DREME Math Observer Application

User Guide

2024

VANDERBILT UNIVERSITY

DREME

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DREME Math Observer App

Contents

Introduction to the DREME Math Observer

The DREME Math Observer was developed to provide administrators, coaches and principals with an effective means of examining the quality of math instruction in Pre-K through 2nd grade classrooms. It is meant to be used on a mobile phone or tablet. It is derived from a more detailed, longer research instrument developed in the COHERE project, funded by the Heising-Simons Foundation through the Development and Research in Early Math Education (DREME) Network. Partner coaches and principals actively participated in creating a measure that was useful and usable in everyday practice.

This tool's design and purpose derives from with the fields of improvement science and education. Since "we cannot improve at scale what we cannot measure," then it follows that "practical measures" or "measures for improvement" are needed (Bryk et. al., 2015; Yeager et. al., 2013). Practical measures are designed to do something different than more familiar types of measures. One common type of measure in schools is the "accountability measure," which is usually designed to provide global outcomes, and makes it hard to pinpoint where a practitioner could take action. Another common type of measure in schools is the demanding "research measure," which is designed to inform theory and practice, but not to guide specific changes in real settings (Yeager et. al., 2013).

Practical measures, such as this tool, serve a different purpose than accountability or research measures. Their purpose is to provide practitioners with rapid, frequent feedback so they can assess and adjust their practice during implementation (Jackson et. al., 2016). As a practical measure, the DREME Math Observer and its data are not intended to be used to evaluate teachers. Rather, the app should be used with the intent of improvement, augmenting the work that instructional coaches and school and program leaders already do.

Early math practices and this measure

Efforts to improve K-8 mathematics instruction have been a consistent feature of the education policy landscape for the past three decades, from the revised state mathematics standards of the 1990s to the Common Core educational standards enacted in 2010. These reforms ask teachers to forgo presenting mathematics as a set of facts and procedures and instead help students to make sense of mathematics conceptually, and also to engage students in mathematical practices such as explanation, argumentation, and modeling.

-*Hill, H. (2021). After 30 years of reform to improve math instruction, reasons for hope and dismay. Brookings.edu*

The Common Core State Standards draw on decades of research to propose three major shifts in the field of teaching mathematics to young people:

1. Greater focus on fewer topics
2. Coherence: linking topics and thinking within and across grades
3. Rigor: Pursue conceptual understanding, procedural skills and fluency, and application withequal intensity.

These shifts will result in different observable practices by teachers and students during math lessons than are typical. This measure is intended to be sensitive to those practices across four dimensions described later in this manual: Student Practices, Teacher Facilitation, Differentiation, and Rigor.

Whatever practices you observe during a lesson, this measure is calibrated to help you understand how a teacher might improve the quality of math practices in their classroom. Using the data from your observation, the measure will provide you with guiding questions to use during your debrief with the teacher.

How to Observe Using this App

1) **Explore the tutorial videos.**

   Throughout the app, there are embedded tutorial videos which are designed to help you navigate the app and provide examples of the teaching and learning practices in this tool.

2) **Decide what to focus on**.
   This app is intended to be flexible so it can fit into your existing coaching or professional development model. Five different domains (student practices, teacher facilitation, differentiation, rigor, student engagement) allow you different "lenses" through which you can observe a math lesson. You might choose to observe across all domains simultaneously or choose to focus on one domain or even several specific practices.

3) **Take detailed notes.**
   Note taking is a key feature of data collection in this app. Each subdomain offers a different pop-out field to take notes about that practice. For instance, if you are interested in how students are using tools, find the Using Tools section and select the notes icon to pop out the field. It is likely that you will be switching between categories to take notes during most of the observation. The notes can be essential to recreating the details of the lesson later and can guide you when determining which practice best describes your observation.

4) **Take photos.**
   You can take photos of classroom practices and students' work that you want to review later. You can take many photos and store them in a gallery under each domain.

5) **Summarize by selecting the practice you observed.**
   When you determine you have enough information for a subcategory, select the practice that best fits your observation. The practice options build from least to most rigorous. Your selection can be adjusted at any time during the observation or edited after the observation is complete.

6) **Rate student engagement.**
   The app will alert you every few minutes to record the phase of the lesson (e.g., intro activity, main task, wrap up) and the overall class engagement at that moment. This can be helpful in reviewing and reconstructing the whole lesson with the teacher during a debrief meeting with them.

7) **End the observation.**
   When your observation is complete, select the X at the top right of the screen to end and save. You will be asked to fill in notes about the math content and the objective.

8) **Review the summary.**
   The app includes several summary sections to help you understand the observation. You can review your observation notes and photos and leave new notes about overall strengths and opportunities you saw from the lesson.

9) **Debrief with the teacher.**
   You can explore the extended summaries on your phone. Each item you selected will show you

the category of practice you selected, as well as the ones not selected. You can use that information to set goals for improving practice. The extended summary will also generate guiding questions you can use to have conversations with the teacher, rather than just giving them a rating. Using your notes and other contextual data you collected, you can recreate the lesson with the teacher.

10) **Set goals and give teacher a record.**
During or immediately after your debrief, set goals about specific practices to work on. You can take notes about these in the observation summary. Then you can send a pdf attachment of the lesson to the teacher's email directly from your phone. The pdf will show the teacher which items you selected, and your notes about their strengths and next steps.

11) **Use previous observations as a guide.**
Before your next observation, you can review the last observation and the goals that you set together. You can use this to help guide your follow-up observation and give you some practices to pay attention to.

12) **Repeat process.**
Compare to previous observation(s) and see if you noticed any patterns or changes.

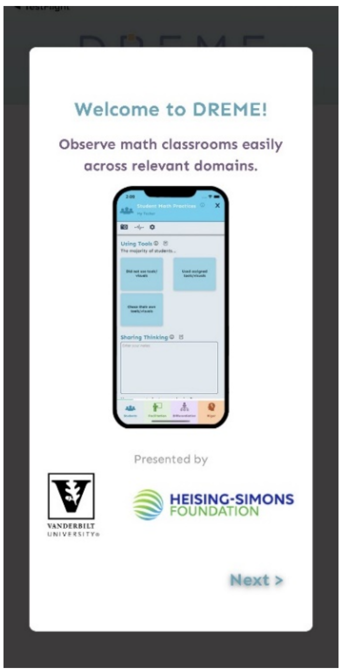
13) **Review trends.**
After multiple observations, use the Trends to compare classrooms, grades, or schools. Are there practices you have not observed yet? Are there patterns that suggest new areas for support?

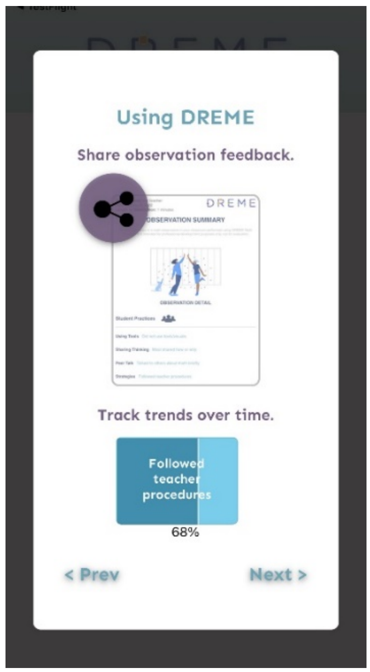
How to Use this Guide

This is a reference guide for how to use the app. It is not required to memorize the content before use.

First-Time Users

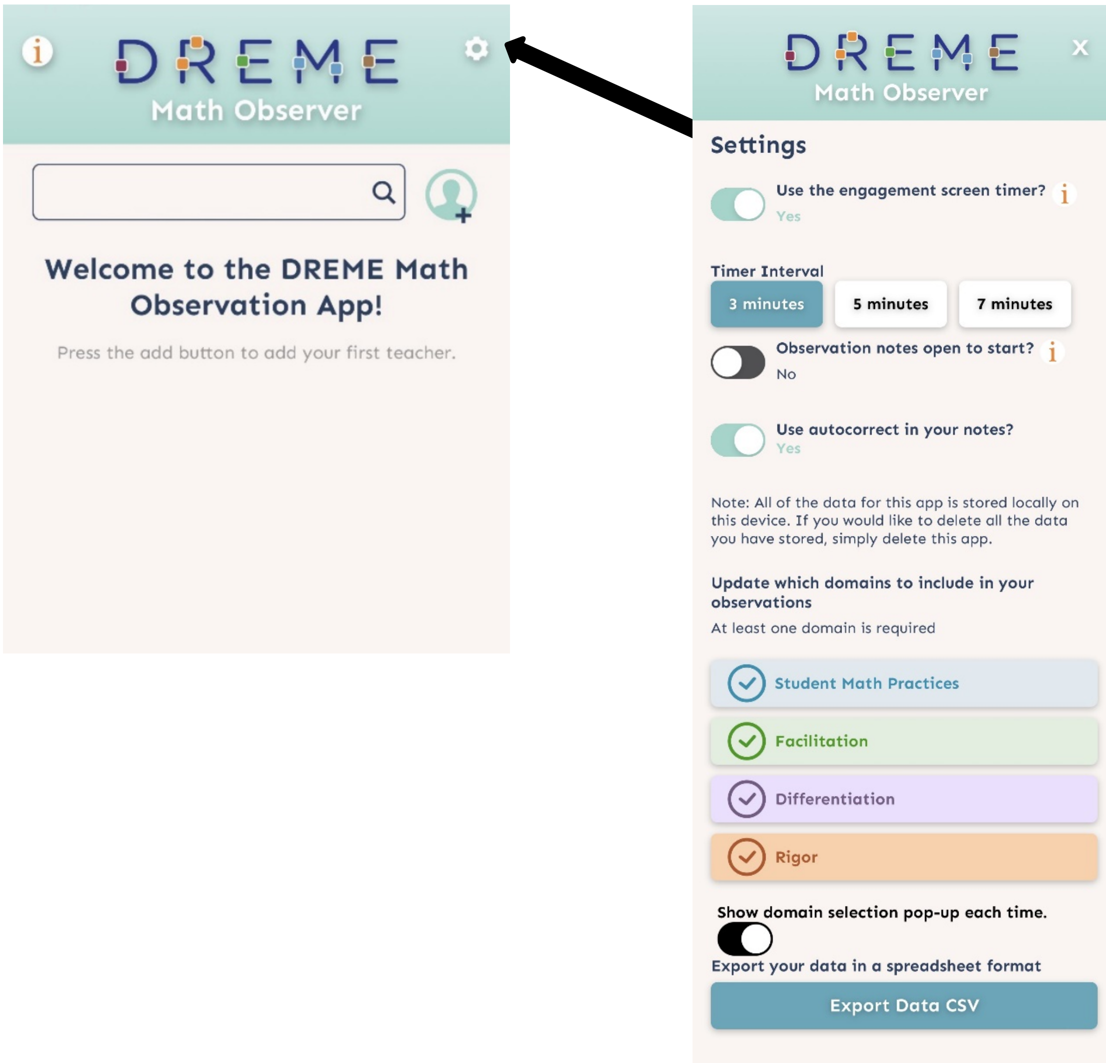
When you first open the app, you will see several screens to help orient you.



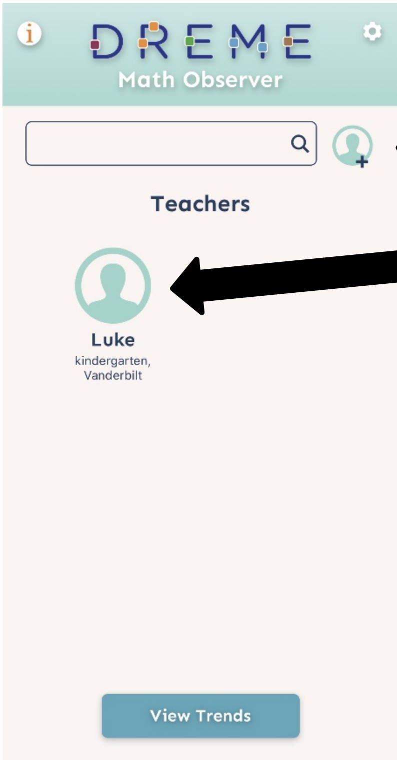


You will see an icon at the top right of the screen which allows you to change settings.

Adjust settings to turn on/off the student engagement timer if you would like. You can also set the notes fields to open automatically when you start a new observation. You can turn off autocorrect in your notes. Finally, update which domains to include in your observation.

