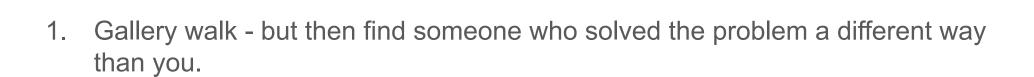
1. Hand up for "I second that" or "I also got that" for quick check of agreement/disagreement on work

- 2. Having them write their answers/work on the board in pairs (they must agree on writing)
- 3. Floating around the room and looking at their independent / group work during work time

1. **Listening to group discussions** - When students work on their assignment, I walk around and listen to student discussions. When they ask me questions, I usually refer ask the questions back to them or direct them to ask one of their group members first. Sometimes, I ask questions that would push their thinking as well.

- 2. **Collected hw** Once a week I collect a spiraled hw assignment. I give detailed feedback on questions, as needed. If I notice a broad misception, I try similar questions for the following week's "Do Now" problems.
- 3. **Weekly quizzes -** I like to give small weekly quizzes. Usually 4-5 questions. That helps me decide the pacing and if/when to move on, go back, etc.



- 2. Quick methods of student self-assessment (head down, 1-5 scale of understanding)
- 3. Listening to conversations students are having among themselves

- 1.One to one conversations where students model the solutions to challenging questions and then are responsible for explaining the solution and fielding questions from their group members
- 2.Rapid whiteboards where students are holding up the solution to certain questions based on the lesson. Then I can have students check in with boards that have errors and assist one another
- 3. Gallery / table / board walks where students can comment on one anothers work and ask questions or agree or suggest different solutions.

1. Circulating and observing

I walk and look around when students work in groups to solve sample problem to get a sense of which concept I need to emphasize more.

2. Clicker Response

This one is anonymous. So I can get an idea of how well the whole class understand the concept taught. Usually for quick conceptual understanding check.

3. Question and response. Open discussion

When I teach geometry proof, each student contribute one step of the proof and they can also comment on other students' contribution and discuss which one is more effective.

- 1. Looking at group work on boards. I have students do a lot of work in random groups of three.
- 2. Looking at individual work on handouts. Problems are split into Basic, Intermediate, and Advanced levels. This is mainly to help students assess their understanding for a topic, but it helps me quickly see where they are in class.
- 3. When students are stuck, asking them about an earlier problem they did, or giving them a simpler problem to get started.

- 1. Administer exit slips: Give each student an exit question based on how far we got in the lesson differentiating difficulty levels, as possible for students' varying readiness levels
- 2. Board work: students come to board, possibly co-teaching, a posed question, and explain their process and thinking to the class.
- 3. Circulate and check student work: Scan overall/individual student work on a posed problem, seeking common misconceptions and understandings, in preparation to provide positive feedback and steps for improvement.

- Ask questions to groups and have students write their results on their group whiteboards →
- 2. Checks and question marks where students walk around and write on student work that is on the boards →
- 3. Put a green cup, yellow cup, and red cup on every student's desk in a stack; instruct them to put their green cup on top if they are understanding the material so well that they want to go faster (i.e. be challenged), yellow cup if they like the pace, and red cup if they need help →



Having students write solutions up on white boards; lots of white boards = lots

- of opportunities for assessments!
- 2. Use of projects for students to demonstrate advanced understanding—the best students create memorable projects ...

3. Think-pair-share!

1. I like listening to my groups after I've given instructions.

- a. Silence usually means the directions were clear and that they each have an entry point
- b. Off task conversation usually no one at group is sure what to do or where to start (I need to go there)
- c. Restating work or explaining work conversations that person has a good understanding and others are now questionable on my radar

2. Looking at work on worksheet

- a. Evaluating students processes or notation
- b. Evaluating organization of thoughts and process

3. Listening for excitement

a. When a group gets loud about a success is a clear indication of some understanding in that space.

journal writing/ Learrning Reflection

2. Think Pair Share - Listen to students conversations

3. Quick do nows and look for errors.

- 1. Use of manipulatives to create models students know they are allowed to grab any manipulatives from the shelves to use to solve problems. In the first weeks of school, I introduce them so they know what is available. I love when they use them in new and different ways to show thinking or to be able to explain to another student.
- Individual whiteboards Often when practicing calculations, we will use whiteboards. The students work the problem and hold it up for me to see.
 If they are super quick, I often give them an extension question so that others have time to think and write.
- 3. Error analysis I will put a problem up that has error (s) and the students need to identify the error, why it happened and how they would correct it.

