Secondary Mathematics Intervention Resources

GUIDANCE IN SELECTING SECONDARY MATH INTERVENTIONS

ACHIEVE THE CORE: MATH INTERVENTION STRATEGIES

https://achievethecore.org/aligned/series/?series=Math%20Intervention%20Strategies

Achieve the Core has published a series of articles to help schools design “shift-aligned” interventions. Includes discussion around a list of do’s and don’ts for supporting students with unfinished learning (e.g. focusing on major work clusters for upcoming content vs. choosing intervention content based solely on students’ weakest areas) that are aligned with the standards shifts in focus, coherence, and rigor.

GETTING STARTED WITH USABLE INTERVENTIONS: HEXAGON TOOL

https://implementation.fpg.unc.edu/resources/hexagon-exploration-tool

The Hexagon Tool, from the Active Implementation Hub, helps schools assess the fit of an intervention with the goals and needs of an organization.

GUIDANCE FOR SELECTING INTERVENTIONS AND ADDITIONAL CHALLENGES

http://tinyurl.com/myad3kn

This Wisconsin DPI/RtI Center-developed resource is intended to help school and district teams select the most appropriate interventions and additional challenges for their unique school system of support. The document provides guiding questions around considerations regarding the system, the student, the interventions/additional challenges, and the supporting research.

IES PRACTICE GUIDES

http://ies.ed.gov/ncee/wwc/MathHome.aspx

Research-based recommended practices in the following areas:

- Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools
- Improving Mathematical Problem Solving in Grades 4 - 8

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- Developing Effective Fractions Instruction for Kind – Grade 8
- Encouraging Girls in Math and Science
- Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students

Intervention Central - RTI: Best Practices in Secondary Math

http://www.interventioncentral.org/wi_ed_math

Presentation and handouts from Jim Wright of Intervention Central. Resources and ideas organized around 4 goals: 1) Creating a Supportive Math Instructional Environment, 2) Developing Classroom Formative Math Assessments, 3) Developing a Math 'Intervention Menu, and 4) Enlisting the Student as a Motivated, Self-Managing Learner.

NCTM Position Statement: Intervention

http://tinyurl.com/o3aeb8g

NCTM Research Brief: Effective Strategies for Teaching Students with Difficulties

http://tinyurl.com/navwqyr

Wisconsin RtI Center: Math Intervention Webinars

http://tinyurl.com/l4obntf

This 8-part series of one-hour videos present the concepts from the IES Practice Guide, “Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools.” Each webinar includes 10-15 minutes of theory/research/content followed by practitioner examples from schools, districts, and Math education experts from around the state.

MATHEMATICS INTERVENTIONS: Instructional Practices

Algebra by Example

http://math.serpmedia.org/algebra_by_example

Research-based SERP- and teacher-developed materials designed to gives students practice solving problems and practice modeling, analyzing, critiquing and articulating mathematical arguments. Assignments are designed to help students identify, discuss, and reduce misconceptions, build deeper correct conceptual understanding and strengthen procedural skills. Provides teachers with insights into students' thinking, launch points for mathematically rich discussions, and a shared language for analyzing mistakes.

All Kinds of Minds

http://www.allkindsofminds.org/thinking-with-numbers

Secondary Mathematics Intervention Resources

This site provides sub-skills related to mathematical thinking processes of 1) learning and recalling math facts, 2) learning and using math procedures, 3) understanding math concepts, and 4) math problem solving. Presents common obstacles for each sub-skill and teaching tips for helping students work through obstacles.

Teaching Mathematics Meaningfully: Solutions for Reaching Struggling Learners

Allsopp, D., Kyger, M., & Lovin, L.A. (2007). *Teaching mathematics meaningfully: Solutions for reaching struggling learners*. Baltimore, Md: Brookes Publishing. [book] A guidebook of research-based strategies to help teachers of students with learning disabilities, ADHD, or mild cognitive disabilities. Book explains common learning characteristics of students with learning difficulties that create barriers to understanding mathematics. Provides concrete ways to help students grasp mathematical concepts, improve their proficiency, and generalize knowledge in multiple contexts.

Intervention Central Accommodations Finder

http://tinyurl.com/ljtfcca

Free database of accommodation ideas to help struggling students attain the Common Core Standards while holding them to the same learning expectations as peers. Accommodations grouped under 6 categories: Communication, Environment, Instruction, Motivation, Self-Management, and Task. Teachers can browse the 60+ strategies in this collection to create a custom checklist with ideas suitable for a specific class, small group, or individual student. Each teacher-made accommodations checklist can be saved to a free account for later retrieval--and can also be downloaded or emailed in text or PDF format.

