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Description automatically generated with medium confidenceSimple Ways to Add Math to Program Activities

**Activity Ideas**



**What to do:** Review these examples to see how to use what you already know to create math moments “on the fly.” Stay alert for ways to bring interesting, relevant, and amazing math experiences into what’s happening in your program *right now.* Providing activities that engage students and increase math understanding and confidence may not require elaborate planning.

**Why it matters:** When you embed math into routine activities, students see math as a useful, everyday tool rather than an abstract concept. These strategies can help staff members make math an integral, enjoyable part of your program and can encourage students to embrace math concepts as a natural part of their daily experiences.

# Math Moment #1

**Math Concept: Number Lines.** Students learn and apply this concept to different situations in math classes (and everyday life), beginning as early as third grade.

* A picture containing text, clock

  Description automatically generatedA “real number” is any number that can be plotted on a number line. It can be a whole number or a fraction, and either positive or negative (or zero). Every real number can be associated with its own point on the number line. Here’s what a number line looks like:
* **What you already know:** You use number lines every day, but you might not call them that. Examples are measuring tools like rulers, tape measures, some bathroom scales, thermometers, barometers, and measuring cups. Number lines don’t have to be horizontal. For example, the number line on a measuring cup is vertical — and the measurement marks show only the positive numbers, not the negative numbers. The bottom of the cup is the “zero” on this number line.
* **What you can do:** Explain the concept of “number lines” the next time you use a measuring device during an activity, like:
  + A measuring cup when you’re cooking
  + A ruler during an art project
  + A thermometer to see if it’s warm enough to sprout seeds in your classroom window. **Note:** The negative numbers are visible on a thermometer (to indicate “below zero”) but not on a measuring cup.
* **Make it relevant:** If a student says, “Our family’s going on a road trip,” here’s some interesting information you can share:
  + Watch for the green mile markers the next time you travel on an interstate. They show the number of miles from where the interstate route enters the State you’re traveling in.
  + The counting always starts at the State line in the south (for north-south routes like I-95) and in the west (for east-west routes like I-90). So the mile marker numbers always get larger as you travel east or north.
  + In most States, each interstate exit is numbered according to the nearest mile marker.
  + The interstates that run east and west are assigned even numbers, and most end in zero, from I-10 in the south to I-90 in the north. The interstates that run north to south have odd numbers, and most end in 5, from I-5 in the west to I-95 in the east.

# Math Moment #2

**Math Concept: Orientation and Location.** Objects in space can be oriented in an infinite number of ways, and an object’s location in space can be described quantitatively (using numbers).

* A screenshot of a computer

  Description automatically generated with medium confidence**What you already know:** You use the concept of orientation and location every time you use a GPS map or give directions to help someone get from one place to another. For example, you might say, “Walk 2 blocks north on Elm Street, then turn left and walk 1 block west on Second Avenue.” Maps have a “compass” symbol to help with orientation. The “crosshairs” of the compass work like two intersecting number lines, one going east to west (left to right) and the other going north to south (top to bottom).
* **Make it relevant:** The next time students mention someplace they’d like to go, help them find the location on a map. Point out the compass icon and discuss how it works. Talk about directions (east-west and north-south). Wherever you are, see if you can figure out which direction is north. Use a real compass, if you have one, or the one on your smartphone, or use the sun’s location and time of day to estimate where north is. Explain that if you’re facing north and have a map in front of you with north on top, the west will always be to your left, the east to your right, and the south directly behind you.
* **Chart, radar chart

  Description automatically generatedCool fact to share:** If your students have smartphones or tablets, they can download a compass app, but they might not know how to use it or how to read the coordinates displayed for their location. They don’t have to do any math to find their coordinates because the Global Positioning System (GPS) uses satellites and computers to do the calculations and provide the exact coordinates through the app on their smartphone or tablet.

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* **A picture containing aircraft, transport, balloon

  Description automatically generatedExplanation of how GPS works:** You can pinpoint any location on Earth by finding its latitude and longitude. That’s an imaginary grid of lines that run east to west and north to south.

**Source:** <https://oceanservice.noaa.gov/facts/latitude.html>

The horizontal lines running east and west are lines of latitude, called parallels. The most recognizable one is the equator, which represents 0° latitude. The vertical lines running north and south from pole to pole are lines of longitude, called meridians. The most recognizable is the prime meridian, which represents 0° longitude and runs through Greenwich in London, England.

These lines are further divided into degrees (°), minutes (′) and seconds (″). There are 60 minutes in a degree and 60 seconds in a minute (similar to measuring time). Each degree of latitude corresponds with 60 nautical miles, or 111.1 kilometers, on the Earth’s surface.

When giving a coordinate, latitude (north or south) always precedes longitude (east or west). For the Sydney Opera House in Australia, the latitude and longitude are given as 33° 51′ 30″ S, 151° 12′ 53″ E — meaning it lies 33 degrees, 51 minutes, and 30 seconds south of the equator and 151 degrees, 12 minutes, and 53 seconds east of Greenwich.

