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Getting Beyond the Surface: Establishing an Environment for Deeper Learning in Mathematics through Writing

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HMH

Essential Questions

- Why do we need constructed and extended response writing in math class?
- What do students need to do to perform successfully?
- How do we get them there?
- What does this look like in the math classroom?

Classroom A

- Get all your math right.
- Don’t copy.
- Write the lines straight.
- Listen to the teacher so you know what to do.
- Don’t write stars. The teacher does it only after.
- Try and get an A so your mother can be happy.

Classroom B

- Think a lot, before and after doing it.
- We write and draw what we think.
- Put how many people, sticks, and the answer. (How I figured it out.)
- Write the number sentence.
- Doing it again. Checking it.
- Do it well. Make the picture and count it.

Criteria for a "Good Math Paper"

- Spend 1 minute thinking about and writing criteria that you feel should be on a class list. Do this individually.
- Spend 4 minutes comparing the lists at your table. Agree on 5 or 6 criteria that you would like to see on the whole-group list.
- Prioritize your list and be ready to read your choices to the entire group.

A Mathematical Tug-of-War

The Task

- Spend 4-5 minutes working alone to solve the problem.

- Turn to an elbow partner. Give each person enough time to clearly explain his or her approach so that you can follow their thinking and reasoning.

- Create a “Good Math Paper” with your partner.

With Students

Work together to write a “Good Math Paper” showing your thinking and reasoning leading to your solution to the *Tug-of-War* problem.

– Record on newsprint
– Consult the criteria as you work
– Be ready to share in 30 minutes

(You should not retell the entire story, but include information about each round so the paper can stand alone as a poster presentation.)

Examining Student Work

- What do you notice about students' strategies?
- What expectations do you think are in place in this classroom?
- How does each piece of student work compare to our *Criteria for a Good Math Paper?*

Assessment Scoring Rubric - Sample

Item 9

Scoring Rubric

Points	Description

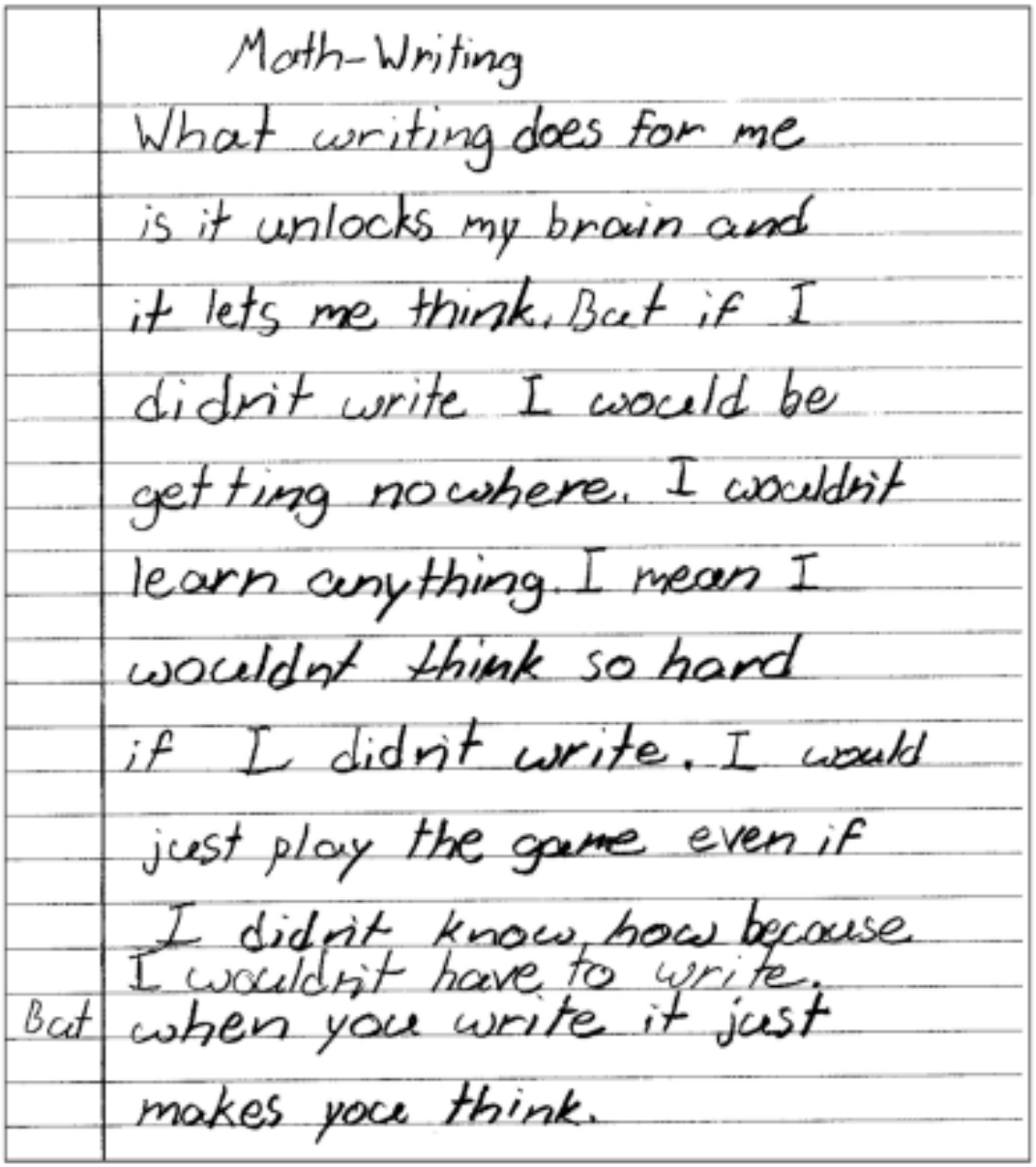
2	The response achieves the following:
	• Response demonstrates a complete understanding of multiplication of fractions as applied to real-world problems.
	• Give 2 points for a correct response and a valid process.
	  • Response is correct and complete.
	  • Response shows application of a reasonable and relevant strategy.
	• Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.