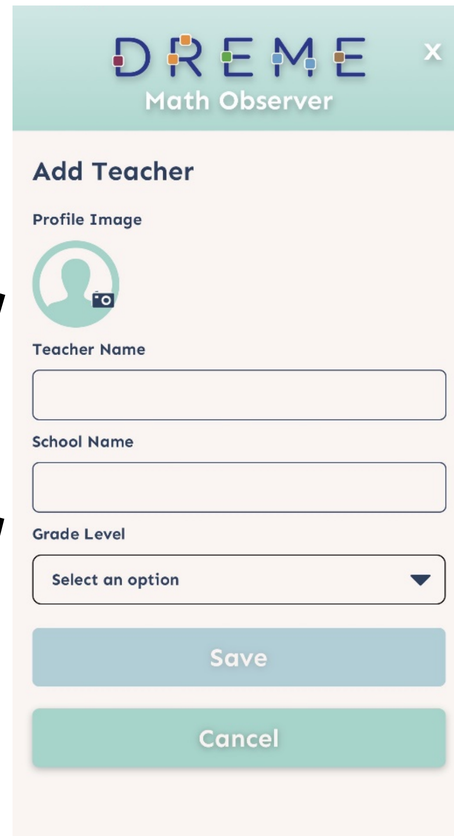


Getting Started



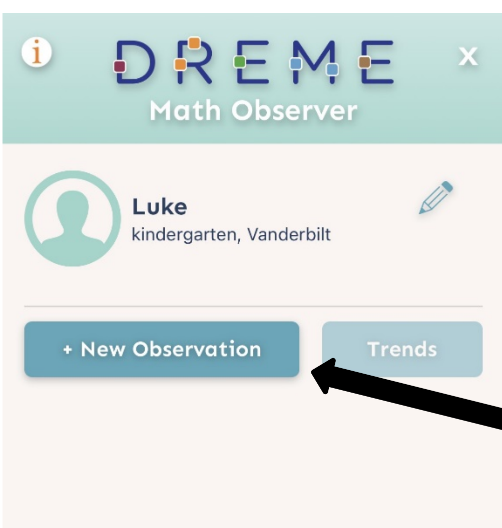
Press this Add button to create a new teacher profile.

If you have previously observed this teacher, you can choose them from this list.



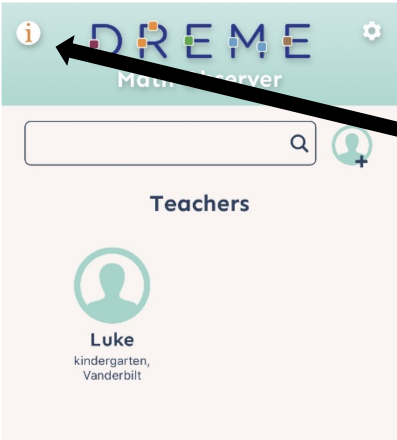
Tap here to upload a photo of the teacher to use as a teacher's profile picture

Fill in the teacher's name and school, and select the grade level from the dropdown list, then tap Save



Tap New Observation to start a new observation

Tutorials



We have included numerous tutorial videos in the app to help you learn more about the functions of the tool and the concepts around each practice.

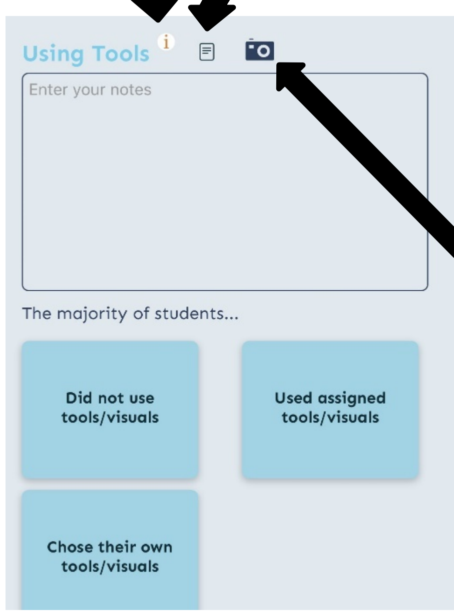
Wherever you see this icon: 
Tap to view the video menu to see relevant tutorials.

Observation

Domains: Observations include a set of domains with several questions in each. The menu pictured below shows you each domain. You can alternate between domains by clicking on them.

Questions with each domain will appear like this:

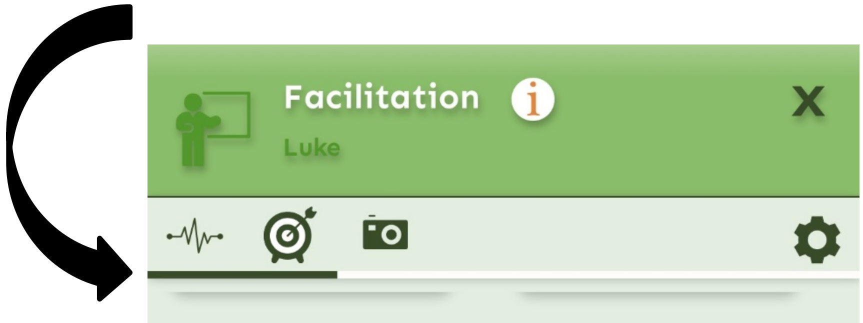
Information: each section contains information pop-outs. In the popout menus there are tutorial videos depicting what each practice might look like in a real early elementary classroom.



Notes: each section contains notes buttons that can be expanded to add notes. Click the icon again to hide the notes.

Camera: each section contains a camera button which you can use to take photos of interesting strategies or student work. The photos will be tied to the domain selected.

Engagement: Every three minutes, a **progress bar** will be filled showing that an engagement rating is coming up



These engagement ratings occur at regular intervals to ensure a fair sample of engagement during your observation. You can change the interval for engagement ratings in settings.

For more information about rating engagement, see p. 30.

Student Math Practices

This Domain is focused on the math-specific ways that students are engaged during the lesson. The Common Core Standards for Math Practices and many state and program standards outline important ways that students can engage with math concepts that are more than "a mile wide and an inch deep."

Research suggests that classrooms in which students regularly engage in these practices show higher gains in students' understanding of math concepts across the year.

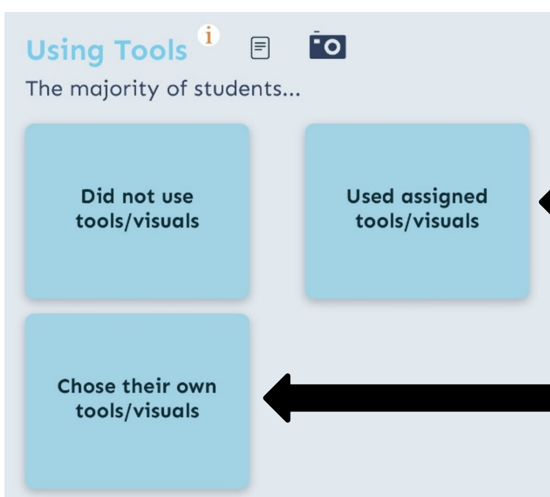
USING TOOLS

Mathematically proficient students choose among the available tools when solving a mathematical problem. In early elementary grades, these tools might include number lines, objects to count (e.g., bears, beads, buttons), base 10 blocks, abacus, geoboards, math link cubes, shapes, etc.

Proficient students are sufficiently familiar with tools appropriate for their grade to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and a tool's limitations.

-Adapted from Standards for Mathematical Practice, Common Core

CODING Using Tools: These are the tools or visuals used by students in mathematical ways. We generally do not include pencil and paper or whiteboard and marker in this category.



To select "Used assigned tools/visuals", look for direct interaction with the tool by students. This should go beyond just watching teacher model them.

Mark "Chose their own tools/visuals" when there is student choice involved in selecting the tool. The teacher may or may not provide some ideas or choice for students to select from, as long as the final choice is the student's.

Using Tools Examples:

Scenario: *You observe a Kindergarten lesson about composing sets of ten. The teacher is using ten frames and drawing red and blue bubbles with markers to fill in the frames on the whiteboard, writing the addition sentence below. Teacher draws four red bubbles and then asks the class how many blue bubbles they needed to make ten. The students yell out, "Six!" The teacher fills in six blue bubbles.*

Did not use tools/visuals: Then she releases them to complete similar problems printed in their workbooks, where the students must fill in the numerals in addition equations to make ten. Since students were not directly interacting with the ten frame, but it was just the teacher modeling it, we would not count that as using tools/visuals.

Used assigned tools visuals: After modeling on the board, the teacher passed out laminated ten frames to students along with blue and red chips. They were asked to use the chips and ten frames to help solve the workbook problems.

Chose their own tools/visuals: Then, the teacher presents an addition equation, 7+ _ = 10. He asks students to name different strategies they might use to solve the problem. Then students are released to find and use whichever tools they want to model the problem. Some students grab laminated ten frames and chips, while others grab number lines or Unifix cubes. Then the teacher draws their attention to the different representations.

SHARING THINKING

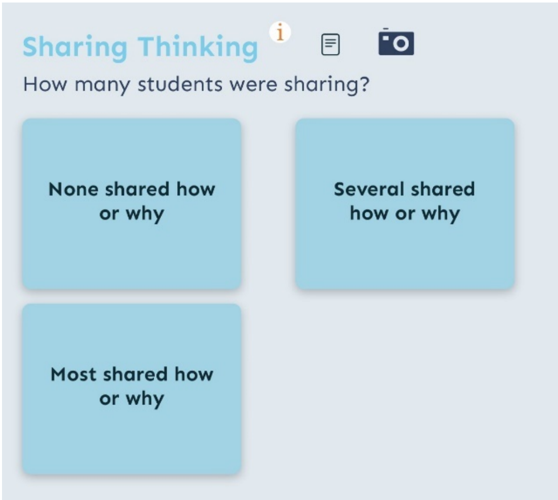
Research demonstrates that young children are remarkably capable of engaging in and making sense of sophisticated mathematical ideas and that their informal mathematical understandings provide fertile ground to build from in the learning of mathematics during early childhood.

-Johnson et al. (2019)

Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

-Principles to Actions, National Council of Teachers of Mathematics

CODING Sharing Thinking:



- Sharing thinking often sounds like the answer to a “how” or a “why” question or to the question “Can you show me how you did that?”
- Listen and look for students expressing partial or full ideas rather than filling in the answer to a question.
- In the early grades, it is common to only hear or see students share their thinking when directly asked by the teacher. However, some teachers set norms early in the year about how students should discuss math with each other, and students can spontaneously share their thinking. In those classrooms, it may be more common to hear students discussing in more elaborate terms with each other during pair or small group time.

Sharing Thinking Examples:

None shared how or why: You’re in a Pre-K lesson, and the teacher reads a storybook with the students on the carpet. He stops along the way and asks students to identify shapes in the illustrations. Students shout out. “Square!” “Circle!” “Triangle!” Sometimes the teacher responds saying, “Yes that’s right!” but doesn’t ask them to elaborate. He moves on to reading. When the book is done, he has students move to choose a center. You observe 2-3 math centers, which involve students mostly completing tasks independently or parallel to other students.

Several shared how or why: In a similar lesson, when the teacher stops and asks for shape identification, one student in particular offers more than other students. Though the teacher did not ask for elaboration, the student chooses to provide an explanation about how she knew a drawing of a sun was a circle because she noticed it was round and reminded her of a drawing of a face that she remembered also was a circle. The teacher is quiet and allows her time to share. Most other students do not offer this elaboration, and the teacher does not encourage it through questioning.

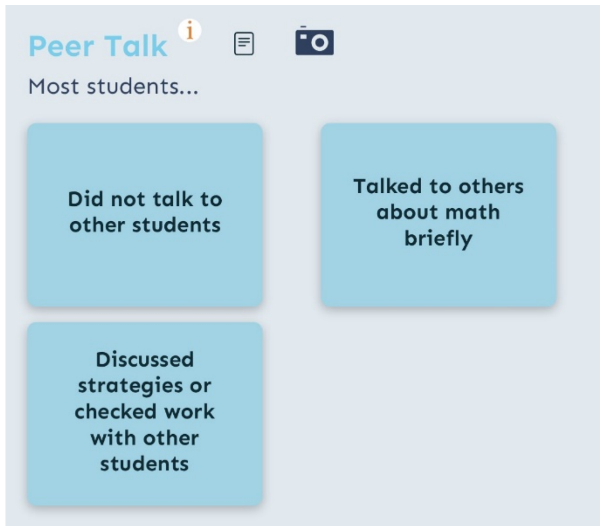
Most shared how or why: In a similar lesson, the teacher stops along the way and creates opportunities for more students to share and to elaborate. She provides space for children to talk about their ideas without interrupting and/or asks students to follow up on their identifications of shapes with how they know. Across the activity, she stops students who tend to offer longer explanations to every question, saying that she wants to make sure all friends get the chance to share. When students go to centers, you notice that she circulates and continues to probe student thinking. You estimate that most students in the class were given some opportunity to share their thinking beyond providing an answer.

PEER TALK

Students talk with each other about math ideas, steps, or solving problems.

