ACADEMIC SUPPORTS TO ENSURE ALGEBRA READINESS

25Q024 Andrew Jackson Elementary

2017-2018 SHOWCASE VISIT ARTIFACTS

SHOWCASE SCHOOLS

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Constructivist Mathematics @ PS 24Q

Mathematics in which students are constructing their OWN meaning of the concepts. Teachers purposefully plan for opportunities for students to develop understanding through exploration and discussion. Instead of traditional "I Do, We Do, You Do," math instruction becomes "You Do, We Do, I Do."

Algebra for All

Pedagogy	Socio-Emotional
Opening Tasks How do you select or adapt tasks to deepen mathematical thinking?	**Making Tasks Accessible** Differentiate by planning instruction so that tasks are accessible to all learners
Persistence How can you develop and support a classroom culture that promotes persistence and sense-making over answer finding and speed?	**Productive Struggle** Experience and learn to implement techniques for helping students understand and trust that struggle is necessary for learning
Discussion How can you use discussion of student strategies to formalize understanding?	**Incorporating All Learners** Important learning happens after the answer is derived
Re-Engaging How can you design follow-up lessons that re-engage, challenge, and support students at all levels of understanding?	**Variation** Multiple and varied perspectives on a problem or concept deepen understanding for all students
Planning for Next Year How can you develop a plan for supporting all students in engaging rigorously with grade level mathematics?	**Scaffolds** Well designed and implemented scaffolds provide access without sacrificing rigor.

SHOWCASE SCHOOLS
Sharing Promising Practices

Constructivist Learning and Teaching

Douglas H. Clements and Michael T. Battista

In reality, no one can *teach* mathematics. Effective teachers are those who can stimulate students to *learn* mathematics. Educational research offers compelling evidence that students learn mathematics well only when they *construct* their own mathematical understanding. (MSEB and National Research Council 1989, 58)

Radical changes have been advocated in recent reports on mathematics education, such as NCTM's *Curriculum and Evaluation Standards for School Mathematics* (National Council of Teachers of Mathematics 1989) and *Everybody Counts* (MSEB and National Research Council 1989). Unfortunately, many educators are focusing on alterations in content rather than the reports' recommendations for fundamental changes in instructional practices. Many of these instructional changes can best be understood from a *constructivist* perspective. Although references to constructivist approaches are pervasive, practical descriptions of such approaches have not been readily accessible. Therefore, to promote dialogue about instructional change, each "Research into Practice" column this year* will illustrate how a constructivist approach to teaching might be taken for a specific topic in mathematics.

What Is Constructivism?

Most traditional mathematics instruction and curricula are based on the *transmission,* or *absorption,* view of teaching and learning. In this view, students passively "absorb" mathematical structures invented by others and recorded in texts or known by authoritative adults. Teaching consists of transmitting sets of established facts, skills, and concepts to students.

Constructivism offers a sharp contrast to this view. Its basic tenets—which are embraced to a greater or lesser extent by different proponents—are the following:

1. Knowledge is actively created or invented by the child, not passively received from the environment. This idea can be illustrated by the Piagetian position that mathematical ideas are *made* by children, not found like a pebble or accepted from others like a gift (Sinclair, in Steffe and Cobb 1988). For example, the idea "four" cannot be directly detected by a child's senses. It is a relation that the child superimposes on a set of objects. This relation is constructed by the child by reflecting on actions performed on numerous sets of objects, such as contrasting the counting of sets having four units with the counting of sets having three and five units. Although a teacher may have demonstrated and numerically labeled many sets of objects for the student, the mental entity "four" can be created only by the student's thought. In other words, students do not "discover" the way the world works like Columbus found a new continent. Rather they *invent* new ways of thinking about the world.
2. Children create new mathematical knowledge by reflecting on their physical and mental actions. Ideas are constructed or made meaningful when children integrate them into their existing structures of knowledge.
3. No one true reality exists, only individual interpretations of the world. These interpretations are shaped by experience and social interactions. Thus, learning mathematics should be thought of as a process of adapting to and organizing one's quantitative world, not discovering preexisting ideas imposed by others. (This tenet is perhaps the most controversial.)
4. Learning is a social process in which children grow into the intellectual life of those around them (Bruner 1986). Mathematical ideas and truths, both in use and in meaning, are cooperatively established by the members of a culture. Thus, the constructivist classroom is seen as a culture in which students are involved not only in discovery and invention but in a social discourse involving explanation, negotiation, sharing, and evaluation.

*1990–1991

5. When a teacher demands that students use set mathematical methods, the sense-making activity of students is seriously curtailed. Students tend to mimic the methods by rote so that they can appear to achieve the teacher's goals. Their beliefs about the nature of mathematics change from viewing mathematics as sense making to viewing it as learning set procedures that make little sense.

Two Major Goals

Although it has many different interpretations, taking a constructivist perspective appears to imply two major goals for mathematics instruction (Cobb 1988). First, students should develop mathematical structures that are more complex, abstract, and powerful than the ones they currently possess so that they are increasingly capable of solving a wide variety of meaningful problems.

