Math Journaling and Vocabulary

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KWL

- What do you know about math journaling?
- What do you want to learn?
- Later we will see what you have learned

Today, we are going to talk about

- Why is math journaling important?
- How to set up journals and use them.
- What types of journals are there?
- How do you grade these things? I am a math person. If I wanted to grade writing, I would have become and English teacher. (right?)
- What does vocabulary have to do with all this?

Why is math journaling important?

- NCTM – Standard (NCTM Website)
- **Communication**
- **Instructional programs from prekindergarten through grade 12 should enable all students to--** organize and consolidate their mathematical thinking though communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely.

NCTM Says

- "In order to communicate their thinking to others, students naturally reflect on their learning and organize and consolidate their thinking about mathematics."(NCTM Website)

- "Students should be encouraged to increase their ability to express themselves clearly and coherently. As they become older, their styles of argument and dialogue should more closely adhere to established conventions, and students should become more aware of, and responsive to, their audience. The ability to write about mathematics should be particularly nurtured across the grades."(NCTM Website)

- "By working on problems with classmates, students also have opportunities to see the perspectives and methods of others. They can learn to understand and evaluate the thinking of others and to build on those ideas." (NCTM Website)

- "When children have regular invitations to write and talk about mathematics in open-ended ways, they soon recognize they can discover new ideas in the process." (Math is Language Too by Whitin and Whitin)

Why not just have them talk it out?

- "Writing shares many of the qualities of talking, but it has some unique characteristics of its own, such as creating a record of our thinking that we can analyze and reflect upon." (Math is Language Too by Whitin and Whitin)
- During talking one does not usually have a chance to reflect and analyze- Writing may give students a safe place to think.

Why is math journaling important?

- "Writing is a natural process, a method of communication between people and a way to express the thoughts and feelings that occur within a person. Its use as a tool for the teaching and learning of mathematics is a recent development, spring in part from the NCTM Standards on Communication." (Writing in the Mathematics Curriculum by Burchfield, Jorgensen, McDowell, Rahn)

- "Through the use of writing in the mathematics classroom, students can clarify their thinking, recognize and appreciate the connection between mathematics and other disciplines, and communicate their thoughts, ideas, and understanding about the subject with other students." (Writing in the Mathematics Curriculum by Burchfield, Jorgensen, McDowell, Rahn)

- "Writing provides an alternative mode of learning for those creative students who have not preciously been reached by more traditional, structured, linear methodology. Because a student often knows more than he or she can explain verbally, writing helps the student to uncover more of what is known and to express it." (Writing in the Mathematics Curriculum by Burchfield, Jorgensen, McDowell, Rahn)

Why is math journaling important?

- Brain Compatible Teaching- Brain Research
- " When one makes an entry into a math journal, it becomes a record of the experience received from the specific math exercise or problem solving activity. The individual has to think about what he/she did in order to communicate it in writing;.... The math no longer becomes a task where by the individual simply follows the steps or rules of thumb." (Math Journals for All Ages by Deb Russell)

- It is all about the reflection
- "Math instructors will also find that math journaling can be quite effective. When reading through the journal entries, a decision can be made to determine if further review is required." (Math Journals for All Ages by Deb Russell)

Why is math journaling important?

- "It helps students stretch their thinking and makes sense of problems that can sometimes leave them confused or frustrated." (Math Journals Boost Real Learning by Burns and Silbey)

- "When children write in journals, they examine, express, and keep track or their reasoning, which is especially useful when ideas are too complex to keep in their heads. By reading their journals, you can evaluate their progress and recognize their strengths and needs." (Math Journals Boost Real Learning by Burns and Silbey)

Why is math journaling important?

- " Knowing mathematics is doing mathematics. We need to create situations where students can be active, creative, and responsive to the physical world." (Writing to Learn Math by Countryman)

- "I believe that to learn mathematics, students must construct it for themselves. They can only do that by exploring, justifying, representing, discussing, using, describing, investigating, predicting, in short by being active in the world. Writing is an ideal activity for such processes." (Writing to Learn Math by Countryman)

Journals help teachers know

- "Does the student use mathematics to make sense of a complex situation?"
- "Can the student organize information?"
- "Can the student explain concepts?"
- Does the student use appropriate mathematical language?"
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

"Some purposes of journals:

- "To increase confidence
- To increase participation
- To decentralize authority
- To encourage independence
- To replace quizzes and test as means of assessment
- To monitor progress
- To enhance communication between teacher and student
- To record growth"

(Writing to Learn Math by Countryman)