> *Effective teaching of mathematics facilitates discourse among students in order to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.*
>
> *-Principles to Actions, National Council of Teachers of Mathematics*

CODING Peer Talk:



- This talk covers any talk about math directly between students. This should not include when a student shares their work or ideas with the whole class.
- Some teachers provide time for quick pair-and-shares, while others build lessons around small groups working together. Many classrooms discourage students from working together at all. Choose the item that best characterizes the lesson.

Peer Talk Examples:

Did not talk to other students about math During an observation of a 2nd grade lesson, you arrive to find students working on workbook pages. They are completing a warm-up word problem which requires them to use multiple operations. When they finish, they bring their paper to the teacher's desk and return to their seats. When the teacher calls time, she calls on one student to come up to the overhead projector and demonstrate his strategy. She does this with 1-2 other students. Because the students were presenting to the whole group rather than between specific other peers, this item should not be coded for peer talk.

Talked to others about math briefly: During a similar lesson, the teacher calls up a student to demonstrate her solution strategy. The teacher has her pause and tells the class to turn to their neighbor and discuss her strategy and answer. This lasts approximately 1 minute. The teacher calls the class back together, and she takes the feedback from some groups. The rest of the lesson involves her modeling solving new problems, and then students work independently. This option would be selected since students had only a brief and superficial opportunity to talk with peers during this observation.

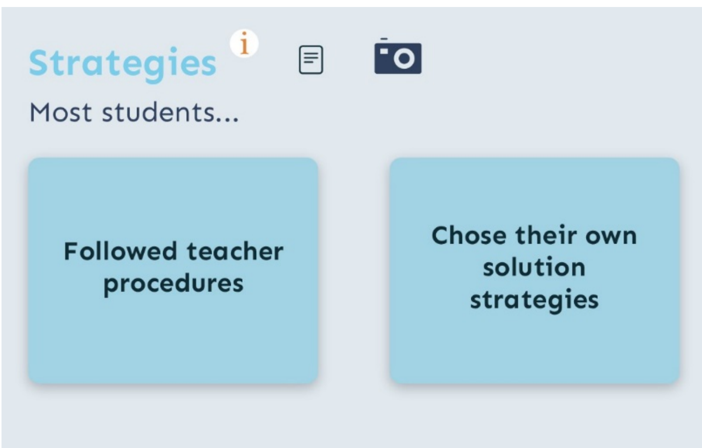
Discussed strategies or checked work with other students: During a similar lesson, after the pair and share, the teacher has the groups engage directly with the student. She has the student call on a representative from any group, who proceeds to ask her about her work. This teacher reminds students about prompts for asking questions (e.g., "how did you…") and explaining in full sentences. The representative from the group tells the girl they came up with another way to solve the problem and explains their way. Even though it was in the context of whole group, this teacher reinforced direct peer to peer talk in extended and substantial ways.

STRATEGIES

Mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

-Standards for Mathematical Practice, Common Core

CODING Strategies:



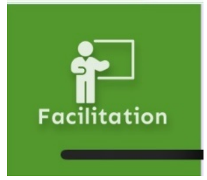
- "Procedures" refer to mathematical procedures where the steps to solve are provided and/or unambiguous
- Use this item to differentiate between math lessons that are mainly following procedures provided by the teacher and those that build in more opportunities for student to choose or invent a strategy.

Strategies Examples:

Followed teacher procedures: A Kindergarten grade class opens with a practice rote count to 50. Then the teacher tells them the objective of the day will be to practice the "counting on" strategy to solve addition problems. The teacher uses a hundreds chart to help guide students. The first problem is 15+?=21. The teacher demonstrates starting at 15 on the chart and then counts 6 jumps to get to 21. He demonstrates several problems, and then calls students up to show their jumps on the board. Because the teacher demonstrates a particular strategy to be used, there is no opportunity for students to select it from other available strategies to solve a problem. They are merely practicing one strategy chosen by the teacher.

Chose their own solution strategies: In a similar lesson, the teacher presents the problem 15+?=31. He asks students how they might solve this problem. Students raise their hands and suggest different options: use blocks to model and count, use tallies, and use fingers to count on. He releases students to work for several minutes with a partner to try out their ideas. Then the class has a conversation about how those strategies worked or didn't work. The students who chose blocks were having trouble keeping them organized to count correctly. The students who tried to use their fingers realized they quickly ran out of fingers. The teacher then uses this opportunity to introduce a new strategy for counting on using the hundreds chart, demonstrating.

Teacher Facilitation



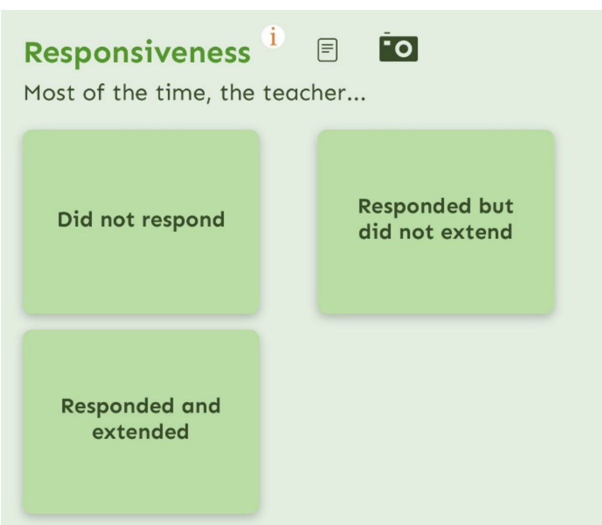
This Domain is focused on how the teacher builds discourse with students around math ideas.

> *Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and explanations.*
>
> - Adapted from National Council of Teachers of Mathematics (2014)

RESPONSIVENESS

> *Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.*
>
> - National Council of Teachers of Mathematics (2014)

CODING Responsiveness:



- “Responsiveness” refers to when the teacher verbally acknowledges student *mathematical* input. You should select an answer based on which choice best characterizes the lesson (i.e., what was happening on average during the observation).
- “Did not respond” means that usually the teacher did not verbally acknowledge student math input or there were no opportunities for student math input.
- “Responded but did not extend” means usually the teacher was doing things like repeating or re-voicing a student answer or acknowledging their answer and telling them the next step.
- “Responded and extended” means that usually the teacher acknowledged student math input, followed by further inquiry. This could sound like the teacher eliciting further explanation of how or why the student answered a certain way. It could be pausing to have another student share why they agree or disagree with the first student. Extending student thinking conveys that the teacher is more interested in how students are thinking than whether they arrived at the correct answer.

Responsiveness Examples:

Did not respond: A major part of a lesson is for students to work in pairs to complete several workbook pages on decomposing three-digit numbers into hundreds, tens, and ones. The teacher models the first couple of problems to the whole group, but he doesn't ask or take questions. As students work in pairs, the teacher walks around, but just comments on behavior issues. At the end of the lesson, he leads the class through the answers to the questions and has them complete an exit ticket individually. In this example, the teacher did not necessarily ignore student input (although he may have) but he did not create the opportunity for students to provide any. In either case, mark "did not respond."

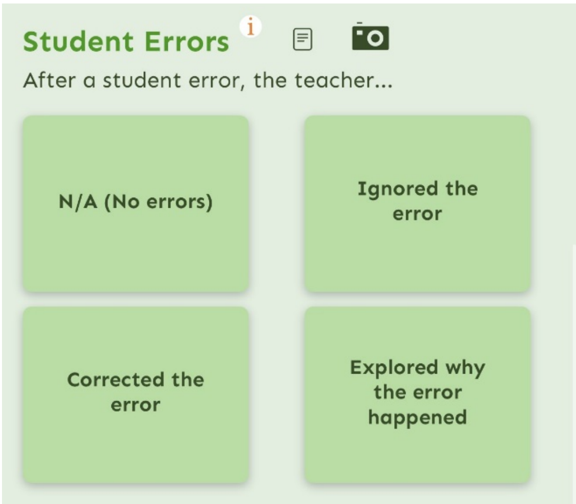
Responded but did not extend: In a similar lesson, the teacher asks students to recall what they started on yesterday. Several students say aloud that they were doing hundreds, tens, and ones. He acknowledges that is correct, and they are going to do more of that today. As he models, the teacher calls on individual students to provide the answer to, "how many" and fills in the numeral for each place value on the board. As students work, he walks around and asks students questions like, "did you remember to…" and "how many?" At the whole group debrief, he asks different students to provide values, and writes them on the board. One student offers that he used some cubes to help him model it, as they had worked on the day before. The teacher responds by revoicing the student strategy so the whole class can hear it. Then he gives them each an exit ticket. This time, the teacher routinely acknowledged student contributions, and often elicited them. But he did not extend the conversation by exploring student thinking further. Student contributions were limited to providing a correct or expected answer but did not become topics for extended inquiry.

Responded and extended: In a similar lesson, the teacher asks students to recall what they started on yesterday. Several students say aloud that they were doing hundreds, tens, and ones. He asks them to explain what that means. One student offers an explanation, and he asks another student to help clarify. The teacher follows up with the class to see if anyone else has an explanation. A few hands go up, and he pulls out some Unifix cubes to help illustrate. He then wants the students to go work with manipulatives to decompose a three-digit number. As they work, the teacher circulates and asks them to explain what they are doing. He doesn't correct anyone but notes misconceptions. Pulling the group back together, he has different groups share what they did. As they talk, he asks for clarifications, revoices phrases or concepts so the class can hear, and invites the class to ask them questions.

STUDENT ERRORS

> *Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.*
>
> - National Council of Teachers of Mathematics (2014).
>
> *When a teacher is able to have their students practice critiquing the reasoning of others and creating viable arguments by analyzing errors in mathematics, the students not only are able to meet the Standard of Mathematical Practice but are also creating a lifelong skill of analyzing the effectiveness of plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is.*
>
> - Rushton (2018)

CODING Student Errors:



- How teachers address student mathematical errors is a particular kind of teacher responsive practice.
- Listen for whether the teacher's goal is to correct errors or use them as jumping-off points to promote understanding.

Student Errors Examples:

Ignored the error: You are observing Kindergarten math centers, and the teacher is rotating around the room to check on different students. You are close to a center in which students are counting a large collection of shells. The teacher comes over to check on them. They are using a strategy to break the collection into groups of ten shells, so they are easier to keep track of, and count later. However, you notice that several stacks clearly have more than ten shells, and other stacks fewer than ten. The shells are different sizes and shapes, which could be contributing to the miscounts. The teacher stops by and asks them what they are doing, and they explain. The teacher neither mentions the error or tries to help students think through it in the moment, nor does she return to it with the whole group later in the lesson.

Corrected the error: In a similar observation, the teacher comes over to the students counting shells but mentions they should check their work. She stays with them for a few moments while they recount the groups of shells that are identified as errors. They add or take away shells to make groups of ten, as needed. The teacher reminds them to count carefully and make sure they only have ten in each group.

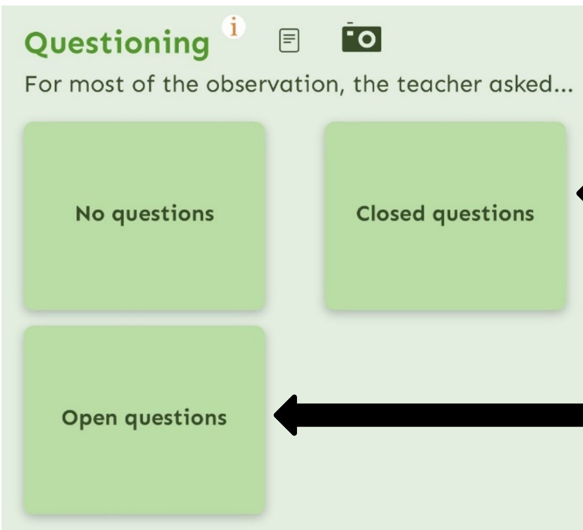
Explored why the error happened: In a similar observation, the teacher notices the student errors in making groups of ten. She asks them about their process, and they show her how they are making piles that look about the same size, though aren't counting carefully for each pile. This is causing errors because the shells are of slightly different sizes. The teacher prompts the students to notice that their count is off, and the teacher has them think about why that might be the case. They reflect on the differences between size and count and strategies for counting more carefully.

QUESTIONING

Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.

- National Council of Teachers of Mathematics (2014)

CODING Questioning:



"Closed Questions" have well-defined answers that can be interpreted as correct or incorrect. The animals may be provided as multiple-choice options, be the solution to a problem with only one right answer, or the answer may be either yes or no

"Open Questions" do not have well-defined answers that can be simply judged to be correct or incorrect. They may elicit multiple possible solution strategies or have multiple possible answers.

"Questions" should relate to mathematical inquiry.

<u>Questioning Examples:</u>

<u>No questions:</u> The teacher launches the lesson telling the students that they will be collecting data and keeping tallies in their journal. He gives each group a category of clothing to collect information about: pockets, shoes, glasses, etc. Students are released to talk with their classmates and collect the data. While they are moving around, the teacher remains at his desk, calling out behavioral reminders, and catching up with grading. After 30 minutes or so, he starts drawing a graph on the board, and then calls the class together. He calls out a representative from each group to come to the board and graph the number of items they found. As the last group is finishing, he points out that the pocket group had the most. Then the class is dismissed.

