

**AN INVENTORY OF RESOURCES FOR TEACHING SECONDARY
MATHEMATICS TO STRUGGLING LEARNERS**

**Craig Olson
Independent Learning Program
School District No.71 (Comox Valley)
July 2007**

INTRODUCTION

After five years of teaching senior math courses to struggling learners, I have come to the conclusion that the recommended resources supplied by the Ministry of Education and the major publishers are inadequate. While my students are not usually diagnosed with learning disabilities, their difficulties with reading, writing, and math require that I provide alternate approaches and strategies when teaching. In the past, I have been reluctant to deviate from the supplied textbooks and programs, even when it was obvious that the students weren't benefiting from the instruction. The prospect of assembling my own resources and materials was daunting. However, appropriate resources do exist and can be found. This project consists of compiling an inventory of resources for use by secondary teachers with struggling math students.

This inventory contains information regarding books, manipulatives, software, websites, and other ideas and strategies. The majority of resources for struggling learners target the primary and elementary student. Resources developed for elementary students are usually not appropriate for secondary students needing additional assistance in math. Good resources that specifically target secondary students can be difficult or time-consuming to find. This project provides teachers with information about resources that is intended to eliminate the need for extensive searching.

The idea is intriguing to my district colleagues that also teach math. They have stated that they would find such a project beneficial to their teaching. The inventory is such that it could be placed on a school or district website. Eventually, it could be possible to have others contribute to the list by adding resources and, possibly, reviews of items and their usefulness.

SELECTED BOOKS

Allsopp, D. H., Kyger, M. M., & Lovin, L. H. (2007). *Teaching mathematics meaningfully: Solutions for reaching struggling learners*. Baltimore, MD: Brookes Publishing.

Recommended reading for all math teachers.

Ashlock, R.B., Hatfield, M.M., Hausher, H.L., & Stoeckinger, J.H. (1996). *Mathematics connections: Integrated and applied*. Westerville, OH: Glencoe/McGraw-Hill.

This book is a valuable resource for those teachers working with secondary students having difficulty with abstract mathematical concepts. The topics covered include patterns, fractions, measurement, geometry, statistics, integers, and algebra.

Bush, W.S. & A.S. Greer (Ed.). (1999). *Mathematics assessment: A practical handbook for grades 9–12*. Reston, VA: National Council of Teachers of Mathematics.

Ellis, J. (2004). *What's your angle, Pythagoras?* Watertown, MA. Charlesbridge.

A fictionalised account of how a young Pythagoras derived his famous theorem.

Enright, B.E. & Heath, R. (1985). *Enright computation series*. North Billerica, MA. Curriculum Associates, Inc.

A useful series that allows students to build their basic math skills. Addition, subtraction, multiplication, and division are covered as well as fractions and decimals. Answer guides and teacher manuals can be purchased along with the eight student workbooks. Located in the Senior Alternate Library.

Klass, C.J. (2001). *Mathpower 9 modified program*. Whitby, ON, McGraw-Hill/Ryerson.

A useful resource that closely follows the learning outcomes for BC Mathematics 9. Despite the title, this resource is adapted and not modified. The material is such that they are able to follow the steps and diagrams without much assistance. Less writing is required than might be necessary when using a textbook. Less reading is also required due to the use of diagrams and flowcharts. This package is comprised of a binder of blackline masters and is also available for Math 7 and 8. Located at Cape Lazo Middle, Lake Trail Middle, Vanier Secondary, and Senior Alternate in Comox.

Kempf, A.F. (1981). *Mastering essential mathematics skills*. Toronto, ON: Doubleday Canada Limited.

An out of print and out-dated publication that could be used with some students on a modified program. Many of the subjects covered roughly parallel some of the learning outcomes of the BC Essentials of Mathematics 10 & 11. Located in the Senior Alternate Library, Comox.

Kimball, D.B. (1990). *Math for the real world*. Syracuse, NY. New Readers Press.

An American series that has some value for students on modified programs. Located in the Senior Alternate Library, Comox.

Pappas, T. (1991). *More joy of mathematics: Exploring mathematics all around you.* San Carlos, CA: World Wide Publishing/Tetra.

A collection of interesting facts, stories, explanations, exercises, and anecdotes about the history of mathematics and its everyday uses.

Saunders, H. (1988). *When are we ever gonna have to use this?* Palo Alto, CA: Dale Seymour Publications.

An interesting approach in that problems are described in the context of the vocation in which they may be found. Some of the learning outcomes from BC Essentials of Mathematics 10 & 11 are covered. Located in the Senior Alternate Library, Comox.

Taylor, H. & Taylor, L. (1984). *Developing skills in algebra one.* Palo Alto, CA: Dale Seymour Publications.

This publication would have some usefulness with students that are needing some practice with algebra skills such as those that need some review of BC Mathematics 9. The material is at a level that is appropriate for students capable of BC Principles of Mathematics 10. Located in the Senior Alternate Library, Comox.

Travis, B. & Dahl, T. (2005). *Mathematics assessment sampler, grades 9-12: Items aligned with NCTM's principles and standards for school mathematics.* Reston, VA: National Council of Teachers of Mathematics.

USEFUL MATH WEBSITES

The home page of a Kelowna math teacher (Lorraine Baron). Some good ideas and resources for BC math courses with many links to useful websites.

