

Assessment Toolbox

MATH GRADES 3-5

North American Division
Adventist Education



Adventist Education
A JOURNEY TO EXCELLENCE

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Introduction to Assessment

Assessment provides instruction and learning feedback to teachers and students. Information gained through informal assessments provides opportunities for teachers to make adjustments to the ways in which they deliver instruction. Teachers use assessments both to provide **feedback** to students about their progress and to **guide decisions** about next steps in the learning process, thereby closing the gap between the learner's current and desired states. Popham (2008) defines formative

assessment as “a planned process in which teachers or students use assessment-based evidence to adjust what they are currently doing”. The operative word in this definition is process, in that formative assessment happens throughout the learning, as opposed to summative assessment, which is often a one-time event that occurs at the end of a learning unit and is used to make judgments about student competence.

This toolbox is designed to provide strategies and resources that support assessment practices in math for grades 3-5.

<http://oea.dpi.wi.gov/files/oea/pdf/activity2el-menu.pdf>

This list is a starting point for your discussion on how to balance the assessment system. If you choose to use this menu, keep in mind that your group does not have to make a decision in every box. These are only suggestions. “Other” is always an option.

<http://www.youtube.com/watch?v=rL54bfmZPzY>

Welcome to REAL formative assessment! Measured Progress has created a DVD program that explores how REAL teachers implement REAL formative assessment in their classrooms. This clip documents teachers use of techniques and tools to bring about gains in student learning.

<http://michelledriskell.blogspot.com/2011/09/formative-assessment-in-first-grade.html>

This is a blog of a first grade teacher. She provides a definition of formative assessment, gives some ideas of strategies to use, and provides examples and excerpts from her first grade classroom. The blog also provides the opportunity for dialogue with other teachers regarding the use of assessment.

<http://www.youtube.com/watch?v=B3HRvFsZHoo>

Dylan Wiliam stresses the importance of assessment as a key process for increasing teacher quality whilst having the biggest impact on student outcomes. He looks at some of the popular initiatives that aim to increase student achievement, such as learning styles, and presents research that shows assessment practices have a much greater impact on educational achievement than most other reforms.

<http://www.youtube.com/watch?v=dxAXJEK--qk>

Kim Slusher uses assessment as a barometer of student learning in a multi-age primary classroom at Norton Elementary in Jefferson County.

<http://www.youtube.com/watch?v=rL54bfmZPzY>

the Formative classroom (Middle grade classroom used as example)

<http://www.youtube.com/watch?NR=1&v=jzWraXa2qFO&feature=fvwp>

Summative vs. formative assessment



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Assessment Strategy: Journal Entries

DEFINITION:

While students learn how to “do” math, they must also learn how to articulate what they are learning. It is important to provide many opportunities for students to organize and record their work without the structure of a worksheet. Problem solving notebooks support students’ learning because, in order to get their ideas on paper, children must organize, clarify, and reflect on their thinking. Initially many students will need support and encouragement in order to communicate their ideas and thinking clearly on paper but, as with any skill, the more they practice the easier it will become.

Journals also serve as invaluable assessment resources that can inform classroom instruction. Reviewing a student’s math journal provides a useful insight into what a child understands, how s/he approaches ideas and what misconceptions s/he has.

A math journal, or problem solving notebook as they are sometimes referred to, is a book in which students record their math work and thinking. They can be used to:

- Record the solutions to math problems, along with the strategy and thought processes used to arrive at the solution
- Write about learning: At times students may be asked to reflect on their math learning. For example, students may be asked to write about “what you already know about” at the beginning of a unit or “what you did today, what you learned, and any questions you have”, or “the three most important things you learned in this unit.”

Taken from: <http://www.k-5mathteachingresources.com>

STRATEGIES:

<http://www.k-5mathteachingresources.com/math-journals.html>

Excellent resource for a description of and rationale for math journals.

<http://www.readwritethink.org/classroom-resources/lesson-plans/talking-writing-reasoning-making-820.html>

Great definition of math journals with additional resources to help you get started. Links to Language Arts standards, an instructional plan to help you get started and journal prompts.