When all is said and done

- "Mathematics is a way to understand the world and writing is a way to understand mathematics."
  - (Writing to Learn Math by Countryman)

How to set up journals and use them

- When setting up journals--
- Some suggest composition books
- Some suggest loose leaf notebooks
- Some suggest file folders
- Some suggest separate forms of paper to turn in
- All say write in the journal everyday and develop a system for collect and distribution

How to set up journals and use them

- Then the when??
- Beginning of the year--
- Before the concept is taught-
- After concept is taught-
- End of every class

How and when to use journals

- 1. When new material, concepts, or vocabulary have been introduced - Ex- "Explain in your own words the meaning of the term_____."
- 2. When the class looks off task or not getting it- Ex- "Write down two questions you have about the work you are doing/ the lesson we're working on."
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

How and when to use journals

- 3. When students work in groups or pairs Ex- Write about what your partner said—
- 4. When showing students the value of revising their work. Ex-"Review the last three entries in your journal. Select one to revise….Write a clearer explanation, or draw a picture to express your idea in this journal entry."
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

How to manage math journals:

- "Provide students with thin, inexpensive journals….."
- "Keep journals in class. Collect math journals each day so as not to lose them."
- "Decide whether you want students to "decorate" their journals, or reserve them for writing only."
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

- "Decide on a system for indentifying journal entries. Rather than having students take time to copy the writing prompt, have them number or date the entries."
- "Develop a system for distributing and collecting journals each day. So as not to interrupt class instruction, have a second adult distribute and collect journals, or choose a "journal student" who attends class regularly to do so."
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

- "Use a timer for some journal assignments. This will help keep students writing. Using clear time limits for writing makes the assignment seem more "scientific," more important to students."
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

What types of Journals are there?

- Dialogue Journals
- Buddy
- Double Entry
- Taxonomies
- Response

- Some work better for different grades and different situations.
- You may use different types for your class.

Dialogue Journals

- In this journal the student and teacher converse in writing. The teacher may respond to the student's entry with comments, questions, and invitations for the student to express themselves

(Reading and Learning to Read by Vacca,Vacca, Gove, Burkey, Lenhardt,McKeon)

Dialogue Journal –getting students started

- “Guidelines to using….
  - Use composition books or note book paper stapled
  - Motivate students, by letting them know journals are like letters. They will write to you about your prompts and you will write back.
  - Communication is the focus. Do not correct entries for grammar and such- Do model correct forms and content in your response.
  - Your response should encourage written expression like, Tell me more about that …, Describe for me…, I liked the way you expressed…, I like the way you described…, Tell me what you were thinking…
  - (Reading and Learning to Read by Vacca,Vacca, Gove, Burkey, Lenhardt,McKeon)

Other Dialogue Journal Prompts

- What I know about ____________ so far is _________.
- What I'm still not sure about is____________.
- What I'd like to know more about is_________.
  - (Math Journals Boost Real Learning by Burns and Silbey)

More Dialogue Prompts

- “Reflect on your participation in class today and complete the following statements:
  - I learned that I…..
  - I was surprised that I…..
  - I noticed that I……
  - I was pleased that I……
  - (http://www2.ups.edu/community/tofu/lev2/journaling/writemath.htm)
  - Remember to write back to your students

Buddy Journals

- This is a variation of the journal mentioned before. Instead of the teacher and student writing- Student writes and responds to another student.
- Students can pair up or draw names, etc
- Again you set up the prompts
- You can grade using scale of participation 3, 2, 1
  - (Reading and Learning to Read by Vacca,Vacca, Gove, Burkey, Lenhardt,McKeon)

Buddy Journal

- You try- Think of a math lesson you did this past school year.
- 1) tell the topic of the lesson- Brief description
- 2) tell what you liked about the lesson
- 3) tell what you would do different next time
- After writing, switch with your buddy and respond to you buddy with encouraging words --- I liked your lesson or idea because…

Double Entry Journals

- In double entry journals, students write or identify important information, vocabulary, concepts, ideas from the text on one side of the paper-
- As the teacher instructs or students work in groups, the student takes notes on the other side of the paper using student talk or notes from the teacher. Student can also use drawings
  - (Reading and Learning to Read by Vacca,Vacca, Gove, Burkey, Lenhardt,McKeon)

Taxonomies

- "A taxonomy is a classification system that organizes information on a specific topic or concept." (Write for Mathematics by Rothstein, Rothstein, Lauber)
- This is a type of journal in which students can build a personal math dictionary or vocabulary list.