IRIS Center: Algebra (Part 1): Applying Learning Strategies to Beginning Algebra

http://iris.peabody.vanderbilt.edu/wp-content/uploads/pdf_case_studies/ics_alg1.pdf

Presents case studies of struggling learners and strategies to support them, including explicit vocabulary instruction, graphic organizers, CRA (concrete-representational-abstract), and mnemonic devices.

Making Sense of Algebra: Developing Students' Mathematical Habits of Mind

http://www.heinemann.com/products/E05301.aspx

EDC book of teaching tips, classroom vignettes, and detailed examples. Shows how to focus instruction on building key habits of mind for success in algebra.

Math Guidebook by Grade LEVEL

http://tinyurl.com/ltvy68m

Louisiana State Dept of Ed-created. Math Guidebooks include remediation guides and charts aligned to CCSSM to help provide a focus of the mathematical content taught in an intervention block for Algebra students.

Secondary Mathematics Intervention Resources

MathVIDS (Video Instructional Development Source)

http://fcit.usf.edu/mathvids/videos/videos.html

Interactive website for teachers who are teaching mathematics to struggling learners. Funded by the Virginia DoE. Designed to help educators connect why struggling learners have difficulty learning mathematics to effective instructional practices for these students. Features: Video models of real teachers in real classrooms using research-supported effective mathematics instruction for struggling learners; teaching plans that describe how these instructional practices can be integrated to teach important mathematical concepts; metacognitive learning strategies for mathematics; and accommodations and instructional modifications for specific types of learning difficulties.

MSTAR Interventions for Algebra Readiness

http://www.meadowscenter.org/institutes/mstar/mathematics-institute/mstar-intervention-equivalent-fractions/welcome

Mathematics Institute for Learning Disabilities and Difficulties' Collection of intervention lessons in Equivalent Fractions, Ratios and Rates, Facts & Patterns: Multiplication & Division, and Proportionality. Each intervention lesson includes research-based intervention strategies and lesson design. Additional activities are included for students who need further practice.

Ntl Center on Intensive Interventions - Mathematics Strategies to Support Intensifying Interventions

https://intensiveintervention.org/intervention-resources/mathematics-strategies-support-intensifying-interventions

Collection of sample lessons and activities intended to assist special education teachers, interventionists, and others working with students with intensive mathematics needs. Materials include considerations for instruction, sample activities, and companion materials necessary to complete the activities. Materials are aligned with the CCSSM and cover a range of skill areas. Not intended to be used as stand-alone interventions, but to provide support for developing and customizing lessons to meet student needs.

Number Talks

http://www.insidemathematics.org/classroom-videos/number-talks

Number Talks is a strategy designed to engage students in "mental math" through grappling with interesting mathematics problems. Educators can use number talks regularly as introductions to the day's mathematical practice, as "warm ups" for other lessons, or as stand-alone extended engagements with mathematical concepts. Also see Jo Boaler video at https://www.youtube.com/watch?v=Jeel4Qjow4s

Reaching the mountaintop: addressing the CCSS in mathematics for students with mathematical difficulties

Powell, S. R., Fuchs, L., & Fuchs, D. (2013). Reaching the mountaintop: Addressing the common core standards in mathematics for students with mathematical difficulties. *Learning Disabilities Research & Practice*, 28(1), 38–48. Article provides teachers with a framework for identifying and building on foundational skills concurrent with the Common Core standards for students with mathematics difficulties.

Standards for Mathematical Practices Progression through Grade Levels

http://teresaemmert.weebly.com/uploads/1/3/0/5/13053448/mpbygradelevel.pdf

Provides a grade-by-grade description of each Standard for Mathematical Practice. May be useful for interventions in "back-mapping" and finding starting points on which to build for struggling learners.

Solving Equations: An Algebra Intervention

Witzel, B. & Riccomini, P. (2010). *Solving equations: An algebra intervention* (math intervention series). Pearson publishing [book]. Details *Concrete* to *Representational* to *Abstract* (CRA) sequence of instruction with forms of algebraic equations. CRA strategy has been shown to help students of all levels acquire and retain knowledge of mathematical concepts better than repeated abstract instruction alone.

MATHEMATICS INTERVENTIONS: PROGRAMS (mostly non-computer based)

Agile Minds Intensified Algebra I

http://www.agilemind.com/programs/mathematics/intensified-algebra-i/

A comprehensive, extended-period course designed to help students 1-3 years behind in mathematics re-engage as motivated learners and succeed in Algebra I within a single academic year.

Do The Math Now!

http://teacher.scholastic.com/products/dothemath/do-the-math-now/experience.htm

Created by Marilyn Burns. Intervention curriculum designed to rebuild numerical foundations and prepare struggling middle and high school students for algebra. Students build numerical understanding, learn to reason, make connections across operations, and apply skills to higher-level mathematics.

