides teaching and assessment frames that will give teachers a clear understanding of students' reading levels: where they are, where they should be, and what they need to do to get there. The authors share insights on the specific demands that fiction and nonfiction texts place on readers. Helpful for teachers as they plan for literacy blocks.

Teaching For Deep Comprehension, A Reading Workshop Approach, Linda J. Dorn & Carla Soffos, Stenhouse Publishers, 2005 (DVD included)

This book explains how the orchestration of strategies, not a single strategy, leads to deep comprehension. The DVD includes 85 minutes of video including a first grade reading workshop (shared reading, author studies, share time), a fourth grade reading workshop (mini-lesson and literature discussion groups), and others. This book gives practical examples for teachers to extend their thinking as they plan for the literacy learning block.

EFFECTIVE PRACTICE TIPS

1. Meet with other grade-level teachers to organize a daily schedule which incorporates learning blocks.

2. Make every minute of the school day focus on student doing and learning.

3. Ensure that learning blocks are uninterrupted and are at predictable time periods in the day throughout the year.

4. Plan for large-group, small-group, paired, and individual learning activities within the timetable.

5. Adjust learning activities throughout the school year to ensure that students are making connections to prior learning experiences and knowledge in literacy, numeracy, and other curricular areas.

6. Gradually release responsibility as students become more independent for literacy/ numeracy learning. As students become more independent, instruction becomes less teacher directed.

7. Make sure students have time regularly to share their thinking and work with others in the class as well as to reflect on their own learning.

8. Focus on reading and mathematical thinking and doing every day so that students are building their understanding and applying learned knowledge and strategies.

9. Give daily attention to oral communication, active listening, and writing throughout literacy and numeracy blocks.

10. Schedule a mathematics learning block on a daily basis and provide places in daily class routines and other curriculum areas for students to apply their mathematical knowledge and strategies.

Adding It Up: Helping Children Learn Mathematics, Jeremy Kilpatrick, Jane Swafford, Bradford Findell (Eds.), National Academy Press, 2001

This book explores how students in pre-Kindergarten through Grade 8 learn mathematics. The authors recommend how teaching, curricula, and teacher education should change to improve mathematics learning during these critical years. The identification of five components of mathematical proficiency characterizes successful mathematics learning and suggests ways to improve instruction. Suggestions for coordinating curriculum instructional materials, assessment, instruction, professional development, and school organization around the development of mathematical proficiency are explained.

How People Learn: Brain, Mind, Experience, and School, John Bransford, Ann L. Brown, & Rodney C. Cocking (Eds.), National Academy Press, 2000

This book is a summary of some recent research in the cognitive sciences about mathematics learning. The findings of the research suggest important implications for what mathematics we teach, how we teach it, and how we assess student learning of mathematics.

Teaching Mathematics Through Problem Solving: Prekindergarten–Grade 6, Frank Lester Jr. & Charles Randall, National Council of Teachers of Mathematics, 1999

This compilation of articles describes the characteristics and strategies for teaching mathematics through problem solving. The main goal is for students to develop a deep understanding of mathematical concepts and methods through making sense of mathematical problems in which the mathematics to be learned is embedded. The teacher's role in this instructional approach is made explicit throughout the volume.

The Teaching Gap, James Stigler and James Hiebert, The Free Press, 1999

Based on a sophisticated analysis of videotapes from 231 classrooms gathered as part of the Third International Mathematics and Science Study (TIMSS), this book offers an insightful approach to examining mathematics teaching based on its practice in three countries: United States, Germany, and Japan. The results of the study highlight that the achievement gap between U.S. students and those in Japan and Germany can be traced to differences in the instruction they have received; that is, a teaching gap. The results of study offer insights and details about effective mathematics instruction through problem solving.

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