<u>Closed questions:</u> In a similar lesson, while students are collecting data, the teacher rotates and checks on their counts. You hear him asking questions like, "How many?" "Did you write down your count?" and "What is this number?" Then, after students finish graphing their answers on the board, he asks the group, "Who can tell us, which has more: pockets or glasses?" "How many fewer sweaters were there than t-shirts?" After answering those particular questions, he ends the lesson. Another example would be students completing a worksheet asking them to solve practice problems with one right answer, and the teacher asking, "What is the answer to question 2?" or "What is 2 plus 3 equal to?"

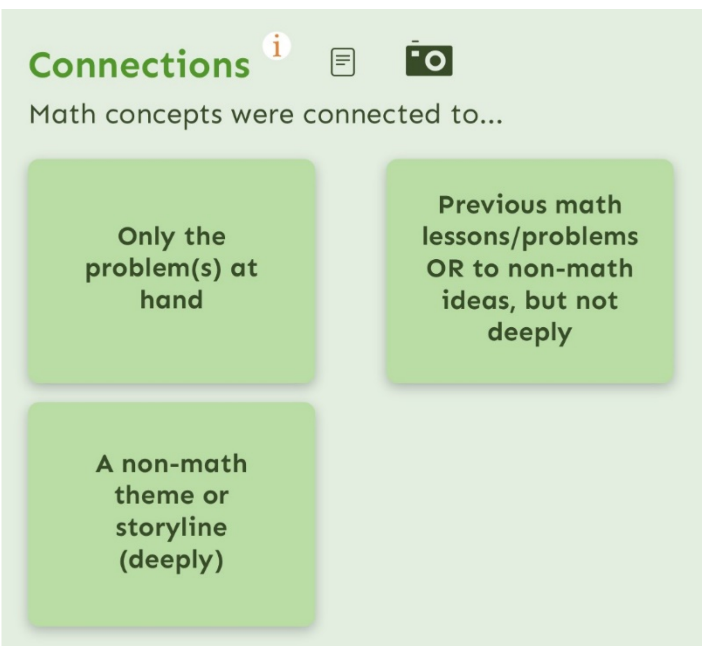
Open questions: In a similar lesson, the teacher circulates, and you hear questions like, "How are you keeping track?" "What's your group's strategy?" He learns that one group is dividing up all the members to go around and collect data on different students, and then they add them altogether. During the debrief, after students have graphed on the board, he asks, "What do you notice about the graph?" and "Can you think of reasons why we counted having the most shoes and the least hair ties?" The teacher finishes the lesson by asking whether they found any surprises in the data and why they were surprised.

CONNECTIONS

Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.

-National Council of Teachers of Mathematics (2014)

CODING Connections:



- Superficial connections are common in word problems (e.g., Janie has 3 balloons and Jason has 3. How many balloons do they have in all?). These connections may be tied to things outside math class (i.e., balloons), but not in ways that change one's understanding of the problem.
- A common explicit verbal connection occurs when teachers remind students of what they did earlier in the week or in the school year. While this practice may be an important way to prime students for learning, it still localizes math learning within math class and school.
- Math doesn't have to be only situated in school. Some teachers find ways to take advantage of student interests or knowledge about other subjects to introduce math concepts. For instance, it is common in Pre-K to see math embedded in storybooks. In older grades, some lessons offer opportunities for students to collect and compare data about their peers.

Connections Examples:

Only the problem at hand: The teacher leads a 2nd grade class through a series of algorithms in the curricular workbook, solving three-step addition and subtraction equations.

Math concepts were connected to previous math lessons/problems OR to non-math ideas, but not deeply: The teacher reminds the students of strategies they used before to solve two-digit addition and subtraction equations. Today's problems are word problems that require students to add and subtract in three steps. Each problem is a different scenario, but the features are interchangeable and do not particularly affect how students solve the problem. For instance, the first problem is about dogs in the park coming and going; the second is about spending money; and so on.

Math concepts were connected to a non-math theme or storyline (deeply): The problem to solve involves students having to find out the shortest route for them to get from the school to a location in their community. Using rulers and other tools, students make measurements on a map, and must add up different distances, then compare the different routes to find the shortest one.

Differentiation

This Domain is focused on how the teacher adjusts instruction and tasks to ensure continual growth for all students by meeting the needs of each student.

In an effectively differentiated classroom, teachers believe that they must:

- Get to know each student's mathematical understandings in order to teach them more effectively.
- Use what they know about each child's understandings to plan next steps.
- Continually map the progress of students against essential, standards-related outcomes.
- Adjust difficulty levels and find alternate paths of learning to ensure continual growth of each student.

- *adapted from Tomlinson & McTighe (2021)*

A focus on children's thinking can provide a starting point for creating classroom spaces where varied ways of knowing and participating can emerge.

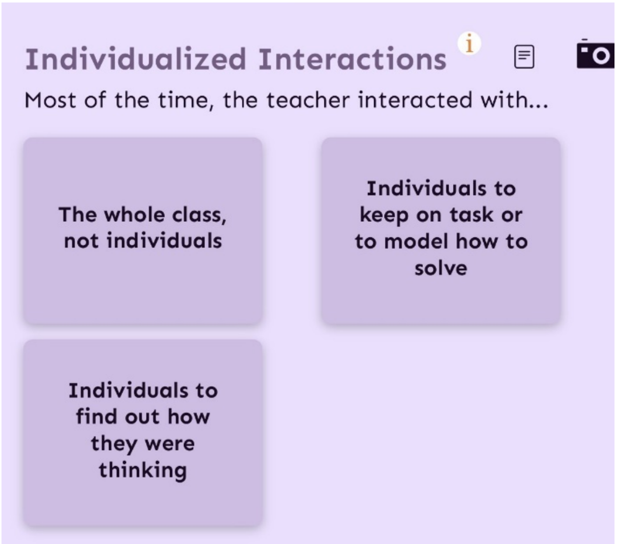
- Carpenter et al. (2017)

INDIVIDUALIZED INTERACTIONS

Teachers build trust through an accumulation of small, positive exchanges with individual students. Trust develops as students become aware that what goes on in the classroom supports their success individually and as a group.

- Tomlinson (2008)

CODING Individualized Interactions



- Checking in with individual students can provide teachers with valuable information about how each is understanding the math concepts.
- In whole group time, you might see teachers having individual students share their strategies with the class. During small group or individual time, you might see the teacher circulating to ask students' questions about how or why or to show they how they solved the problem.
- It is common for teachers to circulate while students complete the task, but often it is to keep students on task or show them how to complete correctly. Listen for whether teachers are using this time to push for completion or are engaging in a conversation that will reveal what their students understand.

Individualized Interactions Examples:

The teacher primarily interacts with…

The whole class, not individuals: A first grade teacher demonstrates measuring familiar objects using small tiles. She occasionally asks questions like, "so how long is the pencil?" These questions get a chorus of responses from the class. The teacher revoices when she hears the right answer. Students break into groups to measure more items. The teacher walks around continuing to talk to the class, reminding them to measure from the edge and to count carefully.

Individuals to keep students on task or model how to solve a problem: A first grade teacher demonstrates measuring familiar objects using small tiles. She asks different students to provide the answer. Students break into groups to measure more items. The teacher walks around and stops in with different groups who seem to be having issues. She prompts different students to remember the instructions, and in several instances, she models for a couple students with their tiles.

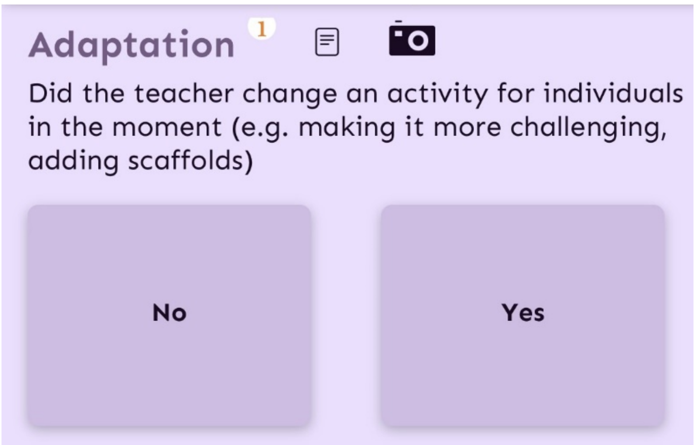
Individuals to find out how they were thinking: A first grade teacher demonstrates measuring familiar objects using small tiles. She has a student come up and model for the class. As students go into groups to measure, she walks around asking students to show what they are doing and explain their answers. She notices a group that is arguing about the length of a shoe, because the children are measuring different size shoes. Calling the class together, she has the two students come up and explain what their disagreement was. She calls on different students to share what they notice, regularly responding and asking follow-up questions. The two students ultimately explain how they realized both measurements were correct.

ADAPTATION

Armed with assessment information and other knowledge about a student—the teacher should adapt teaching plans to attend to learner readiness, interest, and preferred modes of learning.

- Tomlinson (2008)

CODING Adaptation:



- These are in-the-moment changes to the task that the teacher makes because they see students already understand or are having too much difficulty

Adaptation Examples:

Yes: A Pre-K center has students using blocks to create a building and then draw a picture of their building to show the spatial relationships. The teacher sees the students are completing this quickly, so he asks students to create a structure with a specified number of blocks and adds a constraint to the construction (e.g., create the tallest building with only 10 blocks).

Yes: A Kindergarten student is attempting to count the total number of items in a collection but is having trouble keeping track of the count. The teacher brings over some ten frames, so that the student can place one item in each square to make it easier to keep track of. Later the teacher will ask the student to count without the ten frames after they have further developed this skill.

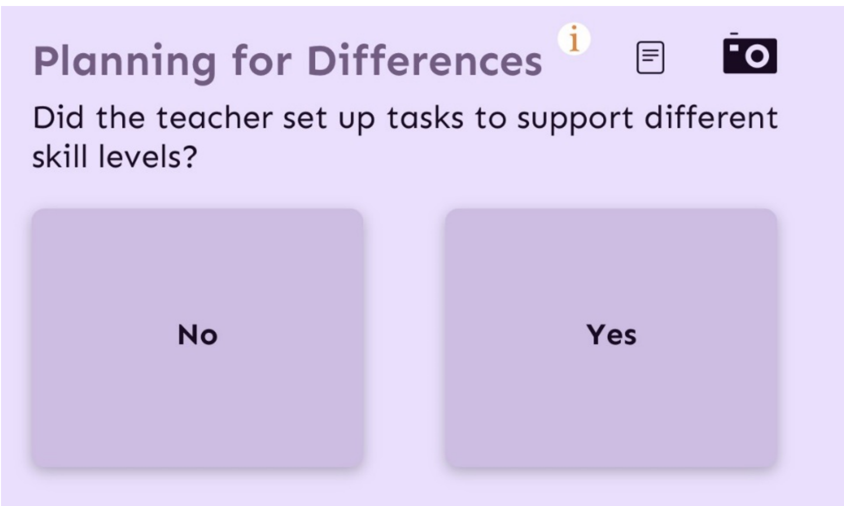
Yes: A class of first graders is having trouble picking out relevant information from a word problem. The teacher notices this as she walks around while students are solving independently, so she decides to pull the class back together. She takes time to have a conversation with the class about what the person in the problem is doing and in which order they are doing things. She takes up thinking from students to help clarify the problem and what the goals of the person in the problem are. When students return to work independently, the teacher gives them a variety of tools to choose from to help visualize their thinking.

PLANNING for DIFFERENCES

Teachers in differentiated classrooms create fit by using small-group instruction, reading partners, text at varied reading levels, personalized rubrics, mini workshops, learning contracts, product and task options with common learning goals, independent studies, varied homework assignments, and a host of other strategies—not for the sake of using them, but to make learning work for each student.

- Tomlinson (2008)

CODING Planning for Differences:



- These are not in-the-moment adaptations to the task, but bigger structural supports that may have required some pre-planning.
- Some examples include: visual representations to give access to dual language learners; roles for different students in groups; charts with sentence stems to help guide discussions; tasks that demand different levels of proficiency; planned pull-outs for certain students to join the teacher in a small group.

Planning for Differences Examples:

Yes: In a Pre-K classroom, during center time the teacher pulls 4 students to work with her at a center. These students are still learning English, and she uses Spanish and English to speak with these students.

Yes: In a Kindergarten classroom, you see the teacher has setup small groups to solve a problem. Each student has a different role in the group. For instance, one student is the “note taker” in charge of drawing their strategy on their posterboard. Another student oversees laying out manipulatives. Another will be the one to share their group’s work with the whole group.