Math 180

https://www.hmhco.com/products/math-180/

Designed to address the needs of struggling students in Grades 5 and up, and their teachers, equally—building students' confidence with mathematics and accelerating their progress to algebra.

Math U See

https://www.mathusee.com/

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Secondary Mathematics Intervention Resources

Student-paced, mastery-based curriculum suitable for students with a wide range of abilities. Explicit, structured, systematic, and cumulative program using multi-sensory teaching techniques. Because this curriculum does not correspond to traditional grade levels but rather to math ability, levels can be used with students of any age.

Moving with Math

http://www.movingwithmath.com

Built on Concrete->Representational->Abstract teaching framework *(see Practices section)* above. Addresses concepts k-12.

ST Math

https://www.stmath.com/

ST Math is a visual instructional program that builds a deep conceptual understanding of math through rigorous learning and creative problem solving to engage, motivate and challenge PreK-8 students toward higher achievement.

Supporting Ongoing Achievement Responsively (SOAR)

https://ifl.pitt.edu/what-we-do/mathematics.cshtml

SOAR tools and activities are designed to identify and support students' mathematical understanding that is in need of further inquiry and development. The survey tools are comprised of three parts: a set of survey questions, a monitoring checklist, and a tiered survey summary. The intervention activities are designed and sequenced to support students across tiers of intervention. These activities are aligned to the survey tool and are designed to support student learning in making sense, creating and using representations, using strategies, and providing explanations. Includes options for training and performance-based assessments.

Transition to Algebra (TTA)

https://www.heinemann.com/transitiontoalgebra

Developed by the Educational Development Center (EDC), funded by NSF grant. Designed to give 1st-year algebra students a set of broadly applicable tools and strategies. Uses hands-on, inquiry-based approach to learning, including algebraic logic puzzles and explorations to help students shift thinking from concrete procedures of arithmetic to the abstract reasoning required for algebra.

TransMath

http://www.voyagersopris.com/curriculum/subject/math/transmath

Secondary Mathematics Intervention Resources

Intervention for students in grades 5-10 performing two or more years below grade level. Designed to deepen conceptual understanding and build problem-solving skills while also building proficiency for entry into algebra.

DIAGNOSTICS, FORMATIVE ASSESSMENT, AND PROGRESS MONITORING

Dynamic Mathematics Assessments

http://tinyurl.com/bb42hgu

Assessment strategy that provides teachers with an in-depth, instructionally relevant picture of any student's mathematical understandings. Combines CRA Assessment, Error Pattern Analysis and Flexible Mathematics Interview. Also see IRIS Center: Applying Learning Strategies to Beginning Algebra at http://tinyurl.com/mbx48y8

Eliciting Mathematics Misconceptions

http://em2.edc.org/home

EM2 assessments are designed to diagnose whether upper elementary school and middle-grade students have specific misunderstandings or misconceptions about rational numbers, such as fractions and decimals. All EM2 assessments require that students provide both a multiple-choice response and a written explanation for their answer. Students' selected responses diagnose whether they are likely to have a targeted misconception, while their written responses are available so teachers can confirm how students are thinking about the problems. In this way, teachers have solid information about why students are having difficulty.

Math Reasoning Inventory (MRI)

https://www.mathreasoninginventory.com/

MRI is a Marilyn Burns-developed formative assessment tool designed to make teachers' classroom instruction more effective. MRI questions focus on number and operations based on content from the Common Core State Standards for Mathematics prior to sixth grade. Student responses reveal student understanding to help teachers plan for next step instruction.

Mathematics Assessment Project

http://map.mathshell.org/index.php

The Mathematics Assessment Project includes tools for formative and summative assessment that expose students' mathematical knowledge and reasoning, helping teachers guide them towards improvement and monitor progress. The tools are relevant to any curriculum that seeks to deepen students' understanding of mathematical concepts and develop their ability to apply that knowledge to non-routine problems (grades 6 – high school).

Secondary Mathematics Intervention Resources

Project AAIMS

http://www.education.iastate.edu/aaims/index.html

Progress monitoring tools for Algebra.

Uncovering Student Thinking About Mathematics In The Common Core, High School: 25 Formative Assessment Probes

Tobey, C. & Arline, C. (2014). Uncovering student thinking about mathematics in the common core, high school: 25 formative assessment probes. Thousand Oaks, CA: sage [book]. 25 easy-to-implement assessment probes designed to quickly and reliably uncover common math misconceptions in Grades 9-12 CCSSM sub-concepts. Helps teachers systematically address conceptual and procedural mistakes, pinpoint where students are struggling, and plan targeted instruction in algebra, functions, logarithms, geometry, trigonometric ratios, and statistics and probability.