Second, students should become autonomous and self-motivated in their mathematical activity. Such students believe that mathematics is a way of thinking about problems. They believe that they do not "get" mathematical knowledge from their teacher so much as from their own explorations, thinking, and participation in discussions. They see their responsibility in the mathematics classroom not so much as completing assigned tasks but as making sense of, and communicating about, mathematics. Such independent students have the sense of themselves as controlling and creating mathematics.

Teaching and Learning

Constructivist instruction, on the one hand, gives preeminent value to the development of students' personal mathematical ideas. Traditional instruction, on the other hand, values only established mathematical techniques and concepts. For example, even though many teachers consistently use concrete materials to introduce ideas, they use them only for an introduction; the goal is to get to the abstract, symbolic, established mathematics. Inadvertently, students' intuitive thinking about what is meaningful to them is devalued. They come to feel that their intuitive ideas and methods are not related to *real* mathematics. In contrast, in constructivist instruction, students are encouraged to use their own methods for solving problems. They are not asked to adopt someone else's thinking but encouraged to refine their own. Although the teacher presents tasks that promote the invention or adoption of more sophisticated techniques, all methods are valued and supported. Through interaction with mathematical tasks and other students, the student's own intuitive mathematical thinking gradually becomes more abstract and powerful.

Because the role of the constructivist teacher is to guide and support students' invention of viable mathematical ideas rather than transmit "correct" adult ways of doing mathematics, some see the constructivist approach as inefficient, free-for-all discovery. In fact, even in its least directive form, the guidance of the teacher is the feature that distinguishes constructivism from unguided discovery. The constructivist teacher, by offering appropriate tasks and opportunities for dialogue, guides the focus of students' attention, thus unobtrusively directing their learning (Bruner 1986).

Constructivist teachers must be able to pose tasks that bring about appropriate conceptual reorganizations in students. This approach requires knowledge of both the normal developmental sequence in which students learn specific mathematical ideas and the current individual structures of students in the class. Such teachers must also be skilled in structuring the intellectual and social climate of the classroom so that students discuss, reflect on, and make sense of these tasks.

An Invitation

Each article in this year's "Research into Practice" column will present specific examples of the constructivist approach in action. Each will describe how students think about particular mathematical ideas and how instructional environments can be structured to cause students to develop more powerful thinking about those ideas. We invite you to consider the approach and how it relates to your teaching—to try it in your classroom. Which tenets of constructivism might you accept? How might your teaching and classroom environment change if you accept that students must construct their own knowledge? Are the implications different for students of different ages? How do you deal with individual differences? Most important, what instructional methods are consistent with a constructivist view of learning?

THINKING WALL

Students are using a Thinking Wall for multiple purposes. One group is having a discussion around the various strategies displayed while the other group has leaders who are engaging the group in a conversation around the models and tools that could be used in navigating the task. In both groups, students are leading the work, taking ownership of all discussions. Collaboration is evident in both situations.

How could I use this in my instruction?

THINKING WALL

Another example of how a Thinking Wall can be utilized. This shows students leading mathematical discourse in one area of the room while other students work collaboratively in other areas. Thinking Walls serve multiple purposes, including student led discussions, display (and discussion) of strategically selected student work samples, and as an interactive tool for students to refer to as needed. Again, teachers are there to guide students, but students are taking the "leader" role in the discussion.

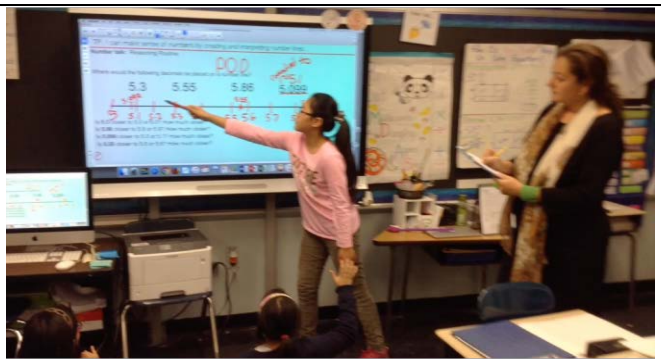
How could I use this in my instruction?

STUDENT CHOICE

Students are given opportunities to use self-chosen manipulatives, rubrics, and checklists to guide their thinking. Teachers are there to support and facilitate student use of tools as well as to push student thinking, both independently and in collaborative conversations.

How could I use this in my instruction?

STUDENT LEADERS



The student is leading the discussion, using the Smartboard to model her thinking. As she facilitates the conversation, the teacher is using the Math Teacher Checklist to assess student understanding, use of Standards of Mathematical Practices, and group dynamics.

How could I use this in my instruction?

TECHNOLOGY/ DIFFERENTIATION

This group is working with technology to further investigate concepts studied in class. Through the use of technology, students are developing stronger understanding of real-world applications of concepts learned in school. Additionally, students each have their own Google Classroom accounts with tasks differentiated to individual needs.