	The response achieves the following: • Response demonstrates a partial understanding of multiplication of fractions as

Processing

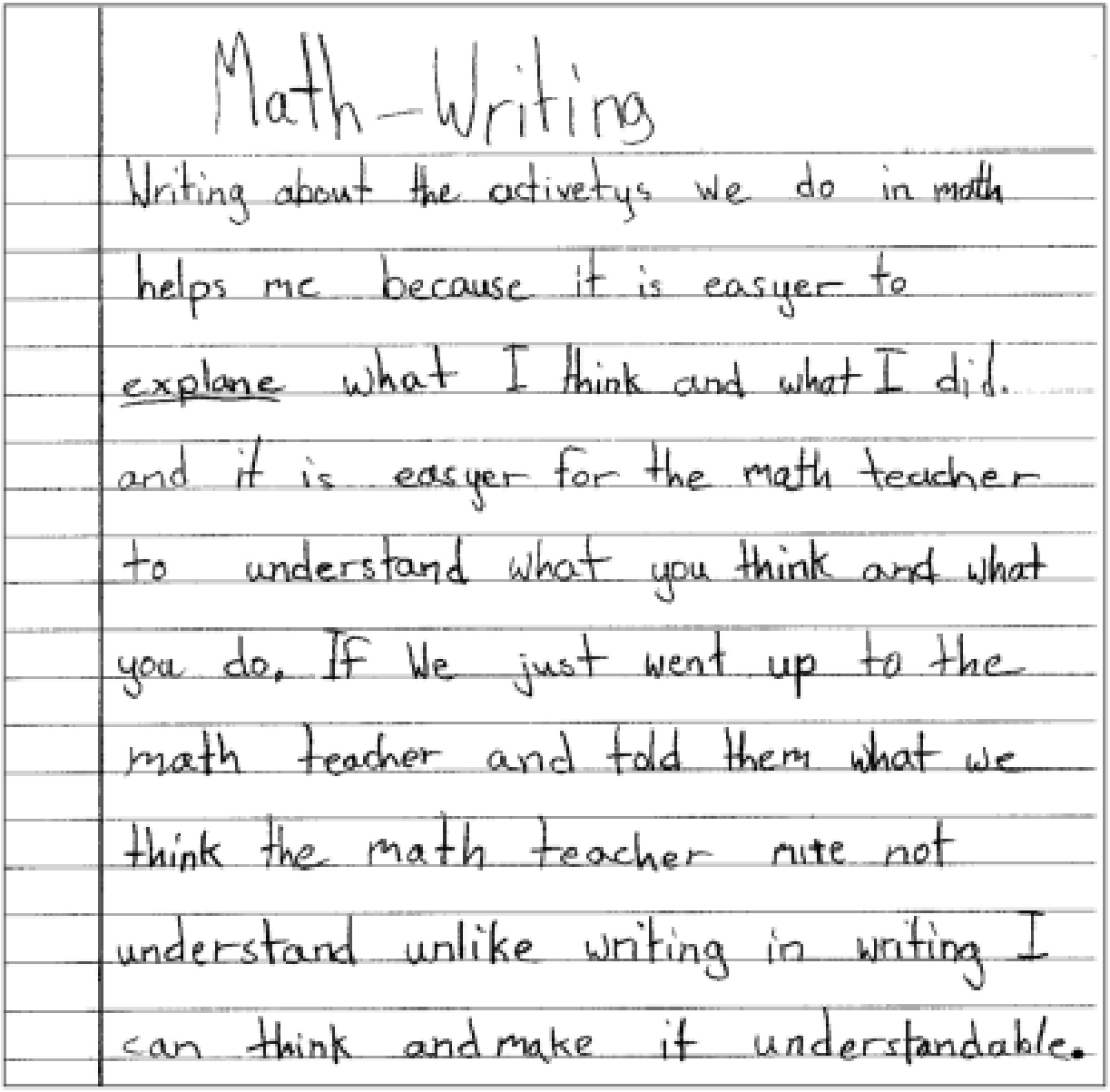
- How does the Scoring Rubric Compare to our Criteria for a Good Math Paper?

- How would students benefit from participating in an experience like this?



Math-Writing

What writing does for me is it unlocks my brain and it lets me think. But if I didnt write I would be getting nowhere. I wouldnt learn anything. I mean I wouldnt think so hard if I didnt write. I would just play the game even if I didnt know how because I wouldnt have to write. But when you write it just makes you think.



