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Description automatically generated with medium confidenceMath Skills for Students to Learn and Practice

**Tip Sheet**



**What to do:** Review the skills for learning and using math, and the skills for managing math anxiety, to get concrete ways to help students put skills into practice.

**Why it matters:** Students who develop and implement these skills become more confident in their math abilities, cultivate a growth mindset, and have positive learning experiences and outcomes.

# Skills for Learning and Using Math

Try out these skills for learning and using math. Then share them with your students.

## Graphical user interface, application Description automatically generatedMental Math

Doing math in your head without a pencil, paper, or calculator is called “mental math.” Helpful skills for mental math include being able to recall math facts, estimating, and rounding. Useful strategies are breaking problems down into steps or breaking numbers down into their components. For example, to add 43 and 52, you could add 40 and 50 to get 90, add 3 and 2 to get 5, then add 90 and 5 to get the answer: 95. *(If memorizing math facts isn’t your superpower, don’t worry: You can develop other powers to help with mental math, like rounding and regrouping numbers or visualizing patterns and relationships.)*

## Picture It

Create a visual representation of a math problem or concept, either on paper or in your head. Some examples are number lines, strip diagrams, pictures of concrete objects, charts/graphs, arrays, and graphic organizers. *(A pizza is a pie chart you can eat!)*

## Say It

Talking out loud about what you’re doing as you work on a math problem can help. For one thing, it keeps your attention on your work. For another, it helps to clarify your thinking when you put it into words. *(Try this at home, not in the library, so you won’t interrupt others.)*

## Sing It

If you’re having trouble remembering a math fact or theorem, try singing it to the tune of a favorite song. Music activates the parts of your brain associated with memory, reasoning, speech, emotion, and reward. *(Not only does music help you access stored memories and create new ones, but it can also boost your mood.)*

## Move It

Use manipulatives (solid objects you can move with your fingers, like wood blocks or coins) to help you see numbers, relationships, and patterns, or to perform number operations like addition and subtraction. Eventually you might be able to see the objects in your head without using physical objects, but don’t worry if this takes a while or doesn’t happen. Research shows that small motor movements or gestures can help improve problem-solving ability and memory, whether you’re doing or watching the gestures. *(Don’t forget: Exercise builds brains as well as muscles.)*

## Read It

Reading skills (including vocabulary) matter just as much as math skills when you’re in math class. So, when you’re building literacy skills, include word problems and share “insider tips” on reading math problems, like paying attention to instructions, thinking carefully about what the words and numbers represent, and making sure you understand math vocabulary terms. English learners may need support in learning “math words” (for example, they might think a “right angle” in math means a “correct angle”).

## Ask It

If you don’t understand something in math, don’t be afraid to ask someone for help, like a teacher, another student, or a family member. If you do a math problem and the answer doesn’t make sense, check your arithmetic and your logic, or try a different method to see if you get the same answer. Thinking about whether an answer makes sense *always* makes sense. Follow up on those hunches. And if you’re curious about something, investigate. Math isn’t just about answering someone else’s questions. *(Millions saw the apple fall, but Newton asked why.)*

**Why the Most Valuable Question May Be “Why?”**

**This true story from Sarah W. explains why it can be especially important in math:**

“I never did well in math because I wanted to understand WHY we had to do things a certain way, and teachers didn’t like being asked that. In graduate school, though, I had a statistics professor who was great about explaining why. He also didn’t make us memorize formulas or anything because “you can look those up. If you don’t know how and when to use it, it doesn’t matter if you have it memorized.” I appreciated that mentality so much! Around the same time, the TV show *Numb3rs* was out. A large part of it was a character using applied mathematics to solve crime. It really made things click for me — here were these math concepts I had heard of before but seemed pointless, being used in real life!”

**Here are two “why” questions to explore with your students:**

* **Why are there two different ways to express a number that’s part of a whole — fractions and decimals?** Students may find it interesting to know that fractions came first, and decimals later. Decimals gained wider use partly because they were easier for printing presses to set in type. This is a centuries-old example of the relationship between technology and numbers! Bonus fact: Did you realize that the metric system uses decimals, while the customary system of measurement in the U.S. is primarily based on fractions?
* **Why do I need to know how to multiply and divide fractions?** It’s useful in everyday situations like doubling a recipe or cutting it in half or deciding how much pizza to order for a party if someone says, “Only ⅔ of the people we invited are coming.”

