

Inspiring Your Child to Learn and Love Math

Resource Guide



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Introduction

“Parent engagement matters. Study after study has shown us that student achievement improves when parents play an active role in their children’s education, and that good schools become even better schools when parents are involved...”

Ministry of Education, “Parent Engagement”

This Parent Tool Kit was created specifically for parents of children in the elementary grades (junior kindergarten to grade 8) in Ontario. The goal of this resource is to provide parents with the most essential, research-based information to help them be the best, most knowledgeable and most confident supporters for their child’s mathematics education.

This Tool Kit is unique because it provides facts and strategies

not found in other parent resources in Ontario. It includes a number of distinct elements: print resources, fact sheets, workshop materials, and videos organized into modules based on grade levels.

How you use this Tool Kit is up to you. You might choose to read the print materials in the five stand-alone modules from front to back. Perhaps you will use them as a reference guide to answer specific questions. Or

Introduction (continued)

maybe you have time to read only the fact sheets, which highlight key information from each module. A visual learner might begin by watching the overview videos that feature highlights from each module. The videos can be found on the Tool Kit's website.

You might also want to share the Tool Kit with other parents in your community who are struggling to find the information they need to help their children navigate the K-8 mathematics program. You can do so by using the workshop planning guide to host a parent information evening at your

local school. However you choose to use it, this Tool Kit will undoubtedly help strengthen your knowledge and understanding. It emphasizes the many ways in which you play an important role in your child's education, and the fact that your child will be able to succeed in mathematics with your help and support.

The contents of this Tool Kit are available online. They can be reviewed and downloaded by going to:

ontariodirectors.ca/parent_engagement.html

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Module Five



Intermediate (Grades 7 and 8)

Countless Opportunities

This module covers the following topics:

- What we know about teens (and parents) in the intermediate division
- Changes in math content and instruction
- “Real life” math
- “Real life” graphs
- Closing the gaps
- Enrichment
- Looking ahead

What we know about teens (and parents) in the intermediate division

How often have we heard that coffee is bad for us one day, only to be told soon afterwards that coffee is good for us? Which study do we believe? There are many conflicting reports about education, too. We hear different opinions about everything from class size and homework to year-round schooling and late school start times for adolescents.

But year after year, different researchers have found the same results about some important areas of education. We can apply two of these findings to math education:

- * “The greater the support that families provide for their children’s learning and educational progress, the more likely that their children will do well in school and continue on with their education.”¹



- * The transition years (intermediate division, grades 7 and 8) might be the “most critical juncture” in a student’s educational journey from kindergarten to grade 12.

Educators know that many young adolescents see the shift from elementary to secondary school as a difficult “journey from a relatively less demanding institution (socially and academically) to a relatively more demanding one.” Students in grades seven and eight might believe that they are about to lose status: from being the oldest students in the school to the youngest. This happens at the same time that they are moving from childhood towards adulthood and are already facing many physical changes and important questions of personal identity.

As a parent, you play a key role in supporting your child through this time of change.

- * You can help them to be hopeful about their new status as a “teen.”
- * You can encourage them to have an open mind about future possibilities—new friends, experiences, opportunities, challenges, and learning.²



¹ A. T. Henderson and K. L. Mapp, “A New Wave of Evidence: The Impact of School, Family, and Community Connections on Student Achievement,” SEDL: Advancing Research, Improving Education, Annual Synthesis 2002 (National Center for Family & Community Connections with Schools, 2002).

² K. Tilleczek, B. Ferguson, and S. Laflamme, *Fresh Starts and False Starts: Young People in Transition from Elementary to Secondary School* (Toronto: Ontario Ministry of Education, 2010).

It is also the perfect time to encourage your child to start planning for the future – one that includes math! You might not be able to jump in and solve a trigonometry problem, but:

* You can support your child’s academic achievement by helping them to see that learning takes time and persistence, and is worth the effort, even when there are new challenges and demands.

* You can encourage your child to have a positive mindset. If they believe that they can learn, grow, achieve, and succeed, it is more likely that they will! Research shows that having a negative mind-

set contributes to under-achieving in math and science. It might also affect a student’s decision not to pursue courses and careers that involve math and science.

“You always give credit where credit is due—to high school coaches, college coaches—but my dad, the foundation that he built with me, is where all of this came from. The speed, the determination, the mindset, just the natural belief that you can do anything you put your mind to, it all comes from my dad.”

Robert Griffin III



Changes in math content and instruction

Up to this point in a child's education, math has been concrete and practical, but the intermediate division brings new demands. The content becomes more abstract – for example, learning about algebra, variables, and polynomials. Students have already been introduced to algebra tiles, interlocking cubes and pattern blocks in earlier grades. They are now likely to use specialized calculators, computers, and software to explore abstract concepts and representations visually.