1. Gallery walk/table walk

Groups of students circulates and write comments/questions on the work of other group. Then, teacher strategically highlights questions and comments that need to be addressed in the whole class.

2. Have student's work(group or individual) on white board.

The work on white board is visible. It is an opportunity for other students to comment or ask questions when students present their work.

3. Writing error analysis

Writing error analysis provides opportunity for students to do reflective thinking. It also enhances deep thinking and writing skills.

1. Ask students to self-assess their understanding (ex: thumbs up/down/sideways)

Require response from all - positive reinforcement for those responding, sometimes a reminder that we're not on Zoom helps to get those not yet responding to respond.

If there's a large chunk of thumbs up people, they can be directed to more to a specific next task solo or in a group

2.Assess vocabulary and language that students use when discussing concepts with one another, perhaps using a rubric.

Review the list of vocab and any group norms before group work starts, circulate with clipboard to make annotations/checks as you overhear appropriate use of vocab and of group norms/discussion norms being respected

3. Hand up for "I second that" or "I also got that" for quick check

Especially helpful so that those who wanted to participate but weren't called on feel SEEN - in my school we also have a culture of Snaps for restorative circles, nice to do something that is also done in other school spaces

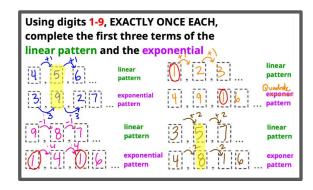


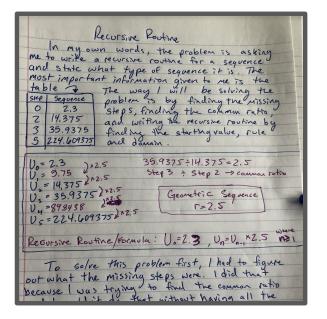
1. OPEN MIDDLE "Do Now's"

2. "Add Em' Up"



3. Problem "Write - Ups" _____





1. Listen to conversations that students are having when working collaboratively on problems

- 2. Look at what students write on the giant whiteboard (ask them to solve problems on the board) three of 4 walls in my room have double sliding whiteboards, there's plenty of space for students to work on the boards.
- 3. Student makes connection between two ideas. (example: compares/contrasts) It's hard to hear the "ha-ha" moments, but that's proof of when a student is



1. listening in on student conversations (pairs, groups)

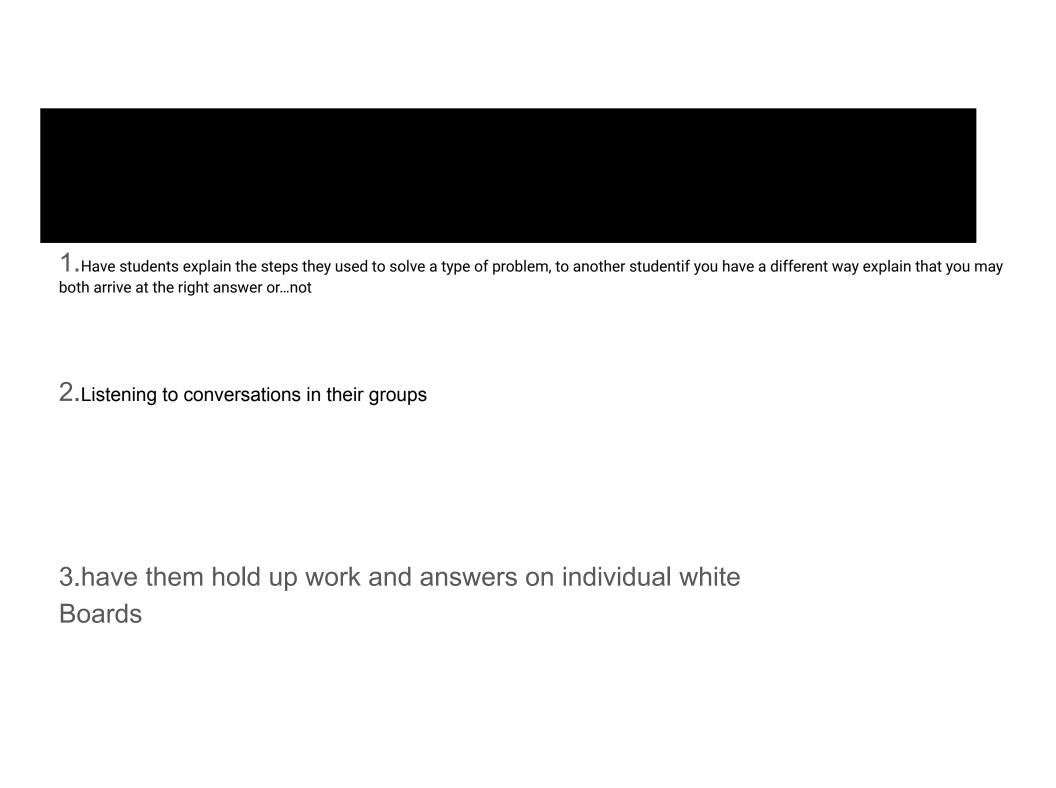
Teacher walks around the room collecting ideas from groups, records this ideas on the board.