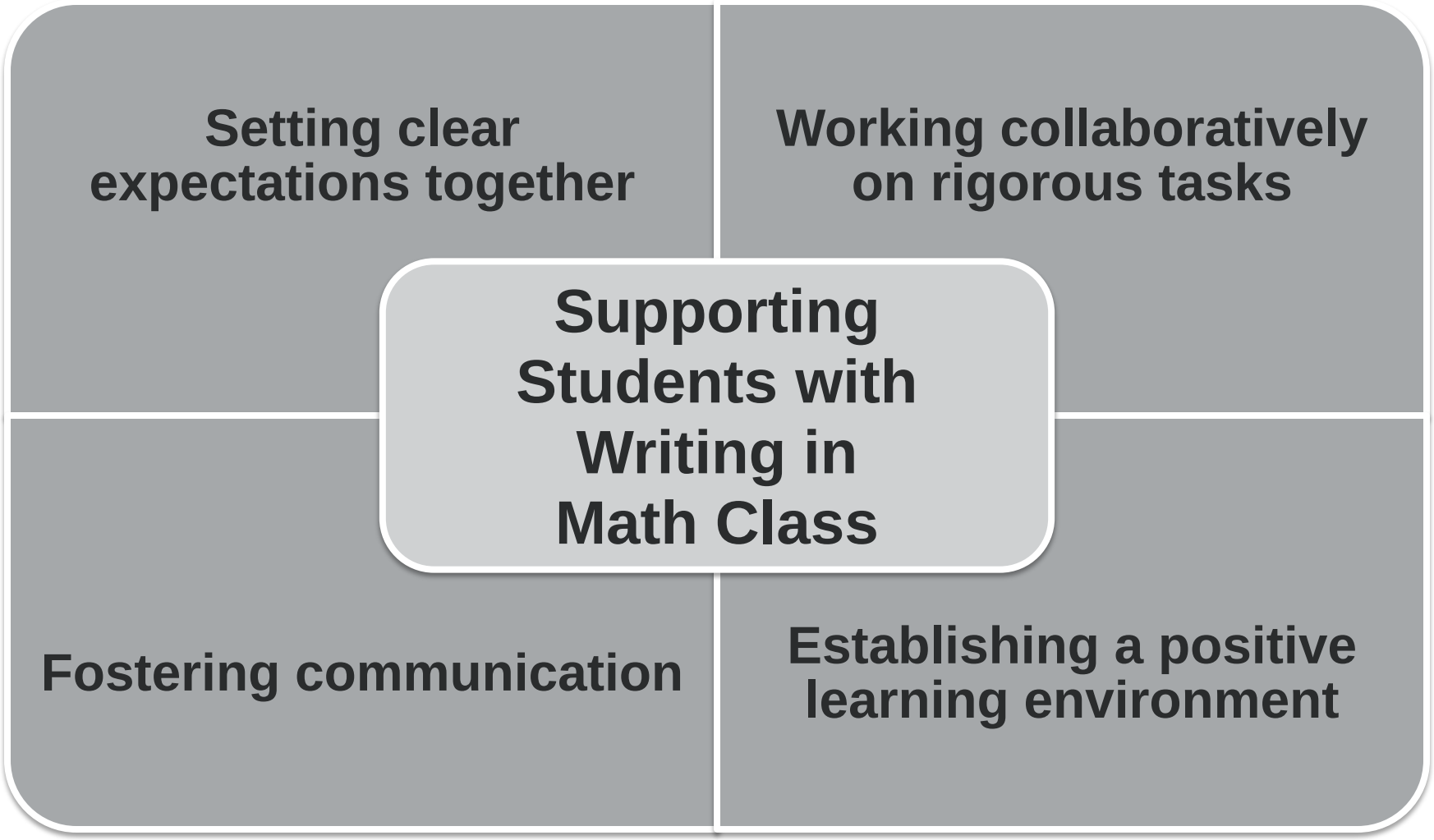
Math-Writing

Writing about the activetys we do in math helps me because it is easyer to explane what I think and what I did. and it is easyer for the math teacher to understand what you think and what you do. If We just went up to the math teacher and told them what we think the math teacher mite not understand unlike writing in writing I can think and make it understandable.

Writing in Math Class

"Incorporating writing into math class adds an important and valuable dimension to learning by doing. Writing encourages students to examine their ideas and reflect on what they have learned. It helps them deepen and extend their understanding. When students write about mathematics, they are actively involved in thinking and learning about mathematics."

-Marilyn Burns


Setting clear expectations together
Working collaboratively on rigorous tasks
Supporting Students with Writing in Math Class
Fostering communication
Establishing a positive learning environment

Teacher Indicators

LEARNING ENVIRONMENT
Teacher
Provides a respectful, safe learning environment in which mistakes are seen as an opportunity to learn.
Structures the class for independent work, pairs, groups, and whole class in a thoughtful and deliberate way.
Asks questions that both build and reveal new understanding of content and practice. Avoids yes/no questions unless they also ask for justification.
Makes appropriate tools available and encourages their use.

Student Indicators

LEARNING ENVIRONMENT
Student
Take an academic risk and rely on their own thinking and the thinking of other students.
Listen and ask questions to each other to clarify information; respectfully challenge ideas; make conjectures.
Explain their reasoning; construct viable arguments and critique the reasoning of others.
Communicate using appropriate mathematical language both orally and in writing.

Quiet Write

- How do the indicators for the Learning Environment from the *Instructional Practice Inventory* support your thinking about mathematics classrooms?

- What ideas do you have for applying the ideas from this session to your work?

Please Provide Session Feedback

Pick One:

- Paper (2 in bag)
- MSC App
- QR Code
- http://tinyurl.com/MSC16eval

#ModelSchools

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