Rigor

This Domain is focused on the math tasks observed across these three aspects: procedural skills and fluency, conceptual understanding, and application. This observation app does not rank one of these aspects higher than the others in terms of importance and allows observers to examine how these different aspects are covered in teachers' classrooms over time.

Rigor refers to deep, authentic command of mathematical concepts, not making math harder or introducing topics at earlier grades. To help students meet the standards, educators need to pursue, with equal intensity, three aspects of rigor: conceptual understanding, procedural skills and fluency, and application.

- adapted from Common Core: Key Shifts in Mathematics

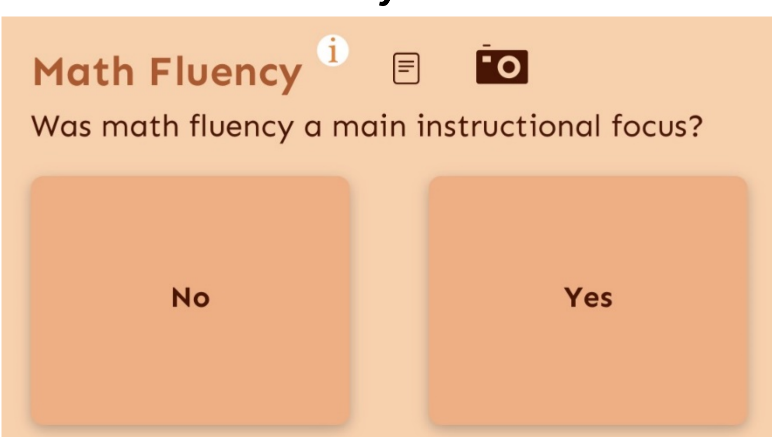
Children's conceptual and procedural knowledge develop iteratively. Rather than development of one type of knowledge strictly preceding development of the other, conceptual and procedural knowledge appear to develop in a hand-over-hand process. Gains in one type of knowledge support increases in the other type, which in turn support increases in the first.

-Rittle-Johnson et al. (2001)

MATH FLUENCY

This includes reproducing math facts, recalling quickly (e.g., sequential counting), and using precise vocabulary.

CODING Math Fluency:



- "Fluency" lessons often focus on reproducing math facts, recalling quickly (e.g., sequential counting), or using precise mathematical vocabulary
- Fluency may be common in most math lessons, but only choose "Yes" to indicate that it was a main focus of the lesson – not just embedded within.

Math Fluency Examples:

Yes: A Pre-K lesson about shape identification involves students shouting out shape names to the teacher when he points to them. Then, students complete a simple worksheet requiring them to circle all of the triangles.

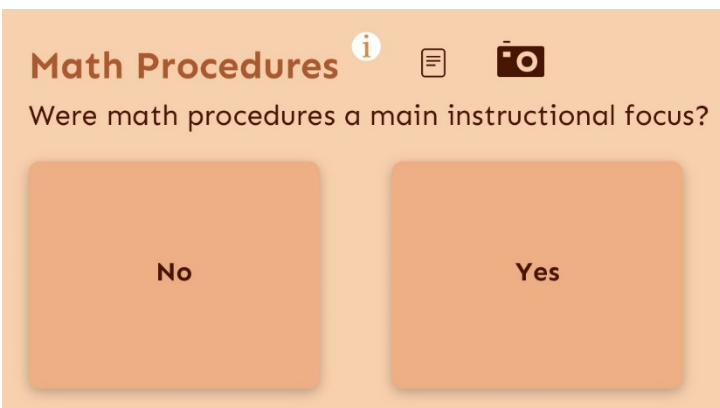
Yes: A Kindergarten lesson opens with students rote counting by tens with the teacher, up to 100. Then, she has them identify the symbols for addition and subtraction on the board.

Yes: A second grade lesson requires students to solve addition and subtraction problems by choosing the strategy that will help them answer the fastest.

MATH PROCEDURES

This includes describing steps to solve a problem, getting correct answers, or using math materials a specific way.

CODING Math Procedures:



- Lessons focused on “Math Procedures” might include describing steps to solve a problem, working to get correct answers, or using math materials in a certain way.

Math Procedures Examples

Yes: A Kindergarten lesson opens with the teacher modeling combining sets using 3 boys and 2 girls to act out the problem. Then, she models a similar problem with ten frames and red and yellow chips. Then students must solve similar problems with a variety of materials.

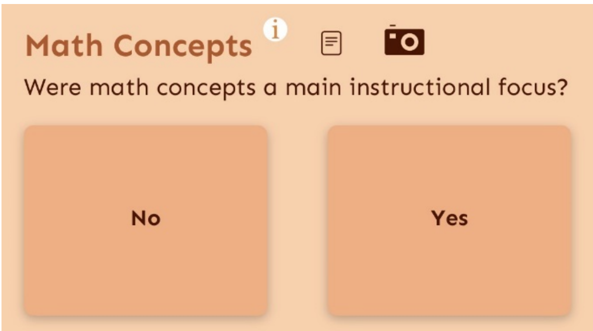
Yes: A first grade teacher shows the class a word problem. She asks them who the problem is about and shows them how to determine what the problem is asking. They write an addition problem and then solve it. Students work in pairs to complete similar problems, following the same steps that the teacher modeled. Then, the teacher has them come to the board and demonstrate the steps they followed to solve it.

Yes: A second grade teacher assigns students to measure pairs of objects and write down how much longer one item is than the other, using a ruler. He calls on pairs to share their answers and the steps they used to solve the problem.

MATH CONCEPTS

This includes an implicit or explicit understanding of math principles and why a strategy works.

CODING Math Concepts:



- Lessons focused on “Math Concepts” might involve figuring out or explaining why a strategy works or not, students explaining math principles, or students explaining their thinking.
- Mark “Yes” if these practices were a main focus of the lesson. It’s not uncommon for teachers to occasionally throw in these practices to an otherwise procedural lesson. Only mark “Yes” if these are the “main course” of the lesson, not just the ”dessert.”

Math Concepts Examples:

Yes: A Pre-K center involves making a pattern with shape blocks. The teacher comes around and asks the students if they can extend the pattern. After students correctly extend the pattern, the teacher asks them to create the same pattern using counting bears instead (i.e., a different material). She asks the students what a pattern is and asks them to describe their pattern (e.g., same, same, different, same, same, different).

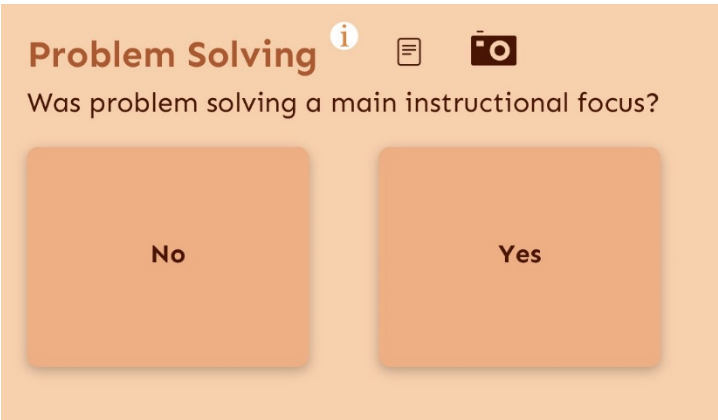
Yes: A Kindergarten lesson opens with the teacher telling students a story about dogs coming and leaving a dog park. How many were left? The teacher asks students to explain how they might solve the problem, and what strategies they might use. Students share different strategies or ways of representing the problem, and then solve it. Then they go off and solve and represent similar word problems using one of the strategies named. The teacher calls them back together and asks a group to share with the class and explain why their strategy worked.

Yes: A second grade lesson requires students to find the missing addend in an equation using a hundreds chart. Students are called up to the board to model jumping forward and backward on the chart. They are asked questions by the teacher about how they knew to go certain directions on the line and how it related back to the addition problem.

PROBLEM SOLVING

This includes changing strategies when a problem feature changes and generating problem solutions without previously worked out examples.

CODING Problem Solving:



- Lessons focused on “Problem Solving” will require students to generate problem solutions without previously worked out examples. A teacher might change a problem feature partway through, requiring students to adjust their strategies.
- “Problem Solving” doesn’t necessarily mean doing word problems. Many word problems are just opportunities for students to practice procedures with different numbers plugged in

Problem Solving Examples:

Yes: Pre-K students are asked to build a castle that has stairs, 2 towers, and 2 doors with blocks. The castle can look like anything they like as long as it contains those features. They must work together to figure out how to include all those features in their castle.

Yes: A Kindergarten class is shown a jar of marbles and asked how many they thought were inside. Then she shows them a jar of pennies and asks the same question. Then she asks which jar they think has more and how they could find out. Small groups discuss and share their strategies. The class thinks about which strategies seemed more or less effective. They choose a strategy to count and compare the jars of marbles and pennies that the teacher introduced at the beginning of class.

Yes: A second grade class is given a word problem which involves a kid buying 3 packs of gum, each with 5 sticks inside. They are asked to use different strategies to determine how many sticks of gum the kid bought all together. The teacher calls on various students to explain their strategies.

Engagement

The Engagement rating is based on student behavior across the observation. It is focused on student engagement in learning not on compliance. Students can be wiggly but actively interested in what is being taught or they can be quietly compliant with no evident interest in the lesson. At the end of the observation, you will have an overall picture of how involved students were in learning across the entire lesson and during each activity phase. The rating anchors derive from the Advanced Narrative Record (Farran et al., 2015).

Regardless of which Domain you are focused on, the app will prompt you to rate the learning engagement of the class every 3 minutes, on a 1 (lowest) to 5 scale. Engagement for this tool is defined as children's engagement in instructional activities and is coded at the whole class level.

Coding engagement of the class as a whole during an episode has two components: a) how many of the children are actively involved during the episode; b) for how much of the episode are children involved, or a combination of the two. If about half of the children seem to be engaged in the activity but a few are clearly not interested, even if they are not disruptive, you would code a Medium. If the balance shifts toward more children being less engaged, you would code Medium Low or lower. On the other hand, across the episode, children's interest may wax and wane. For instance, children might be interested in the activity when it first begins but then lose interest as the activity goes on. Depending on how much of the activity engaged children's interest, you would code up or down from Medium.

RATING ANCHORS

1- Low: *No instruction occurring (transition)* OR if instruction is occurring, children exhibit the following behaviors:
Students are not interested
Lack of attention to teacher or materials
Sitting quietly when participation is elicited
Fiddling with object, clothes, or other children
Eyes not focused

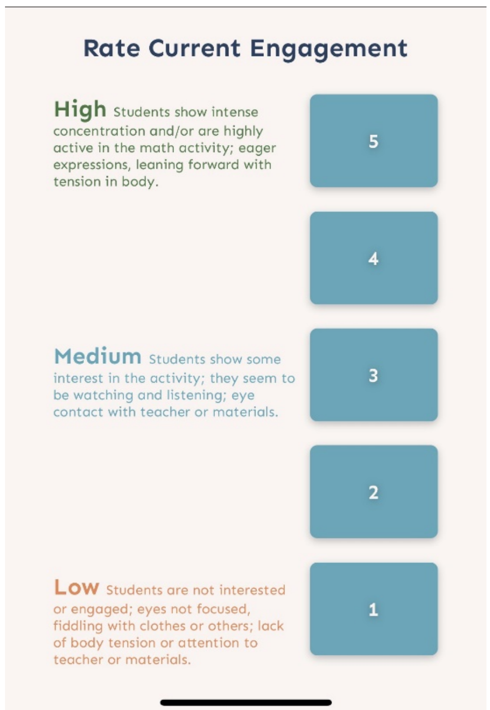
2-Medium Low
Students show lack of interest, distracted
Inconsistent attention
Flat affect
Looking bored
Lack of persistence
Most students are doing task asked to do but doing it half-heartedly

3-Medium
Students show some but not intense interest in the activity, they seem to be listening and watching
Mostly on-task
Mostly making eye contact with teacher or materials
Participating in activity but not intensely
Interest can wane but comes back to task

4-Medium High
Students are consistently interested
Volunteering, responding, and active with the materials or activity
Eager expressions, Positive affect
Persistence
Talking about the task

5-High
Students show intense concentration and/or are highly active in the math activity; eager expressions, leaning forward with tension in body.

CODING Engagement:



ACTIVITY PHASES

Before you rate Student Engagement, the app will ask you to select the Activity Phase of the lesson. Choose the Phase that best describes which portion of the lesson you are observing. The app will average the Engagement ratings for each Phase. At the end of the observation, you will have an overall picture of which parts of the lesson the class appeared most or least engaged. For example, you might notice that students were highly engaged during the main task but less engaged during the wrap-up.

The Activity Phase options are:

Intro Activity – Some teachers do a warmup activity to transition to math such as a song or review exercise. Others might start their lesson off with a “math talk” or calendar discussion. Use this category for any of these types of warmup activities

Main Task Setup – Usually, the teacher will explain the main learning or talk objective of the lesson and/or introduce a new concept. Use this category for rating student engagement during the task setup.