You and your students might enjoy this 2.5-minute video from the Australian National Maritime Museum, which provides a helpful explanation: <https://www.youtube.com/watch?v=-8gg98ws2Eo>.

# Additional Math Moments for Younger Students

* **Game-Based Learning:** Staff members can design or use games that require counting, sorting, or pattern recognition. Games with scoring systems encourage basic arithmetic operations such as addition or subtraction. Students use math without being aware of it.
* **Manipulatives and Hands-On Activities:** Using objects like counters, blocks, beads, or even paper clips can provide a concrete visual example of mathematical ideas to help students gain understanding. Manipulatives can be used to teach counting, addition, subtraction, and even early multiplication, division, and fraction ideas.
* **Storytelling With Math:** Creating stories around numbers and mathematical operations can give meaning and substance to abstract concepts. It also acquaints students with word problems and helps them to solve mathematical problems in a different manner.
* **Integrating Math and Music:** Students can learn mathematical concepts directly through the words of a song, as would be the case with a counting song. Clapping to a beat or following the rhythm of a song is more indirect, but can also teach counting, along with patterns and sequencing.
* **Integrating Math Into Daily Routines:** There are many opportunities for mathematical learning during daily routines.
  + Ordinal numbers can be taught when students line up or are dismissed in a specific order.
  + More than, less than, and equal to concepts can be taught just by looking at various groups of students working on different things at a given time.
  + Counting skills are taught as students pass out papers, pencils, or other supplies.
  + Students learn division as they divide snacks equally among the group.
  + Understanding 1:1 correlation occurs as students set a table for snack time, matching the number of plates and cups to the number of chairs.

# People and Resources to Help With Math

Here are some ideas about people and resources in your community that may help you provide interesting, relevant, and amazing math activities:

* **Bank official:** May be willing to provide financial literacy activities.

**Not Sure Where to Start?**

To prevent being overwhelmed, use these criteria to help you identify and prioritize which people and resources to engage:

* Relevant to program goals
* Meets student needs
* Proven to get results
* Easy to use
* Free or within budget
* **Bus driver**: Can share with students how fast they are traveling, and students can calculate how far they’ll go in a given amount of time.
* **Coach:** Can share how geometry can be used to build skills when playing basketball. For example, to make a basket, gauge the angle and speed of your shot to create the perfect arc.
* **District math specialist**: Can provide grade-level guidance on student learning and can possibly help recruit math teachers.
* **Family members:** Can provide valuable math support at home, especially if you train them.
* **Librarian:** Can help you find math-related books students will enjoy and may loan resources like graphing calculators and measuring devices. Some libraries may offer financial literacy workshops for teens and families, too.
* **Math hobbyist**: Your students may be amazed to hear directly from someone who does math “just for the fun of it.”
* **Math teacher:** Can tell you what students are learning in school and areas where they need help.
* **Office support staff:** Show students how they collect and analyze data to track attendance. (But don’t share personally identifiable information, like student names.)
* **School counselor:** Share simple techniques to manage stress and focus attention. They can also talk about careers that use math.
* **Science museum director:** May offer enrichment activities.
* **Special education teacher or advocate:** Can share teaching strategies and provide insights into how dyslexia, dyscalculia, attention-deficit/hyperactivity disorder, and various learning differences and disabilities may affect how students learn and process information.
* **Statistician from a State agency or university:** May be able to share interesting insights about statistics to grab students’ interest.
* **Students:** Can tell you about their interest areas, serve as “math buddies” for immigrant students or other students who could use some friendly support.

# Free Online Resources (Don’t Reinvent the Wheel)

Here are just a few examples of online resources you can use to create interesting math activities or provide homework help:

* [Global Math Project](https://globalmathproject.org/) is a worldwide movement of teachers committed to igniting and sustaining a love of mathematics in their students. There’s something for every grade level. Check out the Exploding Dots videos and interactions.
* [Khan Academy](https://www.khanacademy.org/) offers math videos/tutorials that walk you through each step. Also check out the searchable [Khan Academy Math Playlist](https://www.youtube.com/c/khanacademy/playlists?view=50&sort=dd&shelf_id=6) on YouTube.
* [NCTM’s Illuminations](https://illuminations.nctm.org/)provides lessons, games, brain teasers, and simulators.
* [Numberphile](https://www.youtube.com/user/numberphile) has interesting videos about math and numbers.
* [PHet](https://phet.colorado.edu/) offers math simulations.
* [Statistics in Schools](https://www.census.gov/schools) helps you connect real-world Census Bureau data to student interests at every grade level.
* [youcubed](https://www.youcubed.org) has many resources for math anxiety as well as math videos, activities, lesson plans, individual and group tasks, research articles, and resources to help teachers, parents, and students experience math as fun and engaging. Its [Fluency Without Fear](https://www.youcubed.org/evidence/fluency-without-fear/) page includes activities to help children learn math facts and develop number sense.
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  Description automatically generated[visualpatterns.org](https://www.visualpatterns.org/) is a website that shows the beginning of a pattern — several groupings of puppies, for example — and asks students to figure out an equation to fit the pattern.

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