Students in the intermediate division might feel that the pace has increased and that they face extra pressure. Adding to the pressure, this is all happening at the same time that they are preparing for life at high school and beyond.

In intermediate math, your child is expected to be able to:

- * Do calculations fluently.
- * Apply basic formulae (such as perimeter, area, surface area, and volume).
- * Estimate efficiently and effectively, and understand when it is appropriate to estimate.
- * Select the appropriate tool to complete a task—table vs. drawing; bar graph vs. pie graph; spreadsheet vs. chart.



- * Apply a specific strategy to solve a problem—work backwards, try a simpler problem, draw a diagram.
- * Use a variety of materials: manipulatives, drawings, diagrams, charts, tables, and graphs to communicate solutions.
- * Use math software such as spreadsheets, graphing software, and dynamic geometry software to show solutions.

“Real life” math

Many of us have heard a child groan, “When will I use this stuff in real life?” In fact, we might have asked the same question

when we were the same age. The reality is that all of us—from students and apprentices to adults and seniors—use so-called school math every day. Just as we need to read and write every day, we need to do math, too! We use math to:

Calculate discounts, interest payments, and tips.

Mix lemonade or garden fertilizer in specific ratios.

Manage finances.

Figure out how much time it takes to fly between cities or across time zones.



Understand government announcements about the national debt, and understand research reports about health issues such as cancer, heart health, and autism.

There are many examples of math in daily life and many ways to include your teen in activities involving math. When you show confidence in their mathematical abilities, they will believe in their own abilities too! For example, together you can:

- * Calculate the least expensive cell phone contract.
- * Determine the biggest discount when using an online hotel reservation system.

* Negotiate the departure time for a road trip knowing the distance, the need for rest stops, and the chance of delays caused by construction and rush hour traffic.

* Calculate heart rate before and after exercise.

* Interpret the latest baseball or hockey stats.

“Real life” graphs

“**Graphicacy**”: the ability to understand and present information in the form of sketches, photographs, diagrams, maps, plans, charts, graphs, and other non-textual, two-dimensional formats.

“**Numeracy**”: the ability to understand and work with numbers.

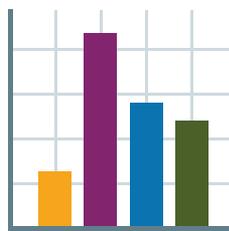
In today's world, it is important to be "numerate." In fact, "graphicacy" skills are life skills! One answer to the question "When will I use this stuff in real life?" is that we all need to read and understand information that is presented in different formats all the time. Think about the media stories we see every day about topics ranging from weather and recycling to global warming and product quality. The data can be shown:

* In a "representative" way—what we see, as in photographs or drawings.

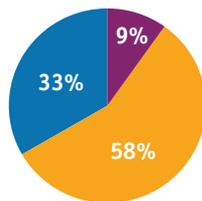
* In a more abstract way—as spatial information in maps, plans, and diagrams, or as numerical information in tables and graphs.

In primary and junior divisions, children learn about different types of graphs—for example, bar graphs (including histograms), line graphs, circle graphs, and scatterplots—and which type to use in different situations. Here are some examples of the types of graphs that children use:

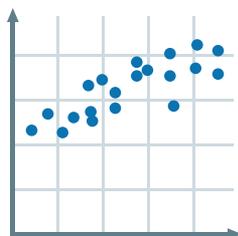
Bar Graph



Circle Graph

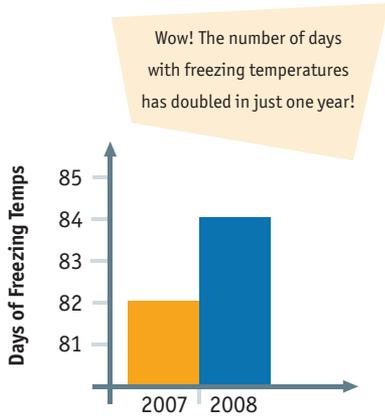


Scatterplot

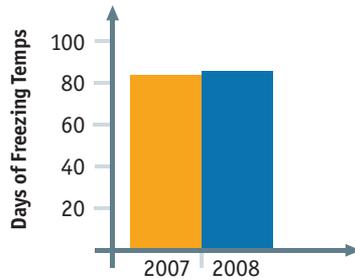


In the intermediate division, students continue to learn why it is so important to be careful when you read graphs and interpret the stories they are telling (or misrepresenting).