<http://members.shaw.ca/barongrodzki/home.htm>

Lessons and resources posted by teachers of Essentials of Math 10 & 11:

<http://www.bctf.ca/bcamt/math11ess.html>

<http://www.bctf.ca/bcamt/math10ess.html>

Virtual activities using integer bars (rods). Includes basic facts, fractions, geometry, and algebra.

<http://www.arcytech.org/java/integers/>

Games involving fractions, decimals, algebra, and geometry at the Grade 6 level.

http://harcourtschool.com/activity/elab2004/gr6/index_2004.html

Tables for trigonometry, powers, square roots, and fraction-decimal conversions.
http://members.shaw.ca/teacherweb/table_page.htm

Design and print your own graph paper.
<http://www.incompetech.com/graphpaper/>

The education portion of the Canadian Mathematical Society website. It contains numerous links to resources, ideas, lessons, software, games, etc. for all levels of math.
<http://www.math.ca/Education/>

Word Problems for Kids.
<http://www.stfx.ca/special/mathproblems/welcome.html>

Vancouver Island Net Diagnostic Math Assessment.
http://sd71.bc.ca/sd71/scripts/math_assessment/

The Van de Walle Professional Mathematics Series – some good blackline masters can be downloaded from this site.
<http://ablongman.com/vandewalleseries/>

This is the website of Marilyn Burns, a respected author and educator in the field of mathematics. It's a commercial links with some freebies such as links to articles as well as information on products.
<http://www.mathsolutions.com/index.cfm>

A video demonstration of estimation and calculation and common sense.
<http://www.youtube.com/watch?v=HGWWFLJxpdA&mode=related&search=>

A video demonstration of the effectiveness of personal strategy versus algorithm.
<http://www.youtube.com/watch?v=nmykxv1ylic&mode=related&search=>

A video demonstration of rote versus strategy.
<http://www.youtube.com/watch?v=4zS1Bou4sjU&mode=related&search=>

A fun site showing the various ways that mathematics is part of *The Simpson's* and how to use the popular television program to introduce concepts.
<http://www.mathsci.appstate.edu/~sjg/simpsonsmath/>

MathVIDS is a comprehensive website for math teachers with struggling students. Teachers can find resources, background information, lesson plans, strategies, video demonstrations, and much more.
<http://coe.jmu.edu/Mathvids2/index.html>

This website contains lesson plans and other strategies for teaching fractions, decimals, and percent for Grades 4 to 8. It was produced by the Virginia Department of Education and is called thinking Rationally about Fractions, Decimals, and Percents.
<http://www.pen.k12.va.us/VDOE/Instruction/Math/FractionsDecimalsPercent.pdf>

VIRTUAL MANIPULATIVES

The National Library of Virtual Manipulatives website. It contains a great deal of information regarding virtual manipulatives and their uses for the classroom teacher.
<http://nlvm.usu.edu/en/nav/vlibrary.html>

More on virtual manipulatives from the Computing Technology for Math Excellence website.
http://www.ct4me.net/math_manipulatives.htm

Top Ten Lists for Using Technology to Help High School Students Learn Mathematics. This site includes many examples and links.
<http://www.wiu.edu/users/mfjr01/wiu/tea/info-on-sites/talks/Lists-of-Top10-listsHS.htm>

Skill Builders – Interactive Sites. This elementary oriented site has activities for students up to Grade 8.
http://www.internet4classrooms.com/skills_5th_original.htm

Everyday Math Resources. Another website for elementary students with resources that could be used for struggling secondary learners.
<http://www.center.k12.mo.us/Edtech/everydaymath.htm>

VIDEOS AVAILABLE FROM LRC (SD71)

Video Title: *Pythagoras' Theorem*

Producer: Channel Four Television Corp.

Length: 15 min

Publisher: Oakville, Ont : Magic Lantern Group, Inc. c2000

Summary: The program shows how Pythagoras' Theorem can be used to find unknown lengths in right-angled triangles and to prove that a triangle is right-angled. It draws on the history of mathematics to show how this important theorem has been used for thousands of years to solve practical problems. Ben and Katie explore the relevance of Pythagoras' Theorem in our own world, witnessing the construction of an aerial slide by the army, the positioning of equipment at a wind farm, and measurement of a corner on a football pitch.

Video Title: *Mathematics: Assessing Understanding: Individual Assessments Parts 1-3*

Length: 20 minutes each

Publisher: White Plains, NY : Cuisenaire Co. of America, c1993

Summary: Three new videotapes show Marilyn Burns conducting individual assessments with students. Part 1 shows interviews with children ages 7 through 9 and focuses on their understanding of place value. Part 2 shows interviews with 10-year-olds and assesses their understanding and use of whole number operations. Part 3 focuses on fractions with 11 and 12-year-old students. The tapes provide teachers with model questions for assessing students' understanding and show the kind of interaction between teacher and student that is basic to assessing their thinking.

OTHER RESOURCES

Fraction circles are an excellent tool for allowing students to obtain a visual representation of fractions and fraction operations. Fraction rings are valuable for demonstrating the relationships between fractions, decimals, percents, and degrees. Information regarding the purchase of these items can be found at the following link.

For fraction rings and fraction rings:

http://www.spectrumed.com/repository/parsed/07SecondaryMath/splits/07SecondaryMath_p43.pdf

LD OnLine is an organisation dedicated to helping children and adults with learning differences reach their full potential. This site contains valuable information for teachers, parents, and students.

<http://www.ldonline.org/>