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Assessment Strategy: Class Discussions

DEFINITION:

It is essential that students have the opportunity to discuss mathematics with one another, refining and critiquing each other's ideas and understandings. Communication can occur through paired work, small group work, or class presentations.

The following are benefits of participation in class math discussion,

1. adds interest
2. engages students
3. Provides teacher feedback
4. Provides student feedback
5. Promotes preparation
6. Controls what's happening in class
7. Balances class contributors
8. Encourages dialogue between students
9. Develops speaking skills
10. Gives opportunity to use "math" language

STRATEGIES:

Card Sorts: This is a sorting activity in which students collaboratively sort a set of cards with pictures, numbers, symbols, or words according to a specific characteristic or category. Students sort the cards based on their preexisting knowledge about the concept of procedure. As students sort the cards, they discuss their reasons for placing each card into a designated group.

Pass the Problem: This strategy provides an opportunity for students to collaborate in activating their own ideas and examining other students' thinking. Students begin by working together in pairs to respond to a problem, partially completing a solution to the problem. When the time is up, they exchange their partially completed solution with another pair to finish--modifying, addition to, or changing it as the pair deems necessary.

Strategy Design: Choose a problem that requires students to analyze the context in order to determine what it is the problem asks for and what their solution strategy is, preferably one that involves multiple steps. Arrange students in pairs and provide them with the problem. Give pairs 3 to 5 minutes to discuss the problem and collaboratively begin working on the solution. Make sure students know they need to show their work and make their thinking visible so that another pair can follow their strategy but not so much that it doesn't leave room for the other pair to complete it. Then have pairs swap their

partially completed problems with another pair. The pairs then continue to to pick up from where the other pair left off.

A & D Statements: Students use A & D Statements to analyze a set of "fact or fiction" statements. In the first part of A & D Statements, students may choose to agree or disagree with a statement or to state that they need more information. In addition, they are asked to describe their thinking about why they agree, disagree, or are unsure. In the second part of the FACT, students describe what they can do to investigate the statement by testing their ideas, examining what is already known, or using other means of mathematical inquiry.

A & D Statements encourage mathematical discussion and argumentation. It is an opportunity for students to practice metacognition (thinking about their own understanding). A & D Statements can be used at the beginning of a learning cycle to elicit students' ideas about a mathematical topic.

Strategy Design: The teacher selects A & D Statements that focus on specific concepts or procedures that students will encounter in the mathematics curriculum. Develop statements that can launch into mathematical inquiry using manipulatives, learned or invented algorithms and procedures, or use of various information sources. Examine the research on learning to find common errors or misconceptions related to the topic. Use some of these common errors and misconceptions to

develop the statements. Students should first be given the opportunity to respond to the statement individually. If they choose disagree or it depends on, ask them to provide an example that refutes the statement or makes the statement true in some cases but not in others.

Then, have students discuss their ideas in small group, coming to consensus on why they agree or disagree with the statement while noting any disagreements among group members.

Agreement Circles: Agreement circles provide a kinesthetic way to activate thinking and engage students in discussing and defending their mathematical ideas.

Strategy Design: Students stand in a large circle as the teacher reads a statement. The students who agree with the statement step to the center of the circle. Those who disagree remain standing on the outside of the circle. Those in the inner circle face their peers still standing around the outside circle and then divide themselves into small groups of students who agree and disagree. The small groups then engage in discussion to defend their thinking. This is repeated with several rounds of statements relating to the same topic, each time with students starting by standing around the large circle.

<https://www.youtube.com/watch?v=ElrrXHai5CA>

Excellent video showing using discussions in class to come to a "consensus" on math assignments.



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Assessment Strategy: Written Assessments

DEFINITION:

In this strategy, students have to engage in some form of writing, little or much as a reinforcement to the concepts introduced by the teacher. There are several strategies that can be categorized as writing assignments.

STRATEGIES:

Odd One Out: Odd one Out combines seemingly similar items and challenges students to choose which item in the group does not belong. Students are asked to justify their reason for selecting the number, symbol, representation, or mathematical term that does not fit with the others.

Strategy Design: Select items that lend themselves to a grouping where one item justifiably does not fit with the others. Be sure to choose items and a relationship that is not immediately obvious in order to promote deeper thinking. Provide the list as a handout, overhead projection, chart, or set of cards. Have students record their own answers and thinking before discussing their ideas with a partner or in small groups.