Consider the stories being told by the following graphs. At first glance, this histogram tells a dramatic story:

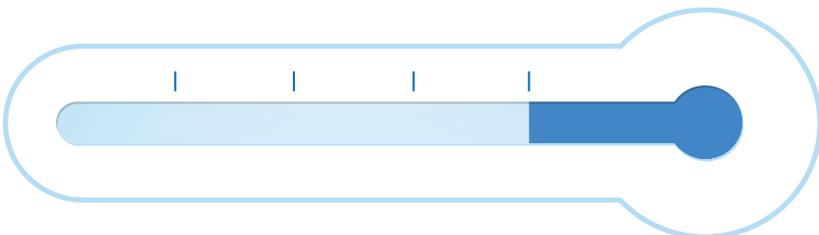


graphs show exactly the same data, but the first makes the change appear to be larger than it really is, and the second shows that there's not much of a story at all. The "real" story is that the numbers on the first graph's vertical axis do not start at zero: each vertical mark on the first graph represents "1" and each mark on the second graph represents "20." The two graphs tell the same story in different ways because they use different scales.



But when we examine the scales used in the graphs, the story changes dramatically. Both

The number of days with freezing temperatures was about the same in 2007 and 2008.



Closing the gaps

For students to invest effort and energy in going to school, they need to believe that their efforts will pay off. As a parent, you can help your children to believe in themselves, and remind them that learning and effort can result in success!

Learning math is like stacking building blocks: you want to make sure everything is sturdy before building upwards. Along the way, it is important to

reinforce the base and fill in any holes, or “gaps,” to build a stronger structure overall.

Similarly, research tells us that new learning builds upon prior knowledge. It is important for students to fill in any gaps in their knowledge in order to move forward and succeed.

Remediation, also called “gap closing” or “gap filling,” is very important when it comes to learning math. If students believe that they cannot succeed, or if they feel defeated by math content, their attention and attendance in math class could suffer and they are more likely to act out in school and at home. In the worst case, this



could even lead to a self-fulfilling prophecy: if you imagine that you will fail, you might give in to feelings of social stigma and decide that dropping out is the only way to save face.

- * Your child's teacher can help to identify gaps in your child's learning in math class, then suggest gap-filling activities.

Teachers understand that intermediate learners have a variety of learning styles. Some students might learn well independently with the visual support of computer programs, remedial games, and activities. Others might need a more personal, one-on-one approach, such as listening to and talking with a trusted individual.

- * High-quality online review and remediation programs can provide motivational and interactive math instruction for grade 7/8 students:

MIT's MathScore

mathscore.com

Ontario-based GapClosing e-practice resources

oame.on.ca/mathies/additionalSupports.html#eP

- * Many senior/college/university clubs provide free tutoring through community outreach programs.

- * You can contact high schools in your area and connect with students who want to complete community service graduation requirements by tutoring or participating in study buddy programs.

Enrichment

Schools try to address the needs of all students to make sure that each individual has opportunities to learn, grow, and strive for excellence. Students who show a deeper interest in, and enthusiasm for, math need special attention and might benefit from opportunities available through both school and community programs.

- * Your child's teacher is an excellent source of information about opportunities for gifted and talented children,

such as math clubs, leagues, competitions, and organizations (local and online).

- * The University of Cambridge's "nrich" website hosts an online community where students can talk about and do math with like-minded youngsters. The website also has games, problems, children's solutions, and articles.

www.nrich.maths.org

Looking ahead

“Beginning with the end in mind” for career planning means:

Talking about your child’s strengths, interests, and future plans.

Determining which courses your child needs to take to graduate from high school and to qualify for a college, university, apprenticeship training program, or specific job or career.

Planning for the future involves some of the most important discussions that you can have with your young adolescent child. Choosing high school courses for the first time can lead to intense conversations. Be positive about the future and serious about the importance of setting career goals. Your 13-year-old does not need to make final, unchangeable plans for the future, but they do need to think realistically about how to work towards a few specific goals.

By “beginning with the end in mind,” you and your child can make realistic and informed short- and long-term plans. Please remember that you are not alone in making these decisions. Having the right information on hand is key!



Here are some steps that you and your child can take to collect information and make informed decisions:

* Visit websites about post-secondary programs, including college and university programs and apprenticeships.

* Find out about prerequisites for post-secondary programs before selecting high school courses.

* Connect with your child's math teacher and guidance counsellor. They can help you make the best choices and understand the consequences of those choices. For example, without enough high school math credits, your child will have fewer post-secondary options and probably won't be accepted into many science, engineering, computer, business, or social science programs.

* Ask questions—"What prerequisites do I need for the veterinary technician program at a community college?" "How do I qualify to be a hazardous materials worker or gemologist?" "What courses do I take to be an optometrist? Animator? Early childhood educator? Chef?"

* Attend grade 9 information nights to learn about high school courses and credits. Participate in a "Take Your Child to Work" program or attend a community career night.

* Be sure to read any career-related resources provided by your school.

"Anything is possible if you have the mindset and the will and desire to do it and put the time in."

Roger Clemens, American baseball pitcher

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Council of Ontario Directors of Education

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