Main Task – This is the main activity of the lesson, whether done individually, in small groups, or in whole group. There may be multiple main tasks that don’t fit into any of the other Activity Phase categories.

Share and Discuss – This is usually a whole group review of the Main Task where students share what or how they completed the task. Some teachers may implement multiple Share and Discuss phases throughout the lesson.

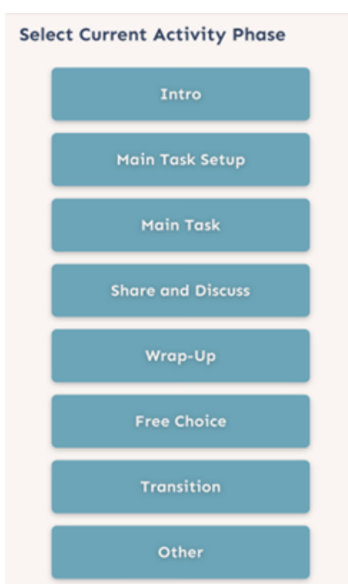
Wrap-Up – This is at the end of class where the teacher ties everything together. Maybe they refer back to the main objective. Other teachers provide exit tickets for students to complete before leaving class. The Wrap-Up is usually related to the Main Task and may connect to the Main Task the following day.

Free Choice – Use this category when 75% of the class has moved on to free choice activities. In some classrooms, this may be called Center time. In others, this may be time after students finish the Main Task early.

Transition – Use this for any transition time between activities. It may or may not be math-related (for instance, if the lesson is interrupted for some students to leave for Specials).

Other – If the activity does not fit into any of the above categories, use “Other.” Examples might include students working on self-paced computer activities.

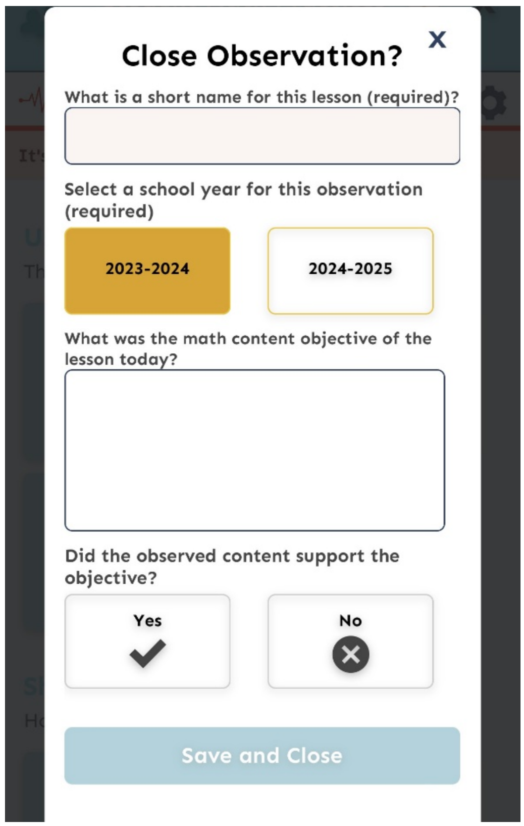
CODING Activity Phases:



Math Content

When you finish an observation, you will be asked to provide some context about the math content (e.g., counting up to 10, recognizing shapes, single digit subtraction, etc.) and lesson objective. This is primarily intended as a way to remember the context of the lesson after it's over. Some users may also want information about whether the objective was clear to students, and whether the math content lines up with the scope and sequence of the curriculum.

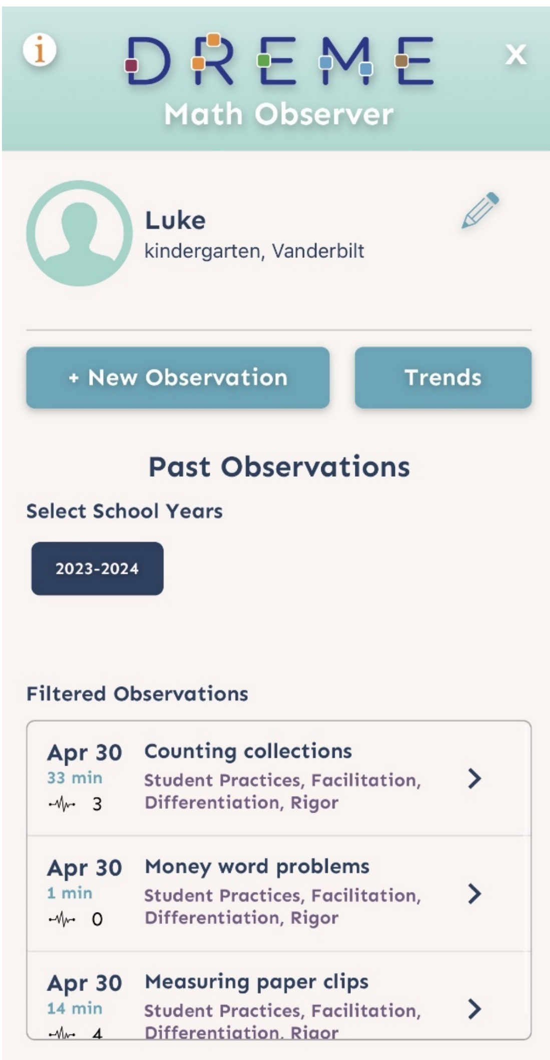
CODING Math Content:



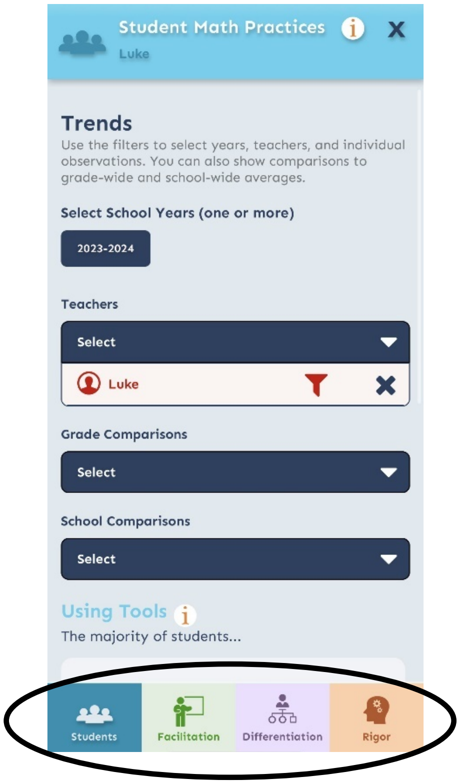
Summary and Trends

The summary section is intended to be a quick reference for both the observer and the teacher. It shows each of the items the observer checked, the average engagement of the class, and notes boxes where the observer can write down what they discussed in their post-observation discussion, and possible next steps the teacher agreed to take. When you click on a teacher's name, you can see all their past observations in a list, as shown below. You can also see the domains that you focused on each time.

The trends section shows data from past observations and allows for comparison of data across teachers, grades, and schools. Tap the Trends button to navigate to this section.

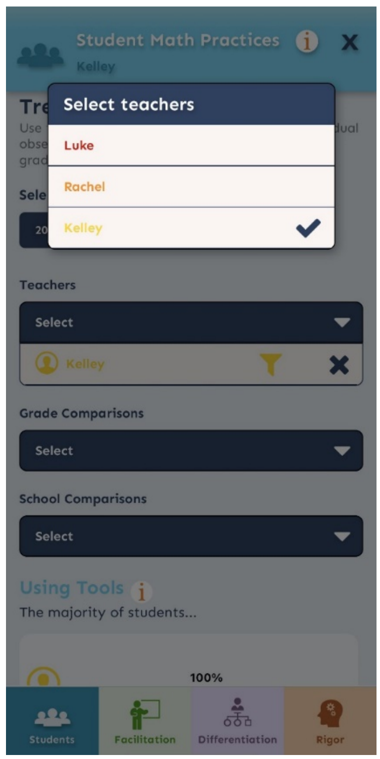


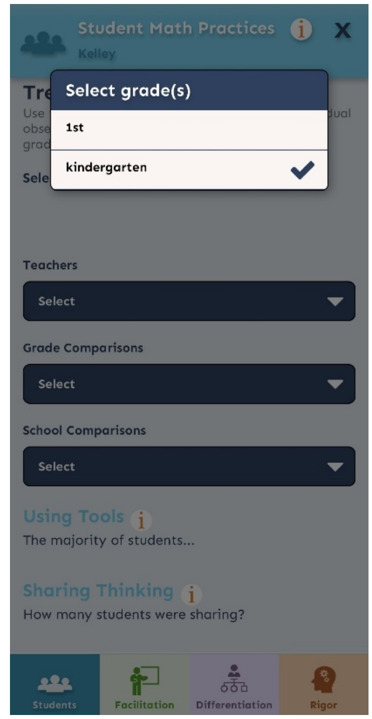
Tap on Trends to get information about past observations for one teacher or comparisons between different teachers and schools.

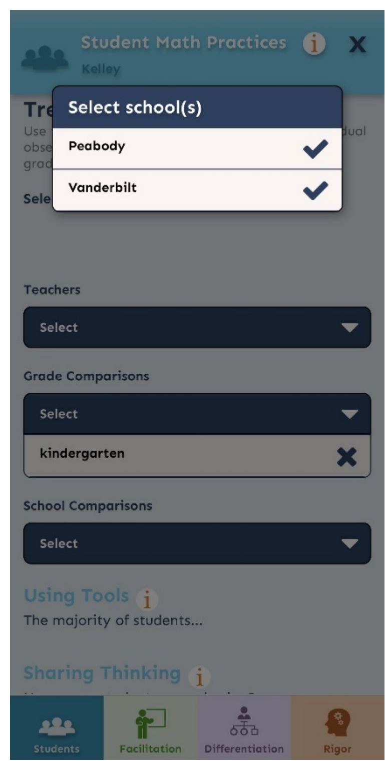


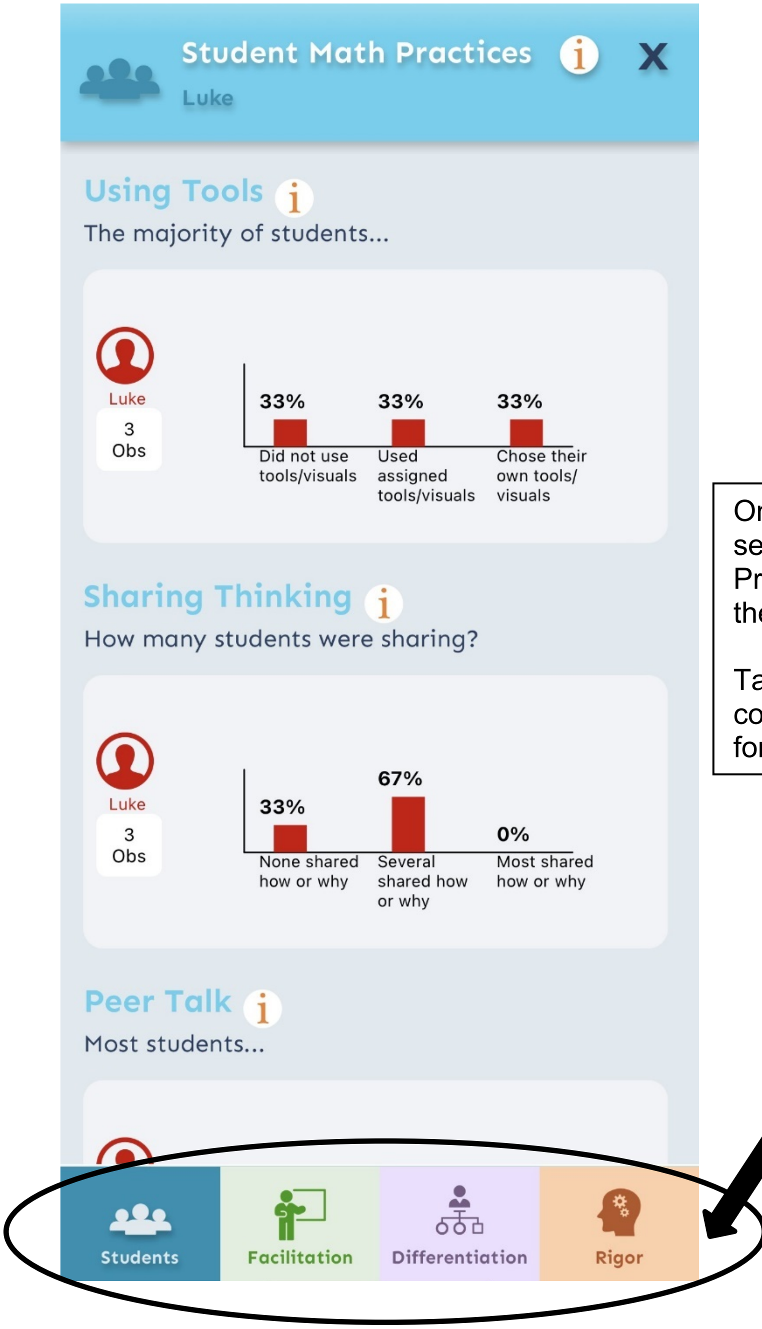
Click on each of the domains to get corresponding trend information

When you open the Trends section, you'll be able to select which teachers, grades, and schools you want information on by tapping on the down arrow on each box. You can select more than one teacher, grade or school at once to compile and compare information about multiple observations.