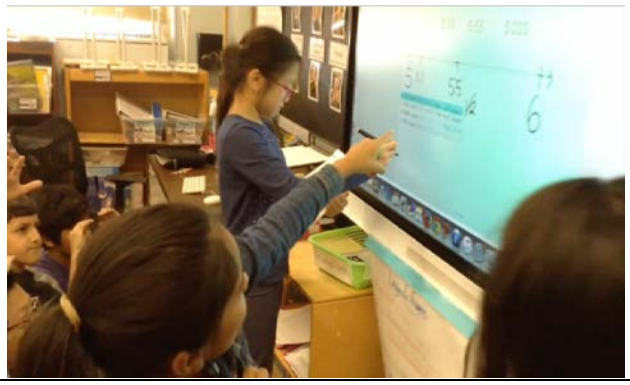
How could I use this in my instruction?

COLLABORATION

Students are working collaboratively to navigate difficult problems, working together to close read and then solve the the problems. Students evaluate and critique each other's work, encouraging one another to try different strategies to better understand the problems.

How could I use this in my instruction?

STUDENT LED SHARE & DISCUSSION



Smartboards are used for students to share their ideas in ways that are visible to others. Students then discuss the strategies modeled and work together collaboratively to think of other strategies that may work for the same problem.

How could I use this in my instruction?

SMALL GROUPS/ REENGAGEMENT

Teachers work with small groups to facilitate conversations and guide students' thinking about mathematics. The teachers' role becomes that of a facilitator, guiding students thinking by purposefully asking questions that align with content and practice standards. Reengagement activities are also applied in these groups.

How could I use this in my instruction?

Strategy Reflection Sheet

The strategy reflection sheet is a tool used to help students recognize that there are various strategies that can be used to solve a problem. It aligns with the Mathematical Practices and pushes students to make sense of strategies that may prove helpful to them in the future.

This tool is first introduced to the whole class, then is used in groups, and eventually is used individually.

Although not utilized in every lesson, it can be used as an exit slip, assessment, or homework assignment to follow up on a problem completed in class.

Strategy Reflection

Today we worked on this problem:
I used this strategy:
We also saw these different strategies:

What do you notice about these strategies?
How are they the same and how are they different?
Why do you think each person chose them?

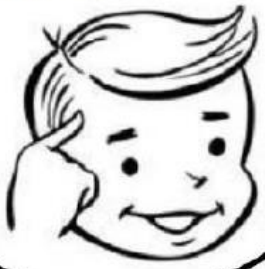
Now, how would you solve this problem?

Questions? Thoughts?

I am ready
我准备好了

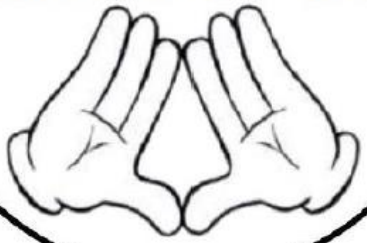
I agree
我同意

I am still thinking
我还在想。。。

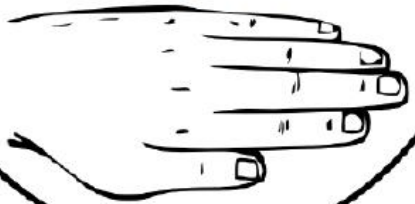


I want to challenge your thinking.
对于你的说法，我有不同意见。

Speak in complete sentences
用完整的句子讲述



I want to add on
我想要添加一些东西



I am ready

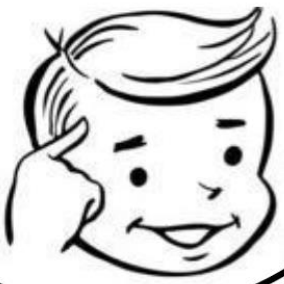
Yo estoy listo

I agree

Estoy en acuerdo

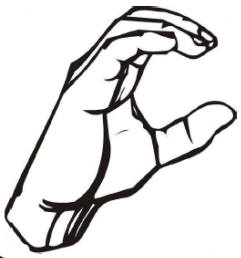
I am still thinking

Yo estoy todavia pensado



I want to challenge your thinking.

Yo quiero desafiar tus pensiamentos

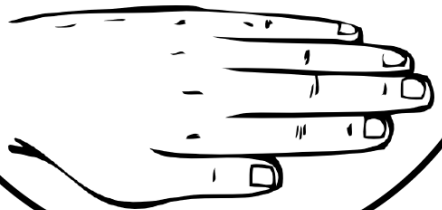


Speak in complete sentences

Habla en oraciones completa

I want to add on

Yo quiero añadir más



Learning Buddies

We make use of the “Learning Buddies” method where students work in groups of four, each taking on an assigned role.

What is the purpose?

Less emphasis on…

Homogeneous grouping where high-functioning students only/always work with other high-functioning students (and vice versa)

Greater emphasis on…

Students working with other students independent of their ability

What are the roles?

- Sketch Partner
- Model Partner
- Explanation Partner

What Could a Lesson Look Like?

Teaching Point

- Use mathematical practices
- Example: TP: I can persevere with problem solving by thinking critically about the situation. **(5.NBT.6)**

Homework Routine

- 3-5 minutes

Routines

- Number strings
- Quick image
- Dot talk
- It can't be…
- Notice & wonder
- Etc.