2. Student makes connection between two ideas. (example: compares/ contrasts)

Teachers gives tables two different graphs (linear vs exponential, continuous vs discrete) and asked groups to make as many comments about the differences or similarities they see. Students sare then ask to share one thing from each group

3. notice and wonder statements

I use *number talks* where students are able to explore patterns and notice/wonder anything! These tasks have so many entry levels that my students are engaged at all times.



- 1. I am still struggling to make this strategy as effective as possible, but I have recently had success with the stoplight-color-cups indicator. Every student has a stack of three cups (red, yellow, green) on their desk. They are instructed to put the red cup on top of the stack when they feel like the pace is too fast for them, yellow cup on top if they are fine with the pace, and the green cup on top if they want to go faster or be more challenged. They know that I circulate the room, looking for red cups (those are the students I go to first) and green cups (I go to greens once all the
- 2. My most frequently-used tool for assessing student understanding involves asking groups questions and having them write their answers on mini-whiteboards. While they are responding to the questions, I have a chance to circulate, listen, and read. Once they hold the whiteboards up, I have a chance to listen to how they are making sense of the responses from other groups' whiteboards.

3.

red fires have been extinguished).

- 1. Desmos teacher dashboard: I use this to identify questions where it seems that we have understanding (and use this to share out and solidify) and where we don't have understanding yet (share out where I see responses that are moving in the right direction. Also identify students who are generally understanding well or not so well
- 2. Listening into conversations: I'm able to get a good summary of what understandings the class has or doesn't have yet. Which groups are doing well on their own vs may need more support
- 3. Exit slips: I get a concrete idea of where we are both conceptually, procedurally, and how confident we are. These exit slips dictate where we focus the following day.