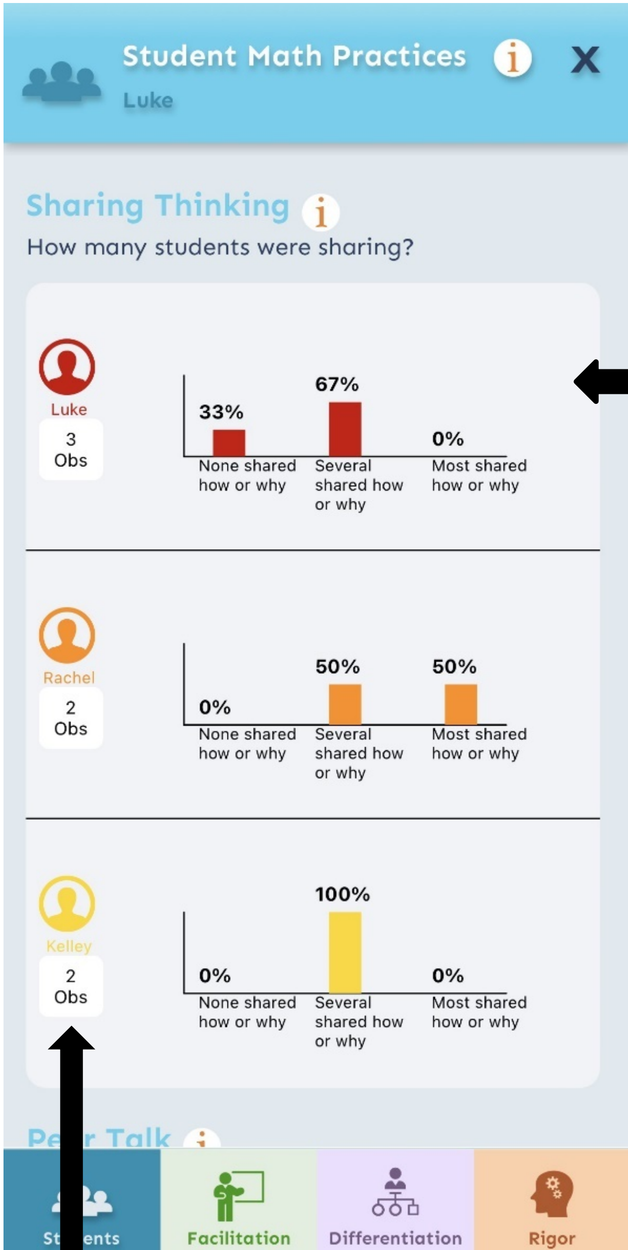






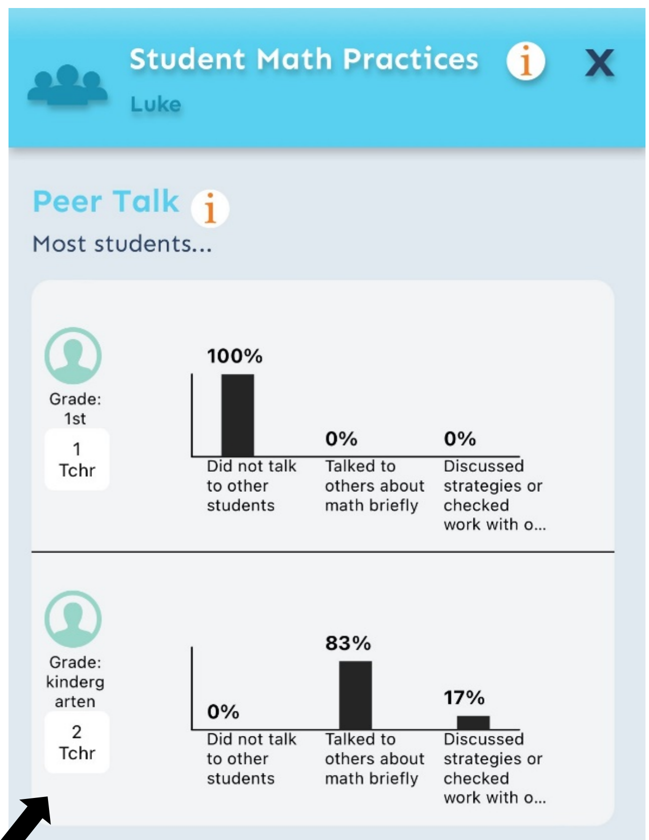
Once you select a teacher in the Trends section, you can see all of the Student Math Practices information compiled across all of the observations done for that teacher.

Tap the domains across the bottom to see compiled information across all observations for Facilitation, Differentiation, and Rigor



If you select multiple teachers, you can compare trends of all selected teachers

You can also compare data aggregated at grade or school levels.



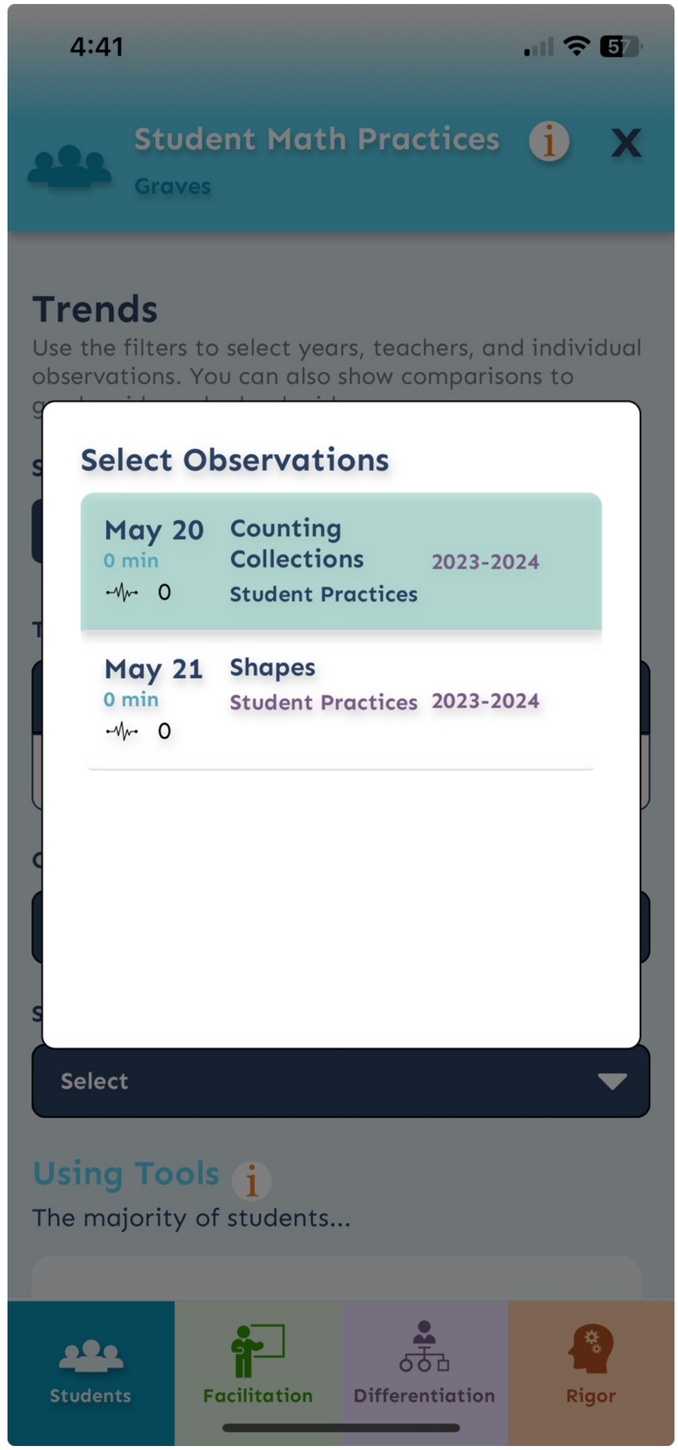
Interpreting the data: Note that the denominator is different for teachers and at the group levels.

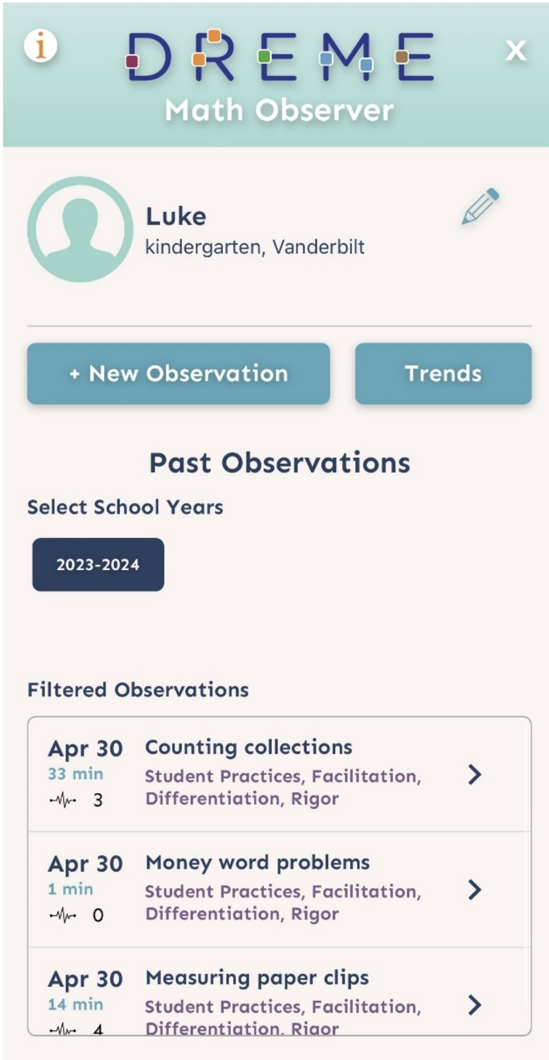
For a given teacher, the trends will generate based on the total observations for that teacher.

For grade or school, the trends will generate based on teacher averages for each group.

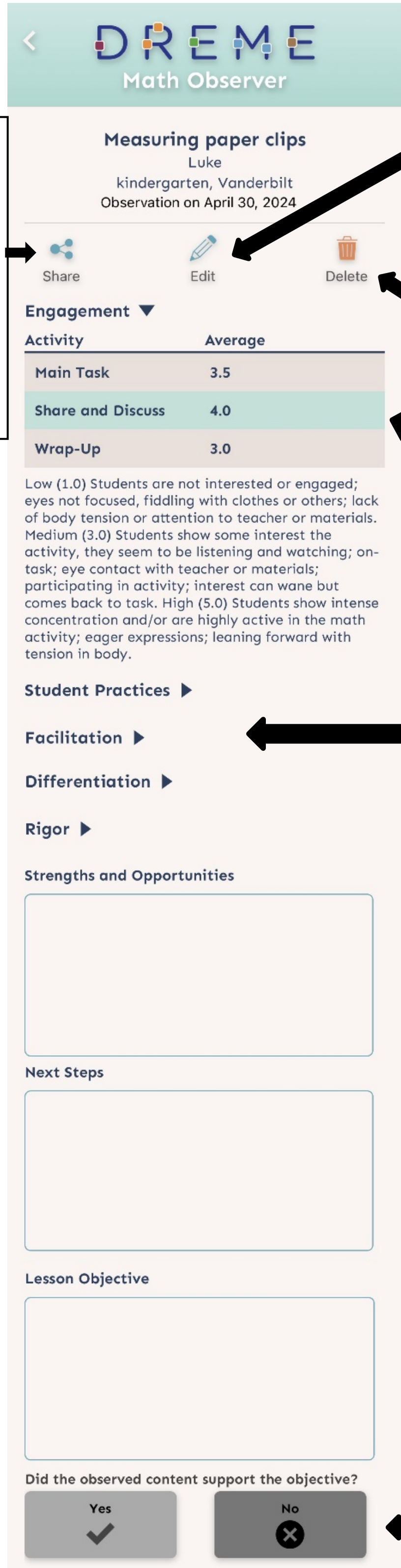
For any teacher, you can filter out the lessons that you want to include in your trends.

For example, you may only want to compare lessons focused on Counting Collections.