Possible Guided Question

- Could be used or can go right into inquiry question – depends on your students and lesson.

Inquiry Question

- 3 read
- Language protocols
- Annotating question
- Think time
- Partner/group work

Summarize / Thinking Wall Protocol

- Pull student work to share (about 2-3)
- Teach/Pull strategies – review misconceptions

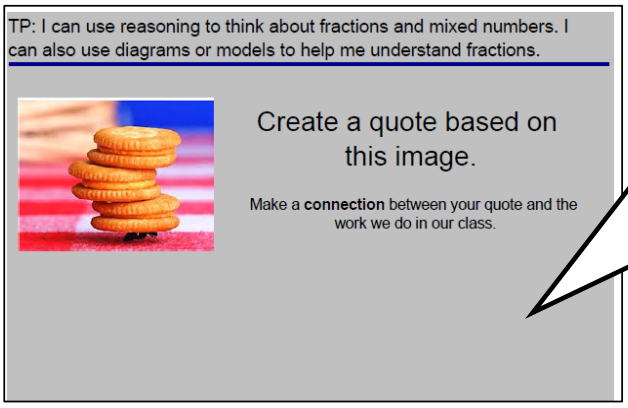
Station Work (Note: station work does not have to be everyday)

- Differentiated Work for students
- Independent Practice
- Center/Task/Enrichment Activities
- Conferencing Time
- Re-engagement Lessons with small groups

Annotated 5th Grade Lesson Plan p.1

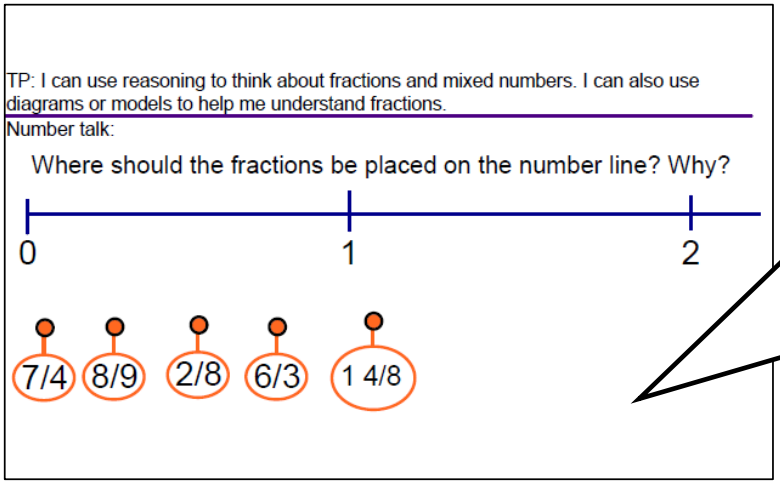
- Used as a quick motivation for all students.
- Welcomes students into lesson by giving them a moment of transition and time to prepare for work.

SMP 1



- Teaching Point introduces the plan and goal of the lesson.
- Quotation is used to build on a growth mindset.
  - Opens up conversation quickly in a non-threatening way with no "right" or "wrong" answers.
  - Promotes discourse for all children, including SWDs and ENLs.

SMP 1



- Number Talk is a short, structured way for students to talk about math with peers.
  - Aimed at building number sense, visualizing problems, and sharing flexible thinking.

SMP 2
SMP 5

Annotated 5th Grade Lesson Plan p.2

TP: I can use reasoning to think about fractions and mixed numbers. I can also use diagrams or models to help me understand fractions.

Speed Round:

a) Write an **expression** for: three times the sum of 3.1 and 4

b) Write in **expanded form**: 432.183

c) What is **one-tenth** of 80?

d) What are the **attributes** of a scalene, right triangle?

e) Can a **square** be classified as a rectangle? Why or why not?

- Designed to build fluency through a spiral review.
  - Can be used at the beginning as a quick review to help reinforce fluency and review concepts.
  - Can be used at the end as a wrap up review to reinforce new concepts.
  - Can be used as a quick pre or post assessment.

SMP 1
SMP 2
SMP 6

TP: I can use reasoning to think about fractions and mixed numbers. I can also use diagrams or models to help me understand fractions.

Launch:

Mrs. Gregory is baking banana bread for her daughter's birthday party. She LOVES this recipe but it only makes enough bread for 10 people. Help her ***adjust***[1] the recipe so that it serves 30 people.

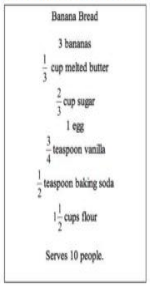
---

1 adjust: to make a slight change to something in order to make it fit or work better

- Promotes/ties in with ELA skills and strategies.
- Includes picture support and vocabulary support for ENL students.
- Develops discussion around a problem, bringing out different strategies and models that may help in navigating difficult tasks.
- Students are given "think time" to process problem before "share time" when they discuss ideas.
- 3-Read strategy for problem solving
  - First read: Listen to/read and make sense of problem
  - Second read: Annotate; Sketch; Stop and jot
  - Third read: Figure out what is needed to solve problem; Solve problem

Annotated 5th Grade Lesson Plan p.3

Use models, diagrams, and words to show your thinking.