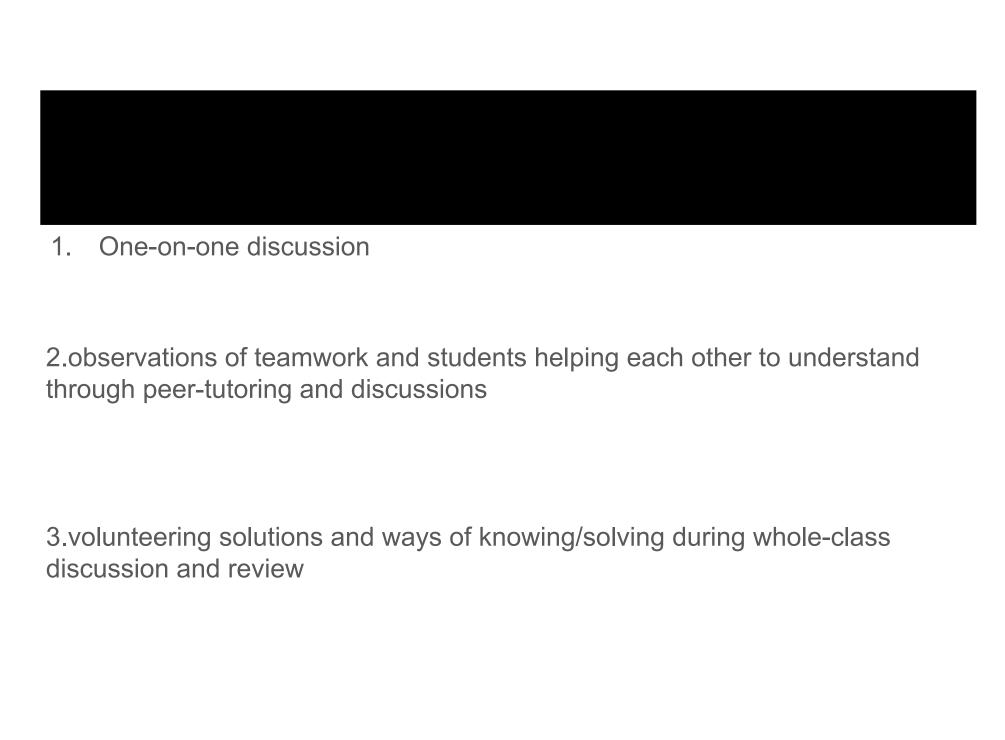
ask questions to groups and have students write their results on their group whiteboards
 Students up at their group whiteboards, able to see other groups' work as well. Having discussions among themselves. And with other groups.

2. Listen to the explanations they give

Happens either when they're working in groups or if called upon to explain their work. Allow other students to respond with questions or comments.

3. Watch students' work live as they work on DeltaMath or Desmos Activity

As students are working, monitor the explanations they are typing into desmos, using the snapshot tool to highlight different student thinking/approaches to start conversations.



- 1. Having all my students *answer by fingers* simultaneously
 - a. "What is 2+3?" and students hold up how many fingers they think
- 2. Using the *Desmos Activity Monitor* to check their progress and understanding
 - a. Are they getting correct answers?
 - b. Are their explanations valid / complete?
- 3. Giving each student space at the board to work on questions
 - a. Is their process correct?
 - b. Can they explain their work to their peers / me?
 - c. Easy to get an eye on everyone and know who needs more attention
 - d. Standing is a nice change of pace

- 1. Mind maps as part of review at the end of a unit, give student groups vocabulary/concepts cut up for them to paste on to a poster board. Ask them to arrange the words on the poster and use marker to connect them and write in how they are connected.
- 2. Looking at errors What kinds of mistakes are students making? What concepts are not clicking? What is missing from their understanding? Do they understand but need to slow down? For me, it helps to analyze errors when I have written work from individual students, like an exit ticket.
- 3. Teacher dashboard on Desmos look at initial student responses to a question, different ways of explaining an answer or different ways of solving a problem. Look for common incorrect answers.

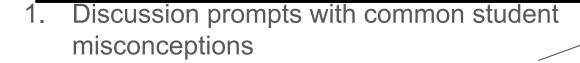
- 1. Thumbs! I love thumbs as a quick indicator of yes/no/maybe or always/sometimes/never. It's then easy to pick a couple of arguments from each side and someone to convince.
- Looking for errors/critique I like to use past Regents Exams Student work. I
 give three-ish examples of student work on the same problem and see what
 score they would give it. I usually have the students do that problem for
 homework the night before or as the opening problem.
- 3. Groupwork I like to hear if they are asking each other questions or explaining the work to each other. I also listen for a mix of voices.

What is fist to five?

- 1. Observations of body language and facial expressions, as well as willingness to volunteer answers, go to the board, or answer cold-call questions
- 2. Group activity, and if they can participate actively and effectively

3. Using a technological tool, such as Desmos, Pear Deck, or Kahoot, to have students answer questions in real time

- Circulating and Observing- Though this is arguably the most common way in my class, I think it gives me insights to "aha" moments and what I can do to level up next. It also gives me a fair sense of their confidence levels. This is especially useful in my warm ups and exit tickets' time.
- 2. Student work- multiple ways- Though this seems like an obvious, I have always found this to be revealing at all levels- whether it is incomplete work, or doing the little extra or even using alternate strategies, I value this the most in my class.
- 3. Projects and showcasing- A tangent to what they do in class, I think this gives my students the opportunity to explore and experience math at their own pace and level. There are soft skills such as collaboration, communication etc. that get revealed to me in this.