# Skills for Managing Math Anxiety

Here are some anxiety management skills you can use anytime stress and worry make you feel anxious, whether it’s in math class or elsewhere. Many of them include mindfulness practices.

## Breathing Techniques

**Build Students’ Math Vocabulary**

The **Science and Mathematics Vocabulary Builder** in the 21st CCLC NTAC Math Toolkit has ideas for using math-related words and questions during snack time, recreation, and other program activities — not just during math activities or homework time. For example: Count your raisins by twos. Divide into teams of three. What’s the repeating pattern in this piece of art?

The most basic technique is to simply pay attention to your breath without trying to control it. Your mind will try to wander. That’s OK. Just bring your focus back to your breath with each inhale and exhale. Another technique some people use for anxiety is 4-7-8 breathing: Close your mouth and breathe in through your nose for a count of four. Hold your breath and count to seven. Exhale through your mouth for a count of eight. Repeat up to three more times.

## Progressive Muscle Relaxation

Tense your toes for 5 seconds, then relax and notice the difference. Next do the same with your calf muscles, thigh muscles, and other muscle groups, one at a time, until you progress all the way up to your forehead. You can do one side of your body at a time, or both sides at once. Bring your focus to the difference you feel in that body part each time you relax.

## Walking Meditation

You don’t have to sit still to meditate. You can walk or do other movements while bringing your attention to your feet, your body, and the ground and focusing on what it feels like to walk. If you’re outdoors, your focus might be on sights, sounds, and sensations — the changing sky, birdsong, the rhythm of traffic, and what the sun or wind feels like on your face.

## S.T.O.P.

**S**top what you’re doing. **T**ake a deep breath. **O**bserve what’s happening around you and inside you. **P**roceed mindfully (either go back to what you were doing or change course and do something different).

## Self-Talk: Be Your Own Coach

Remind yourself that you’re ready: “I’ve studied this material, so I’m ready for the test.” Recall past successes: “I thought I’d fail the last test, but I passed it with room to spare!” Reframe your anxiety: “This state of heightened alertness feels uncomfortable, but I can actually take advantage of this extra energy to improve my performance.” Reassure yourself with calming words like “It’s OK” or use an energizing mantra like “I’ll give it my all. Let’s go!”

## Write It Out

Write out any worries and negative thoughts about math before a math test or performance task. This might seem like an odd idea, but it works because writing is a form of action. So instead of your negative thoughts continuing to run in circles inside your brain, they’re rounded up, directed into your writing hand (or fingertips), and “released” onto paper. Give it a try!

## Pomodoro Method

If anxiety causes you to avoid doing math homework or studying for a test, try the Pomodoro Method. This time management strategy can help you overcome procrastination and make the task less overwhelming. Set a timer and work for 25 minutes, take a 5-minute break, and do another 25 minutes. After four times, take a longer break (20 or 30 minutes). You can adjust the times. Experiment and do what works best for you!

**Math Messages and Math MUSTs**

MUST is an acronym for four tools that fight math anxiety and nurture a can-do attitude:

* **M** is for the **messages** students get about math and their ability to learn it.
* **U** is for **understanding** math concepts and how thoughts and emotions affect learning.
* **S** is for **skills** that help you learn and use math — and manage anxiety, if it’s an issue.
* **T** is for **thrills** because students need positive experiences to help them discover the magic and satisfaction of math in a way that’s meaningful to them.

For more about the math MUSTs, see the 21st CCLC NTAC Math Toolkit for these tools:

* Math Anxiety and Four MUSTs for Addressing It
* Math Messages That Build Confidence
* Math Understanding: Helping Students Think Conceptually
* Math Thrills: Putting Fun Into the Equation

*Mathematics rightly viewed possesses not   
only truth but supreme beauty.*

— Bertrand Russell

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