Extension: Mrs. Gregory wants to have enough bread for 40 people. How much of each ingredient will she need?

TP: I can use reasoning to think about fractions and mixed numbers. I can also use diagrams or models to help me understand fractions.

Explore:

Mrs. Gregory is baking banana bread for her daughter's birthday party. She LOVES this recipe but it only makes enough bread for 10 people. Help her ***adjust*** the recipe so that it serves 30 people. Use models, numbers, and words to show your thinking.

Extension: Mrs. Gregory wants to have enough bread for 40 people. How much of each ingredient will she need?

- Inquiry work is used in a variety of ways, for a variety of reasons.
  - Used to introduce a new concept.
  - Used to develop a deeper understanding of concepts.
  - Used to tie multiple concepts together.
- Incorporates any other resources students may need to support understanding (charts, pictures, manipulatives, etc.)
- Extension is offered as enrichment for some or all.
- Slides are sometimes combined, depending on lesson/task.
- Often, dual slides are presented, one in English and one translated to meet needs of class.

ALL SMPs are addressed

Rubric for Productive Teams

Level 4:

- All team members are working **collaboratively** and **productively at all times**
- All **conversations** remain focused on the task
- Models/sketches/graphs are **accurate**
- Data is displayed correctly
- Statements are being created that show **deep analysis** of the data.
- **Effort** is clearly visible and **team's work ethic** is impressive

Level 3:

- All team members are working collaboratively and productively (with maybe one redirection)
- Conversations are generally focused on the task (with maybe one redirection)
- Sketches/diagrams/graphs are generally accurate. Minor corrections needed.
- Statements are being created that show some analysis, but could have been more thorough and/or have shown deeper analysis.
- Effort is satisfactory; Work ethic is **satisfactory**, but not impressive

Level 2:

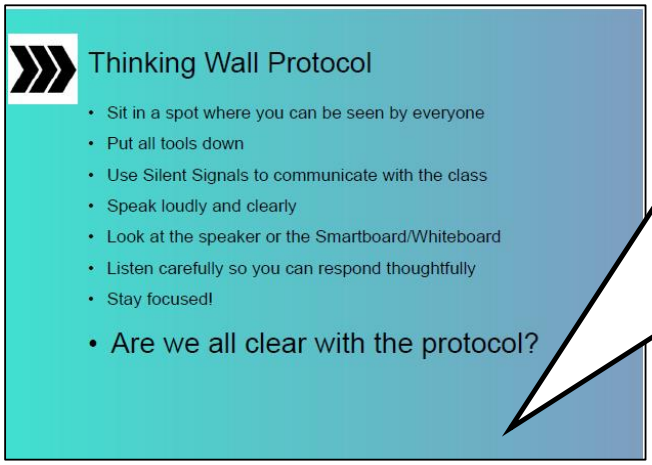
- Team members could be working more productively and collaboratively
- Sketches/diagrams/models/graphs are not completely accurate
- The team is not showing deep conceptual understanding of the concept
- The statements being created are superficial and do not show deep analysis
- Effort is not acceptable; Work ethic is not satisfactory or is **mediocre**

Level 1:

- "Teamwork" is not evident throughout most of the task
- The team is not showing deep understanding of the material
- Little or no work is being produced
- Conversations among the team do not focus on the task
- The team's work ethic could be much stronger

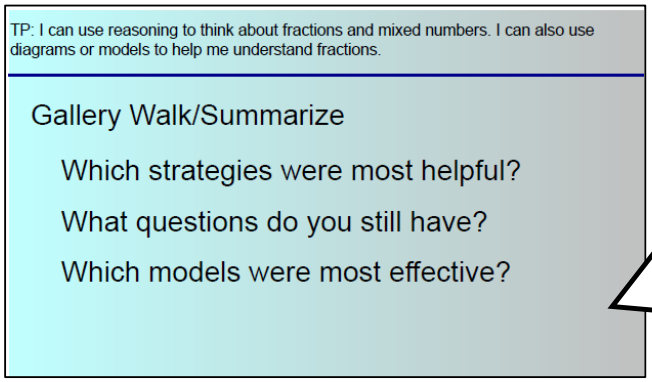
- While students are engaged in task, teachers use checklists to observe, support, and look for work that will be useful for the share
- Students are actively engaged, looking for new ideas and strategies
- There is time given during each inquiry task for students to take a moment and reflect on their work. They use self-reflections and peer feedback to push thinking.