To view a more detailed summary of a particular observation, tap on it in this list



Tap the "Share" button to email a pdf summary of your observation to the teacher. Wait to share until you have reviewed the observation and debriefed with the teacher

Tap on the "Edit button to edit your observation

Tap on the "Delete" button to delete your observation

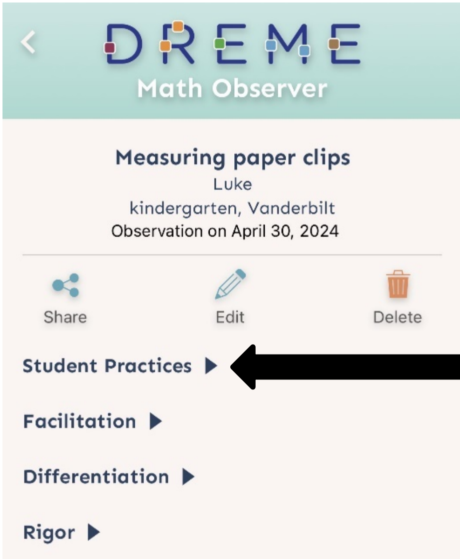
This section shows the average student engagement for each activity type

Tap on each domain to see the items you selected

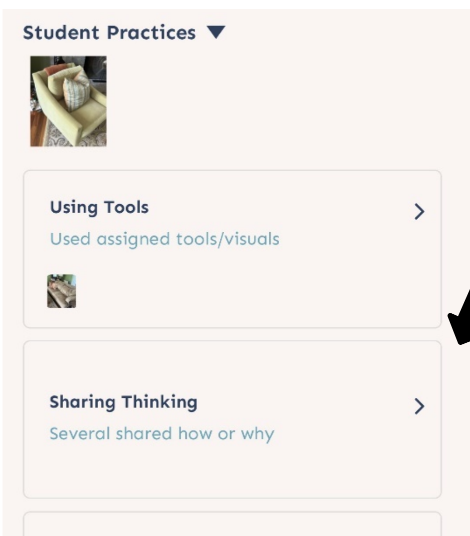
After coach and teacher meet to talk about the results, they can write down what they discussed in their post-observation discussion, and possible next steps the teacher agreed to take.

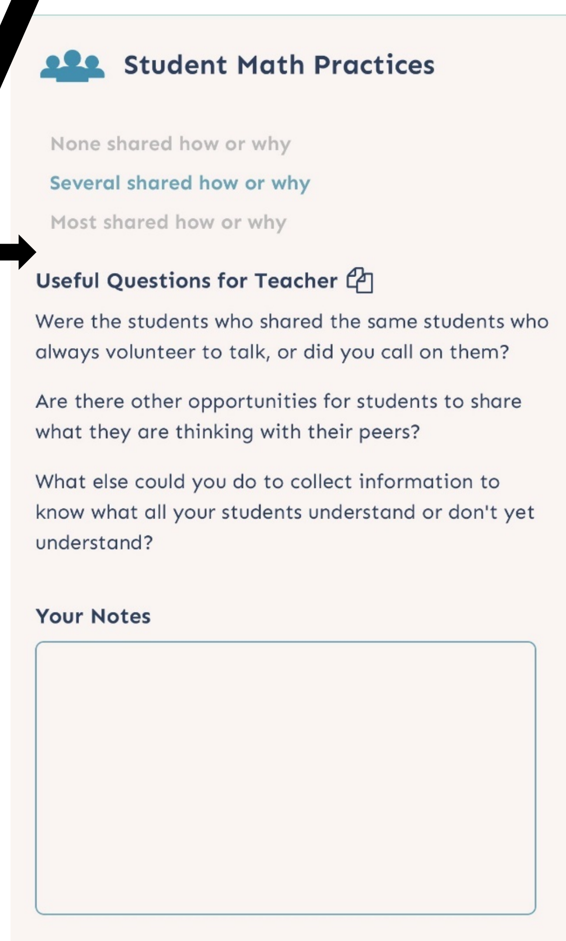
These notes will be shown on the pdf that you can email to teachers.

Mark Yes or No for content supporting the objective



Once you tap on one of the domains, any pictures taken will appear, as well as the question. Click on each question to see what responses were selected, questions you can ask teachers during debriefing, and notes you took during the observation.





Each item summary section, you can see all practices including the selected one.

Each Domain Summary generates questions to coaches based on the items selected in that day's observation. See pp. 38-43 for all of the suggested questions.

Question Prompts for Each App Domain

To help support practitioners use this tool when having formative conversations with teachers about their practice, we have provided a set of questions and prompts that will automatically show up at the end of the observation based on the items the observer selected. These questions are meant to support the conversation that could occur and can be used as a starting point. They are not meant to be evaluative or an exhaustive list of how the observations can spark conversations about practice.

Table of the Suggested Questions for Each Domain:

Student Practices

Rating Question	User Response	Suggested Questions
Using Tools	Did not use tools/visuals	1) Were you able to assess student understanding without students using mathematical tools? 2) Are there any tools or visuals that would be helpful for struggling students?
Using Tools	Used assigned tools/visuals	1)How did students use tools to approach the problem(s)? 2)How did using the tools help students better understand the math concept? 3)Did the tools that students were assigned to use help you better understand their thinking? Why or why not?
Using Tools	Chose their own tools/visuals	1)How did students use the tools they chose to approach the problem(s)? 2)Which tools were chosen most frequently? 3)Are there any different tools that you could introduce to support struggling students?
Sharing Thinking	None shared how or why	1) How were you checking whether students understood the concept today? 2) Are there ways for students to share what they're learning with their peers in future lessons? 3)Are there ways to help students who have a hard time expressing themselves?
Sharing Thinking	Several shared how or why	1)Were the students who shared the same students who always volunteer to talk, or did you call on them? 2)Are there other opportunities for students to share what they are thinking with their peers? 3)What else could you do to collect information to know what all your students understand or don't yet understand?
Sharing Thinking	Most shared how or why	1) Were many students sharing how or why, or was it the same few students? 2) How did you encourage students to listen when their peers shared? 3) How could you continue to make all students feel supported to share how or why with the class?
Peer Talk	Did not talk to other students	1) How much do you expect students to work on their own in math class and how much do you expect them to work with each other? 2) What are some ways you could support student-student discussion?

Rating Question	User Response	Suggested Questions
Peer Talk	Talked to others about math briefly	1)What are some clear guidelines about how students should talk with each other about math for your students? 2)What are some ways you can support student-student discussion? 3)What were opportunities for students to discuss things with each other in this lesson?
Peer Talk	Discussed strategies or checked work with other students	1)Was student-student talk all guided by the teacher, or were students discussing on their own? 2)Were the conversations productive? Why or why not? 3)Were there students who might need more support to have these kinds of conversations in the future? How could you help them?
Strategies	Followed teacher procedures	1)How was student work in determining whether students understood the concept? 2)What were the opportunities in this lesson for students to make connections between the day's task and previous tasks you've had them work on?
Strategies	Chose their own solution strategies	1)Were the strategies students chose helpful in understanding their thinking? Why or why not? 2)How did the strategies students chose reveal misconceptions they had about the concept?

Teacher Facilitation

Rating Question	User Response	Suggested Questions
Responsiveness	Did not respond	1)How do you get information about how your students are thinking? 2)How do you know which of your students have misconceptions about the task at hand? 3)Are you modeling for students how to listen and learn from their peers? How or how could you do this if not?
Responsiveness	Responded but did not extend	1)How do you get information about how students got the answers they shared? 2)Are there opportunities in your class to use student thinking as a jumping-off point for a conversation? What could that look like in this lesson?
Responsiveness	Responded and extended	1)Are there students who you respond to more than others? Why? 2)How can you start conversations with students who are less talkative?
Student Errors	N/A (No errors)	1)How do you collect information about student misconceptions during your math class? 2)Are there ways to build in learning opportunities that address student misconceptions? What could that look like in this lesson?
Student Errors	Ignored the error	1)How do you collection information about student misconceptions during your math class? How can you go beyond looking for students who got the right answer? 2)Are there ways to build in learning opportunities for the whole class around common misconceptions?

Rating Question	User Response	Suggested Questions
Student Errors	Corrected the error	1)How do you collect information about student misconceptions during your math class? How can you go beyond looking for students who go the right answer? 2)Are there ways to build in learning opportunities for the whole class around common misconceptions?
Student Errors	Explored why the error happened	1)How can you explore student incorrect responses with individual students and with the whole class? 2)Are there ways to make common misconceptions a central part of your lesson?
Questioning	No Questions	1)How do you find out what students know during your math lessons? 2)Are there ways in which you can start a discussion with your students? How?
Questioning	Closed Questions	1)How are you able to find out how or why students arrived at their particular answers? 2)Are there ways to make student thinking and student strategies a more central part of the lesson? How?
Questioning	Open Questions	1)Are you providing sufficient time for all students to consider your questions before answering? 2)How can you model how students should answer open-ended questions, so that all students can participate?
Connections	Only the problem(s) at hand	1)How can you make math more engaging by connecting concepts to life outside of the classroom? 2)How could your students connect today's task with the task from a previous lesson? 3)How could you highlight how today's objective might relate to something students learned earlier in the year?
Connections	Previous math lessons/problems OR to non-math ideas, but not deeply	1)Are the "real-world" connections in your class deeply connected to how students might solve the problem, or are they just "decoration" (e.g., a word problem centered around data they've collected about their favorite bugs vs. around hot air balloons that are not part of students' daily lives)? 2)How can you embed math tasks in real problems to solve in students' lives outside of the classroom?
Connections	A non-math theme or storyline (deeply)	1)How are you connecting math concepts to things that are relevant to your students? 2)How do you facilitate multiple ways for students to connect to problem solving in your class?

Differentiation

Rating Question	User Response	Suggested Questions
Individualized Interactions	The whole class, not individuals	1)How are you able to determine what students are learning during math lessons? 2)What are some ways to collect that information?
Individualized Interactions	Individuals to keep on task or model how to solve	1)How are you able to determine why students solved a problem in a certain way? 2)How would that information help you understand how to support student learning? 3)Are there students in your class who need different kinds

		of support? How can you help them? 4)How do you know what kind of support to give different students?
Individualized Interactions	Individuals to find out how they were thinking	1) How can you share your conversations with an individual child with the whole group when it could help all students learn? 2) What were the opportunities for students to share their thinking with other students in this lesson?
Adaptation	Yes	1) How did your adaptations keep the task rigorous for students? 2) Are there other students in your class that might benefit from adaptations? What are some examples of adaptations you could make for them?
Adaptation	No	1) Are there students who might benefit from adaptations to the task? What are some examples of adaptations you could make for them? 2) What are some ways to support struggling students that go beyond solving for them? 3) Are there ways to support students who have mastered the concept to move ahead on their learning trajectory?
Planning for Differences	Yes	1) What ways of accommodating different skill levels were you unable to incorporate into today's lesson? Why? 2) What are ways to incorporate those into future lessons?
Planning for Differences	No	1) What are ways to plan lessons in the future to accommodate different skill levels? 2) What are ways to support students who are learning English? 3) How can you set clear norms with students about how to have conversations about math with each other? 4) How can you build in ways to collect data about student learning during your lessons? What would that information allow you to do differently in this lesson?

Rigor

User Response	Summary Response	Suggested Questions
ONLY Non-Math Classroom Practices were chosen	Classroom Practices Only	1) What are some ways to steer students' focus back to the mathematics objective of the day? 2) What are some ways you can embed classroom procedures in the lesson in ways that don't interrupt instructional time?
ONLY Math Fluency OR Math Procedures were chosen	Fluency and/or Procedural Only	1) What are some ways to help students generalize from the procedures they focused on today? 2) What are ways to connect the procedures in your math tasks to other math concepts that students already know? 3) What are some applications to the procedures students know that can connect their knowledge to the world outside math class?
ONLY Math Concept OR	Conceptual and/or Problem	1) Were you able to connect today's concepts

Problem Solving was chosen	Solving ONLY	to procedures or other skills your students have already mastered? If yes, how? If no, how could you do this in the future? 2) How did you help students have the opportunity to do sense-making and find connections themselves?
Fluency and/or Procedural AND Conceptual and/or Problem Solving	Fluency and/or Procedural AND Conceptual and/or Problem Solving	1) How did you highlight the connections between the conceptual and procedural/fluency elements of today's task? 2) Are there ways to make those connections more clear for students? 3) Are there ways to make the problems students solve more relevant to the world outside math class?

When you are finished observing and summarizing, you can tap on “Share” button to email the observation summary to the teacher.

Troubleshooting

If your observation information isn't updating or a feature is not functioning, you can try to close and reopen the app by tapping on "X" on the right corner of the screen. You can also restart your phone and check the updates.

Please contact Luke Rainey at luke.rainey@vanderbilt.edu if you need assistance or have questions.

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