Attainment Cards: This strategy encourages students to develop their own definition of a concept by examining labeled cards showing examples and nonexamples of a concept. By comparing and contrasting various characteristics and attributes of the examples and nonexamples provided, students identify the defining features of the concept and apply those features to create a definition and additional examples and nonexamples.

Strategy Design: Students are asked to think about what they previously learned about a concept, examine labeled

examples and nonexamples, and provide a supporting rule or operational definition for the concept. First, identify the concept or mathematical term for which you want to determine how well students are able to generate a rule or definition. Develop a list of examples and nonexamples for each of the various defining characteristics and attributes. Present the examples and nonexamples on individual cards so students can sort as needed.

Create a Problem: This is a reverse problem-solving strategy. Instead of performing the computation, students are given the solution and are asked to figure out what the real-world problem might be.

Strategy Design: Create a Problem can be designed using basic computational problems or more complex problem-solving tasks. Choose a mathematical equation and have students work backwards from the end result to what they think the initial problem could be e.g., the teacher might give students the equation $\frac{2}{3}$ of 15=10. Students are asked to come up with problems that may have been solved with this equation. Example: John's mother gave him \$15 to spend at the fair. She told him he could only spend $\frac{2}{3}$ of it on rides. How much money could John spend on the rides?



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Assessment Strategy: Open-ended Projects and Problems

DEFINITION:

Defining a problem or project to a group of students and have them solve it through teamwork or individually. To better prepare for tests, students should answer with a picture, diagram, or paragraph explaining the solution and how they determined their answers.

STRATEGIES:

Whiteboarding: Whiteboarding is used in small groups to encourage students to pool their individual thinking and come to a group consensus on an idea or problem-solving approach that is then shared with the teacher and the whole class. The use of whiteboards supports a classroom environment that encourages student-generated ideas and solutions. Researchers have found that when students use whiteboards their discussions are more animated and on task and draw upon higher-level thinking.

Strategy Design: This technique involves using portable 24-by- 32-inch whiteboards or electronic interactive boards to draw and record their ideas and solutions in response to a prompt given by the teacher. Students work collaboratively around the whiteboard to draw and record their ideas and solutions in response to a prompt given by the teacher. Whiteboards can be purchased from suppliers but they are less expensive and a more suitable size when cut from 4-by-8-foot sheets of white economy tile board, available from hardware stores. Use low-odor dry-erase markers (four colors).

http://www.nj.gov/education/assessment/es/openended_math_scoring_manual_g34.pdf

This is a copy of the New Jersey Assessment of Skills and Knowledge manual for open-ended questions for grades 3 and 4. It includes scoring information and sample questions in major mathematical domains.



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Assessment Strategy: Oral Reports

DEFINITION:

Any type of student oral presentation to present understanding of math concepts to the whole class or small group.

STRATEGIES:

Partner Speaks: Partner Speaks provides students with an opportunity to talk through a concept or problem solution with another student and receive feedback before sharing with a larger group. When ideas are shared with the larger group, pairs speak from the perspective of their partner's ideas. This encourages careful listening between student pairs and encourages students to summarize their partner's thinking so that others can understand.

Strategy Design: Have students turn to their "elbow partner" and provide time for them to take turns discussing a concept or problem giving feedback on each other's ideas. For the first time using this strategy, it may be helpful to model for students what it looks and sounds like when two people are engaged in dialogue and when it is appropriate to give feedback. Encourage students to make eye contact and think about what their partner is saying as they respectfully listen without interrupting.



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Assessment Strategy: Exit Cards

DEFINITION:

An assessment technique whereby students fill out a 3 x 5 card, or any small slip, at the end of the class and respond to a question posed by the teacher. They can be used at any grade level and in any subject area. They are also known as “ticket out the door” cards.

STRATEGIES:

<http://www.slideshare.net/mistercooke/exit-cards-and-beyond>

Slide show describing and giving examples of exit cards! Well done!

<http://www.tvdsb.ca/webpages/msurti/files/tvdsb%20-%20exit%20cards.pdf>

Brief descriptive resource for teachers on the basics of what an exit card is and how to use one.