Taxonomies

- These can be used to:
  - "assess prior knowledge;
  - serve as a continuous note taking system;
  - assess new knowledge
  - build mathematical vocabulary; and
  - develop cooperative learning experiences
    (Write for Mathematics by Rothstein, Rothstein, Lauber)

How to set It up

- Using a loose leave binder have students create or letter pages A-Z in as many groups as you want. Ex: Vocabulary I already know (blue section), Terms that the teacher uses (red section)-
- Have students create a table of contents Ex: "Math terms I already know, Number sentences and word sentence key words, Word problems for Algebra-composing with keywords" (Write for Mathematics by Rothstein, Rothstein, Lauber)

When students make an entry

- Have student write the word in the correct section-
- Have students write a in their own words how to use the word or how the word is used.
- Have students then write an example or draw an illustration

- You can even use this with when compiling a list of Academic Vocabulary-
- SDE website has forms – We will look at these more when talking about vocabulary

Response Journals

- The students respond to a prompt from the teacher.
- The prompt could be on the morning math meeting-
- The prompt could be on the board for students to write about as the enter from a concept of the day before
- The prompt could at the end of the lesson
- The student uses a form or a sheet of paper to respond to the prompt

Response Journal Prompts

- "Do 0.3 and 0.020 equal the same fraction? Explain your answer."
- Allison's team won 8 out of 10 games. Jennifer's team won 15 out of 18 games. Whose team won a greater fraction of its games? Explain your answer."
- I also like tell me what you are thinking when ….
  - (http://www2.ups.edu/community/tofu/lev2/journaling/writemath.htm)

Response Journal Prompts

- "Explain how you feel about the mathematics now as compared to before you took this class."
- "The most important part of solving a problem is…"
- "Write instructions for a fifth grader to follow when (adding fractions, finding percentages, calculating averages, etc.)"
- You know several ways to …(solve and equation, factor a quadratic, add fractions, etc.) Which method is your favorite? Why?"
  - (http://www.geocities.com/kaferico/writemat.htm?200819)

Scoring

- Set up a rubric –
- 4- Response is well organized and well structured. Ideas are clear and communicated well. Math language is used correctly.
- 3- Response is fairly organized and structured. Ideas are fairly clear. Math language is used fairly correct.
- 2-Response is not complete. Ideas are not completely organized and ambiguous. Math language is used incorrectly sometimes.
- 1- Response written but does not match the prompt.
- 0-No response
  - (http://www2.ups.edu/community/tofu/lev2/journaling/writemath.htm)

Now you try

- Watch the two video clips
- Choose one clip and answer the following prompt using a form I will give you.

- First clip-Based on the video clip, explain in your own words, when you would use calculation and when you would use estimation in the real world.
- Second clip-Based on the video clip, explain in your own words another time in the real world that you would use the math concept in the video.

How about Vocabulary

- Vocabulary is very important-
  - Each Reading in the Content Area has **Specialized Vocabulary**
  - **If students do not understand the Specialized Vocabulary , then comprehension becomes harder.**
    - **Ex: Read the following passage and answer the questions with a buddy.**

From Chilton Repair Manual

- "The F4-134, 4 cylinder engine is a combination value-in-head and value-in-block construction. The intake values are mounted in the head and are operated by pushrods through rocker arms. The intake manifold is cast as an integral part of the cylinder head and is completely water jacketed.
- Draw a picture and explain what you would do if the water jacket cracked.
- Draw a picture and explain what you would do if the intake valve became bent.

- Vocabulary can be hard for students that are new to a concept or subject – What's an integer? Why do I need to know about? Is my definition the same as the teacher? Does the teacher's definition match the definition on the state test?
- San Carlos- Congruent – Similar or Completely the same

Where to find the vocabulary

- Building Academic Vocabulary Teacher's Manual by Marzano and Pickering
- PASS
- SDE Website

How do you teach the voc?

- Have students make a list of definitions, memorize them, and then write them on a test- You done right?
- Lets look at some better models based on brain research

Frayer Model

- In the Frayer model students list the definition, Facts/Characteristics, **Examples, and Nonexamples –**
- **The examples and nonexample are the real world math stuff**
  - (Teaching Reading in Mathematics: A Supplement to Teaching Reading in the Content Areas by Barton and Heidema)
- **Look at some examples**

VVWA- Verbal and Visual Word Association

- "The VVWA strategy puts together in a graphic a vocabulary word and its definition with both visual of the term and personal association of the characteristics of the term."
  - (Teaching Reading in Mathematics: A Supplement to Teaching Reading in the Content Areas by Barton and Heidema)
- **Again with the Graphic and Personal Association**
- **Look at some examples**

- SDE Website Forms

Graphic Organizers – Concept Maps

- Elaina Stewart

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