Annotated 5th Grade Lesson Plan p.4



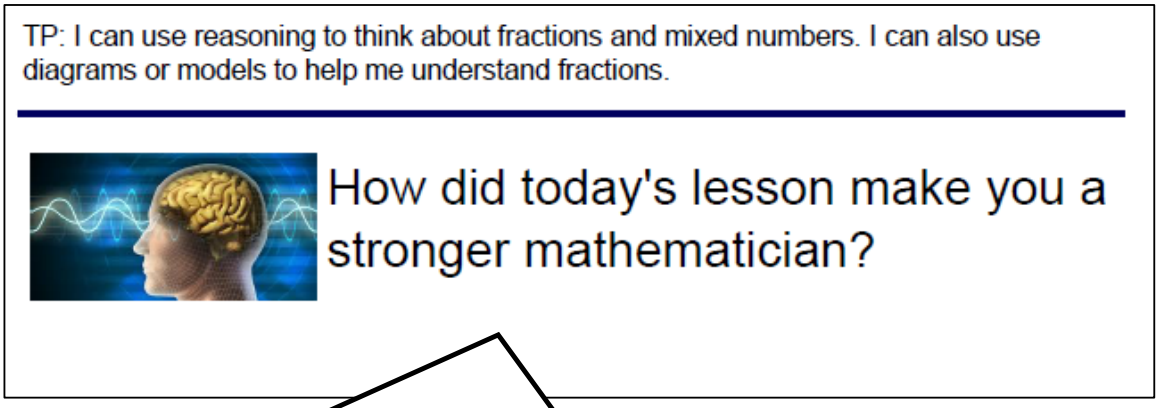
- The selection and order of the work shared is incredibly important – all work is chosen and ordered purposefully to reach desired lesson outcomes.
- Student leaders lead this share, beginning with reminder of protocols.
- Various types of "Thinking Walls"
  - SmartBoard (with document camera)
  - Dry erase boards
  - Bulletin boards
- While students share, teachers use checklist to track understanding

ALL SMPs addressed



- Continuation of share to promote discourse in a shared learning environment.
  - Work is displayed on any of the Thinking Walls for students to see.
  - Discussion takes place around:
    - Strategies
    - Struggles
    - New ideas
    - Connections
    - Wonderings

ALL SMPs addressed



- Can be used as a discussion prompt or as an exit slip to assess student understanding and use of mathematical practices.
- Relates back to growth mindset.
  - Often references of original picture and/or quotation are made.
  - Used to remind students that struggle is part of growth and that mistakes are celebrated.

SMP 1
SMP3

SHOWCASE SCHOOLS
Sharing Promising Practices

PROBLEM SOLVING RUBRIC

CRITERIA	4 Exceeds Expectations	3 Meets Expectations	2 Approaching Expectations	1 Well Below Expectations
UNDERSTANDING	I understand the important parts of each problem and can set up my solving strategy clearly. I have completed all parts of my work.	I show understanding for most parts of the project and can set up my solving strategy.	I only show some parts of understanding and have attempted to set up my solving strategies.	I show very little or no understanding of the problem and have not set up my problem solving strategies correctly.
STRATEGY	I have selected appropriate strategies for each part of the task and carried them through to a correct solution, clearly showing my thinking.	I have selected appropriate strategies for most parts of the task and carried them through to a correct solution, trying to show my thinking.	I have selected an appropriate strategy and may have arrived at a correct solution. My thinking may not be clear to follow.	I have selected an ineffective strategy and have arrived at an incorrect answer. Little or no thinking is shown.
PROBLEM SOLVING	I have chosen correct strategies and have shown all correct computations. My method shows my thinking and problem solving with a model.	I have chosen an effective strategy and most of my computations are correct. A model shows my thinking.	I have chosen a strategy and some of my computations are correct. A model may or may not be shown.	I have chosen an ineffective strategy to solve my problem. My computations are incorrect and a model is not shown.
EXPLANATION/ RESPONSE	I show my understanding and thinking by writing a detailed explanation of my strategy and how I solved my problem using mathematical vocabulary.	I show my understanding and thinking by writing an explanation of my strategy and how I solved my problem.	I show my understanding by writing a sentence or two of my strategy.	I do not show my understanding or thinking. Explanation does not make sense or is not written.

