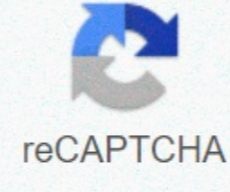




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## Think like a mathematician poster

Welcome friends! Today's guest post is sponsored by Shametria L. Routt, a Routty math teacher, and is about using effective mathematical talk in the classroom. This post contains tips and strategies to help you get started, including a variety of resources to use on your journey. Happy read! Using mathematical discussion in the classroom is an effective way to increase the critical thinking and communication skills of our students. However, what does effective mathematical talking in the classroom look like? This article explores how to make your students think and communicate mathematically from the first day of study. What is mathematics? The National Mathematical Council (NCTM) defines mathematical talk as a means of representation, thinking, talking and agreeing, and disagreeing that teachers and students use to participate in [mathematics] work (NCTM, 1991). Effective communication about mathematics is essential to help students develop their self-questioning thinking skills and the explanations needed to hone the necessary skills and concepts. Successful math programs focus on frequent mathematical communication in the classroom. In addition to NCTM standards, most state standards also include the ability to communicate effectively through mathematical language, proving solutions and evaluating other people's mathematical thinking. What does it look like and sound like? The image below shows the interaction between teachers and students during effective mathematical talks and shows how knowledge is created through these interactions and exchanges with others. Before using mathematical talk in the classroom, brainstorm a list of classroom norms on how community members will participate and behave during discussions (see below for examples of certain norms that you might want to include). How to use Math Talk through sharing an open strategy, as with any lesson, it is important to create a plan for the use of mathematical talk in the classroom. During open strategy sharing, students will discuss how they solve specific problems. Students listen and share their thoughts. Teachers interrogate students with questions related to how to determine how to solve problems and why they choose a specific solution path. In addition, teachers emphasize a variety of strategies and emphasize the similarities and differences among them. Use the following steps to help perform math talks in the classroom: Set your goals: How do you hope to succeed? Goals for mathematical talking include requiring students: listen and compare the methods used to solve problems, looking for the most effective ways to solve the problem. Create an explanation of why a specific solution works, or determine why one solution is correct and why other solutions are not correct. Choose a problem: Depends on your goals. If you want to focus on a variety of strategies that can be used to solve the problem, choose several problem solving strategies. If you are examining why one solution is more accurate than another, choose a problem that students often make mistakes in their problem solving strategies. Take my back to math solving pack school to get you started! You can find it in my TpT store. Anticipate students' answers: To create the best debate opportunities, think about how students might respond to specific problems, and create a plan to address misunderstandings that may develop. Also, if there is a vague solution that you think may be missed, then plant seeds with a group of students or be prepared to recommend the strategy yourself. For example, you can say that when I look at this problem, I think I can solve this problem (show strategy). How does this strategy compare to the other strategies we use today? Check out students' answers: During this time, observe group interactions and take notes about their problem-solving strategies. Also, please observe the observable areas of concern to be discussed later. Choose the students to present: From your observations, formulate a problem-solving strategy that will focus on helping you achieve your goals best. For example, if you want to focus on a variety of strategies to solve a specific problem, choose a solution that is different from the other. Student response sequence: Order a presentation of a resolution strategy in a way that will help you enhance the student's learning experience. For example, starting with a widely used strategy and then moving on to a more abstract strategy may draw students' attention to new approaches. Similarly, starting with a more concrete strategy will give students the opportunity to move from more concrete to abstract understanding. Connect students' answers: The most important thing about using math talk in the classroom is the connection between the solution you and the student do. Beginners will need to provide your support to establish these connections. For example, if you rank a presentation from less complex to more complex, you can use the <a0><a1> Presentation </a1> You can also discuss performance. Which processes are more efficient? The top open-ended question chart contains a great list of questions both you and students can use during mathematical talks to establish connections and analyze problem-solving strategies. Find downloads for my open-ended questions for math talk in charge in my TpT store. Use the Math Talk Moves poster above to teach. How to connect and respond to others during mathematical talk, posters describe student movements. Teachers should teach these movements and promote their use during discussions. You may want to have a move of the day/week to highlight how to connect students' ideas. You may also want to include these in a student's math notebook or tape a copy to their desk to refer to during a discussion. Please note: Many sources explain Because I chose to focus my poster on student movements, I didn't include it. However, it is a useful move to use during mathematical talks to allow students to have other participants share ideas with them during large class discussions. From that point on, they can choose to move students to keep the conversation going, or choose one move for sharing across the class. To get a copy of my own Math Talk Moves poster, please go to my TpT store. Participation is key! Sometimes it's hard to get all students involved because they're afraid to take risks. One of the ways you can get students who are more reluctant to engage in conversation is to use hand signals, such as teaching students to use the American Sign Language symbol for Y (see picture below) to indicate that they agree with someone else's ideas. When students are reluctant to see that they are not alone, they may be willing to participate more. After reviewing the student solution and listening to their presentations, use the information you collect to determine the next step. The following activities will help expand and deepen students' understanding of the intended content and skills: Look for a worrisome part: Reviewing a workaround for common errors or misunderstandings may provide content for small lessons or content for additional troubleshooting tasks later. Reasonable check: It is essential that students develop their ability to monitor, solve problems and monitor them for reasonableness. After discussion, you can ask each group to develop a way to review their strategy for reasonableness or choose a specific solution, and ask students to determine how to determine their reasonableness. Don't forget to let students share and compare their strategies. Optimize solutions: In addition to the ability to solve problems, students should be able to explain why a specific problem-solving strategy leads to the right answers. For this activity, students use images, numbers and words to understand how to solve problems and explain why it works. Look for what went wrong: One of the most powerful activities for students is to check their mistakes. Use one of the solution strategies that doesn't lead to the right answer (if any) and explore where the solution goes wrong. After a missed consideration, give the student a chance. The rest of the solution strategy If you don't have the wrong solution strategy to use, create it yourself and say if someone does (show a strategy), then let students discuss the error. Conducting and planning regular mathematical talking sessions will support the development of stronger and more profound communication skills, students' ability to reason and think carefully about the content and mathematical skills they intend. Books: There are several resources that can provide additional structures and methods for the use of effective mathematical talking in the classroom. Check out the following resources for more insights: Pinterest boards: There are many great resources for all levels on Pinterest, click here to see my Math Talk Pinterest board, Shametria has been a Texas educator for 13 years. She is also a blogger (reborn next) and a teacher author for all things math! Check out her Routty math teacher's blog and the teacher pays the teacher a store for some more teaching tidbits and its free! Books and resources on the web Kazemi, & Hintz, A. (2014) Deliberate Discussion: How to Structure and Lead to Effective Mathematical Discussions Stenhouse Publishing: Portland, Maine National Federation of Mathematical Teachers (1991) of Professional Standards for Teaching Mathematics' drawn from Smith, M. S. & Stein, M. K. (2011) Five Practices for Effective Mathematical Discussion Corvin: Reston, Virginia, Clipart

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