2. Giving problems where students might model in different ways, having them share methods and discussing how they connect (this example from NCTM)

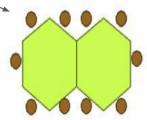
3. Speaker-scribe: A fun way to make a student explain steps clearly to another student (ther switch roles) with cross-talk time for them to agree or disagree

James says that the equation that represents the table below is f(x) = 3x+1. Agree or disagree supporting your claim with evidence and

explanation.

X	f(x)
0	1
1	3
2	9
3	27

To make more room for dancing at the Teddy Bears' wedding banquet, the staff arranges the tables in a long row along one side of the room. When they connect two tables together, here's how the seating looks:



A. How many guests can sit at 3 tables? Explain how you found your answers and how you know you are right. Describe any patterns that helped you.

- 1. Use of mini-white-boards or sending students to white-boards: I have students use mini whiteboards nearly every day to work out the warmup questions and share their thinking with other students. Often, I will have them hold their work up high so that I can quickly assess who might still have questions or decide who might be ready to explain to the class.
- 2. Listening to student conversations: students have the opportunity nearly every day to work in groups on a task, and I circulate throughout the room to see who is able to proceed through the tasks, who reaches the extensions, and who might need extra support.
- 3. Desmos teacher dashboard: monitoring the dashboard often provides me the most accurate information about which individual students are understanding the material and the activities. I use both the quick checks on desmos (whether there is a literal checkmark on a slide) and also monitor for specific answers on certain slides. We use desmos once every week/once every 2 weeks or so!

- 1. Listening to student conversations: I have my students do almost all of their work collaboratively in groups. So I do a lot of walking around and listening, getting a sense of what they are figuring out and how they are figuring it out -- and where they are getting stuck and why.
- 2. "Do Now" questions at the start of class: Often times, I will use a start of class question for one of two things: (1) to remind students of an older thing they should know (that I know they'll need to recall for class that day) or (2) to check to see if students grokked an idea or type of problem that I hoped they understood from the previous class or the nightly work.
- 3. Exit Questions: I don't do this super consistently (some years more than others), but I had created a google form which had a pre-set list of questions (e.g. Write down one thing you understood really well from class today... What is a question you are still wondering about... What are something you better understand now than you didn't understand at the start of class... etc.), and I'd tell kids to go to the google form, and I'd ask them to all do the same question. It gave me a sense of how kids are feeling, but also a sense of what they as a whole understand and don't understand. [Here's an example of the google form you can play with:

https://docs.google.com/forms/d/e/1FAIpQLSe8oa83aYdqW89qGIqx156910ssQcBb-JkaONJK72f8jeSpHQ/viewform]

- 1. **Pear Deck Thumb Up/Down Check In**: Ss can be drag their icon to the left (thumb down) or to the right (thumb up) or anywhere in between to show understanding; however, I made a change to thumb down (and/or sideways) into "I need two more examples/problems to work on to show my understanding" (and/or "I need one more examples/problems to work on to show my understanding").
- 2. **Cornell Notes/Journal Summaries**: Ss write down a sentence about the math that they've learned and/or reviewed that day (we do this daily), and also include an example of their own (if they can't, they can refer to their favorite problem that we've done in class together to help them understand today's concepts).
- 3. Circulate and Check Students' Work: I give my students options to work either digitally and/or on their math notebooks. For students who work on PearDeck, I can see their work as they progress through the problems, but for the students who are working in their math notebook, I walk around the classroom to assess their understanding and give them feedback.

Looking at students' work on as they work in groups of 3 on whiteboards. I can see who is writing (e.g. is it the same person doing all of the writing or are different people writing) as well as get some evidence about the group collectively understands.

- 2. Listening to students' discussions as they work together on tasks. This gives me evidence about their thinking (e.g. what ideas are they using).
- 3. Listening to the questions students are asking during whole-class discussion (e.g. conceptual vs procedural).