FEEDBACK: You were able to _____

GUIDANCE: Your goal is _____

You can reach your goal by _____

EVALUATION: Your overall score is _____

MATHEMATICAL PRACTICE PROBLEM SOLVING RUBRIC

Standard	4 Exceeds Expectations	3 Meets Expectations	2 Approaching Expectations	1 Well Below Expectations
MP #1 I can solve problems without giving up.	I read the problem several times and figured it out on my own. I worked on the problem and didn't give up.	I read the problem more than once and worked on the problem on my own. I only asked for help after I read the problem and tried it myself.	I read the problem once and then asked for help. I worked on the problem with help from my teacher, group or partner.	I was asked for help before reading and trying the problem on my own. I gave up on the problem even with help.
MP #2 I can think about numbers in many different ways.	I used several different strategies to solve the problem. My thinking was flexible and reasonable.	I used an effective strategy to solve the problem. My thinking was flexible and reasonable.	I used an effective strategy to solve the problem. My thinking was not very flexible and / or not reasonable.	I was unable to use an effective strategy to solve the problem. My thinking was not flexible or reasonable.
MP #3 I can explain my thinking	I was able to explain my answers and strategies clearly while using correct math vocabulary.	I was able to explain my answers clearly. I correctly used some math vocabulary.	I was able to explain my answers, however they were somewhat difficult to understand and/or they were not completely correct. I tried to use math vocabulary.	My explanation was not clear, was inaccurate, or was missing information. I didn't attempt to use math vocabulary.
MP #4 I can show my work in many ways.	I was able to show my thinking in several different ways.	I was able to show my work in at least two ways.	I was able to show my work in at least one way.	I didn't show my work.
MP #5 I can use appropriate math tools and explain why I use them.	I used a tool that helped me solve the problem. I was able to clearly explain why and how I used it.	I used a tool with help from others to help me solve the problem. I was able to explain why and how I used it.	I used a tool with help to help me solve the problem. I was not able to explain why or how I used it.	I didn't know which tool to use and/or I didn't know how to use them.
MP #6 I can work carefully and check my work.	All calculations and strategies were correct, clearly written and easy to follow.	All calculations and strategies were correct. Mistakes were corrected along the way and didn't affect the outcome or final answer.	Most calculations or strategies were correct, however mistakes affected the outcome or final answer.	There were several mistakes in my work and / or my final answer was incorrect.
MP #7 I can use what I know to solve new problems.	I was able to quickly figure out what I knew about the problem and apply my knowledge to solve.	I was able to figure out what I knew and apply my knowledge to solve. I may have needed help at first, but was able to finish on my own.	I was able to figure out what I knew and apply my knowledge to solve with help from my teacher, group or partner.	I was unable to use my knowledge to help me figure out how to solve the problem even after having help.
MP #8 I can solve problems by looking for rules and reasoning.	On my own, I was able to quickly find a strategy and / or shortcut to help me solve the problem.	I was able to find a strategy and / or shortcut to help me solve the problem. I may have needed help at first, but was able to finish on my own.	I was able to find a strategy and/or shortcut to help me solve the problem with help from the teacher, group or partner.	I was unable to find a strategy and/or shortcut to help me solve the problem even after help from the teacher, group or partner.

FEEDBACK: You were able to _____

GUIDANCE: Your goal is _____

You can reach your goal by _____

EVALUATION: Your overall score is _____

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DATE: _____ MATH CONCEPT/STANDARD: _____

Math Teacher Checklist

Student Name	Participates in discussion with partner/group	Use different strategies to solve a problem	Solves problems with precision and accuracy	Explains mathematical thinking	Demonstrates an understanding of the math concept	Teacher Comments

Notes on Checklist

-This is used to informally assess students at various points of a lesson, including partner work, group work, share, etc.

-Allows teacher an opportunity to assess on both their use of the standards of mathematical practice as well as student understanding of the concepts of the task

-Data gathered is used to drive instruction in that it helps determine what concepts need to be visited again and in what form - whole class, small group, centers/stations, etc.

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Departmentalization Schedules

Schools participating in Algebra for All agree to departmentalize 5th grade. This allows some teachers to specialize in mathematics instruction and helps ensure that there is enough time for mathematics instruction. We later introduced departmentalization in 4th grade as well. The departmentalization structures in 4th and 5th grades are slightly different, underscoring the importance of being flexible as a school to achieve our goals.

4th Grade Departmentalization Schedule:

Pairs of teachers take responsibility for two classes. One teacher specializes in Math and Science and the other teacher specializes in ELA and Social Studies. Each class has a double period of math and a double period of ELA each day, and they alternate between science and social studies in week A or Week B.

4-223/4-229	Week A		Week B	
	4-223	4-229	4-223	4-229
8:25 - 8:50	DEAR TIME	DEAR TIME	DEAR TIME	DEAR TIME
8:52 - 9:37	223 ELA Teacher A	229 Math Teacher B	229 Math Teacher B	223 ELA Teacher A
9:38 - 10:23	223 ELA Teacher A	229 Math Teacher B	229 Math Teacher B	223 ELA Teacher A
10:25 - 11:10	Prep	Prep	Prep	Prep
11:17 - 12:02	229 Math Teacher B	223 ELA Teacher A	223 ELA Teacher A	229 Math Teacher B
12:09 - 12:54	229 Math Teacher B	223 ELA Teacher A	223 ELA Teacher A	229 Math Teacher B
1:02 - 1:47	Lunch	Lunch	Lunch	Lunch
1:53 - 2:38	223 Social Studies Teacher A	229 Science Teacher B	229 Science Teacher B	223 Social Studies Teacher A

4-327/ 4-329	Week A		Week B	
	4-327	4-329	4-327	4-329
8:25 - 8:50	DEAR TIME	DEAR TIME	DEAR TIME	DEAR TIME
8:52 - 9:37	327 Math Teacher C	329 ELA Teacher D	329 ELA Teacher D	327 Math Teacher C
9:38 - 10:23	327 Math Teacher C	329 ELA Teacher D	329 ELA Teacher D	327 Math Teacher C
10:25 - 11:10	Prep	Prep	Prep	Prep
11:17 - 12:02	329 ELA Teacher D	327 Math Teacher C	327 Math Teacher C	329 ELA Teacher D
12:09 - 12:54	329 ELA Teacher D	327 Math Teacher C	327 Math Teacher C	329 ELA Teacher D
1:02 - 1:47	Lunch	Lunch	Lunch	Lunch
1:53 - 2:38	327 Science Teacher C	329 Social Studies Teacher D	329 Social Studies Teacher D	327 Science Teacher C

