

Gap Closing: Grade 6

Connections to the Instructional Core:

The *Gap Closing: Grade 6 Number Sense* package is designed for Tier 1, Tier 2, or Tier 3 intervention for students who are struggling in Grade 6 mathematics.

Connections to improved learning:

The *Gap Closing* package focuses on 5 approaches in order to be effective:

1. Assessment and Differentiation
2. Explicit instruction
3. Self-Instruction
4. Visual Representation
5. Meaningful Practice

1. ASSESSMENT AND DIFFERENTIATION

The *Gap Closing* package is designed to help teachers provide precisely targeted remediation for students identified as being significantly behind in mathematics. The goal is to close gaps in Number Sense so that these students can be successful in learning grade-appropriate mathematics.

For each topic in Grade 6 Number Sense, there is a diagnostic and a set of intervention materials. Diagnostics are designed to uncover the typical problems students have with a specific topic. Each diagnostic should be used to tailor differentiated lessons as instructional decisions are being made for the struggling student.

Each set of intervention materials includes a single-task Open Question approach and a multiple-question Think Sheet approach. These approaches both address the same learning goals, and represent different ways of engaging and interacting with students. Differentiated instruction is evident in the student choices of lesson approaches.

In a research study carried out in Spring 2010, all students interviewed talked about an increase in their mathematical confidence. Students perceived that the *Gap Closing* materials were targeted to their particular areas of weakness – or particular skills they were missing. Once they had successfully completed the modules, students

reported that their confidence in math increased.

2. CONCEPTUALLY-BASED EXPLICIT INSTRUCTION

Research has shown that explicit instruction improves math achievement in struggling learners (Gersten et al., 2008).

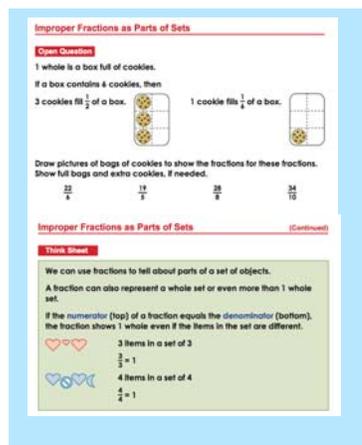
This is a detailed instructional approach in which students are guided through a defined instructional sequence.

Students learn to regularly apply strategies, understand and articulate relationships, and are provided practice with effective feedback.

The *Gap Closing* Strategy includes conceptually-based explicit instruction for students formatted in a 3 part-lesson design. The instruction is clear and concise. For example, Think Sheets are sequenced carefully and highlight only the critical features for the student.

In addition, the teacher's guide provides scaffolding questions for each of the three parts of the lesson. The idea

is that a child may not know how to start so we help him get there, but we don't tell him what to do- we ask a specific question that could lead him/her there. This instructional approach leads them to independence and builds more confidence.



3. SELF INSTRUCTION

A student can use a variety of self-regulation strategies to manage themselves and direct their own learning e.g., setting goals, staying on task and persevering with the task, self-monitoring their work and progress, and checking their answers to see if they make sense. By engaging in these actions, the student develops meta-cognitive awareness and the self-regulation skills to take charge of the learning process. Self regulation strategies were practiced by students in the context of the *Gap Closing* research, Spring 2010.

During the research study, many students articulated the purpose of the diagnostic tools, their ability to

work on only lessons that would address their personal needs, and how they set realistic goals on what they would accomplish.

Along with an increase in achievement and confidence, some students also reported that working with the Gap Closing materials increased their perseverance when tackling difficult mathematical questions. When encountering a difficult problem, one strategy was to continue on with the lesson and then return to the difficult problem. Students reported that they could then discover their own mistakes, and could correct them based on the work they had done in the rest of the module. Another strategy students involved using the Think Sheets:

“The Think Sheets really helped me understand the math. It tells you everything...so now I understand. It explains everything and it didn’t have any hard words, so I understood everything on the think sheet. So if I didn’t understand something, I would go back to the last think sheet and it would explain the lesson again.” Students recognized that their abilities to competently and effectively complete the Gap Closing materials increased as they worked through the lessons: *“I did all these questions the first time...and I got them wrong. And then I found out the proper way to do them, and it was way easier, and it took me a lot less time!”*

Gaps Closing Evidence gathered April-June 2010 from 470 students across ten boards

	Non-Gap Closing Students	Gap Closing Students	Gap Closing Males	Gap Closing Females
Pre %	57.2	37.2	40.0	34.8
	← Gap of 20.0 →		← Gap of 5.2 →	
Post %	58.6	56.4	57.0	56.2
	← Gap of 2.2 →		← Gap of 0.8 →	
% Growth	1.4	19.2	16.8	21.3

4. VISUAL REPRESENTATION

Studies have shown that children who struggle with learning mathematics instruction do better when visual representations that emphasize conceptual understanding are used. (Xin & Jitendra, 1999). Visual representations of mathematical concepts are a key feature of the Gap Closing lessons. Students in the study reported that they liked being able to “see

what the math is that I’m supposed to be doing.” The importance of the visual representation was cited in terms of understanding models that were presented, and also in their ability to create their own models.

5. MEANINGFUL PRACTICE

Students who needed remediation required up to six times more time to achieve mastery than students who were successful (Arlin, 1984; Kulik, Kulik, and Bangert-Drowns, 1990, Martinez and Martinez, 1999). Marzano states that a key strategy to help students gain a deep understanding of a topic is practice that focuses on understanding of the big ideas.

Meaningful practice encompasses a balance of conceptual and procedural drill; Gap Closing attends to both of those dimensions of practice. As well, Gap Closing materials offer a variety of contexts which helps students generalize what they learn and is more likely to support transfer of knowledge.

Currently, e-learning modules are being prepared so that students can continue their practice online and in a variety of settings to strengthen and reinforce what has already been learned.

RESOURCES

Gap Closing: Grade 6 Number Sense, Modules 1-8 Student Booklets and Facilitator’s Guide
www.edugains.ca.

REFERENCES

Arlin, M. (1984). Time variability in mastery learning . American Educational Research Journal, 21(1), 103-120.

Gersten, R., Ferrini-Mundy, J., Benbow, C., Clements, D., Loveless, T., Williams, V., Arispe, I., & Banfield, M. (2008). *Report of the task group on instructional practices* (National Mathematics Advisory Panel)

Kulik, C.-L. C., Kulik, J. A., & Bangert-Drowns, R. L. (1990). Effectiveness of mastery learning programs: A meta-analysis. *Review of Educational Research*, 60(2), 265-299.

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