4-328/4-325	Week A		Week B	
	4-328	4-325	4-328	4-325
8:25 - 8:50	DEAR TIME	DEAR TIME	DEAR TIME	DEAR TIME
8:52 - 9:37	328 ELA Teacher E	325 Math Teachers F & G	325 Math Teacher F	328 ELA Teachers E & G
9:38 - 10:23	328 ELA Teacher E	325 Math Teachers F & G	325 Math Teacher F	328 ELA Teachers E & G
10:25 - 11:10	Prep	Prep	Prep	Prep
11:17 - 12:02	325 Math Teacher F	328 ELA Teachers E & G	328 ELA Teacher E	325 Math Teachers F & G
12:09 - 12:54	325 Math Teacher F	328 ELA Teachers E & G	328 ELA Teacher E	325 Math Teachers F & G
1:02 - 1:47	Lunch	Lunch	Lunch	Lunch
1:53 - 2:38	328 Social Studies Teacher E	325 Science Teachers F & G	325 Science Teacher F	328 Social Studies Teachers E & G

5th Grade Departmentalization Schedule:

Fifth grade has 7 classes, so there are two pairs of classes and teachers and one trio. The class pairs have a similar schedule to the 4th grade pairs, but for the trio, one teacher concentrates on math for all three classes, another for ELA, and another alternates between Science in week A and Social Studies in week B.

5-309/5-323	Week A		Week B	
	5-309	5-323	5-309	5-323
8:30-9:50	309 Teacher A ELA	323 Teacher B MATH	323 Teacher B MATH	309 Teacher A ELA
9:53-11:13	323 Teacher B MATH	309 Teacher A ELA	309 Teacher A ELA	323 Teacher B MATH
11:17-12:07	LUNCH	LUNCH	LUNCH	LUNCH
12:09-1:29	309 Teacher A SOCIAL STUDIES	323 Teacher B SCIENCE	323 Teacher B SCIENCE	309 Teacher A SOCIAL STUDIES
1:31-1:51	309 DEAR	323 DEAR	309 DEAR	323 DEAR
1:53-2:38	PREP	PREP	PREP	PREP

5-307/5-308	Week A		Week B	
	5-307	5-308	5-307	5-308
8:30-9:50	307 Teachers C & D ELA	308 Teachers E & F MATH	308 Teachers E & F MATH	307 Teachers C & D ELA
9:53-11:13	308 Teachers E & F MATH	307 Teachers C & D ELA	307 Teachers C & D ELA	308 Teachers E & F MATH
11:17-12:07	LUNCH	LUNCH	LUNCH	LUNCH
12:09-1:29	307 Teachers C & D SOCIAL STUDIES	308 Teachers E & F SCIENCE	308 Teachers E & F SCIENCE	307 Teachers C & D SOCIAL STUDIES
1:31-1:51	307 DEAR	308 DEAR	307 DEAR	308 DEAR
1:53-2:38	PREP	PREP	PREP	PREP

5-317/ 5-315/ 5-313	Week A			Week B		
	5-313	5-315	5-317	5-313	5-315	5-317
8:30-9:50	313 Teacher G MATH	315 Teacher J ELA	317 Teacher H SCIENCE	317 Teacher H SOCIAL STUDIES	315 Teacher J ELA	313 Teacher G MATH
9:53-11:13	317 Teacher H SCIENCE	313 Teacher G MATH	315 Teacher J ELA	315 Teacher J ELA	313 Teacher G MATH	317 Teacher H SOCIAL STUDIES
11:17-12:07	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
12:09-1:29	315 Teacher J ELA	317 Teacher H SCIENCE	313 Teacher G MATH	313 Teacher G MATH	317 Teacher H SOCIAL STUDIES	315 Teacher J ELA
1:31-1:51	313 DEAR	315 DEAR	317 DEAR	313 DEAR	315 DEAR	317 DEAR
1:53-2:38	PREP	PREP	PREP	PREP	PREP	PREP

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PS 24Q Math Resources

Math in the City Resource Books

- Many books in the series, including Strings books (minilessons) and Contexts for Learning units – great sources for routines and longer tasks

Number Talks (From Math Solutions) by Sherry Parrish

- Multiple number strings to use – great for routines

Step-by-Step Model Drawing - Solving Word Problems the Singapore Way (Math with Meaning) by Char Forsten

- Great for modeling
- Helps diverse learners, develops number sense and number relationships

Powerful Problem Solving by Max Ray (Heinemann)

- Activities for sense making with math practices
- Tasks

What's Your Math Problem? by Linda Gojak

- Strategies to help solve math problems
- Tasks that use multiple math practices

No Naked Numbers by Christine King

- Routines
- Building Number Sense

Go Math Resources

- Think Deeper Questions – great start for inquiry questions
- Can be used for homework, additional practice

Engage NY

- Great for sprints – builds up fluency
- Additional homework practice
- Additional models