

By the Numbers

Mathematical Connections in Newspapers
for Middle-Grade Students

TEACHER'S GUIDE

Newspaper
Association
of America



By the Numbers: Mathematical Connections in Newspapers for Middle-Grade Students

*A project of the
Newspaper Association of America
Foundation*

The NAA Foundation strives to develop engaged and literate citizens in our diverse society through investment in and support of programs designed to enhance student achievement through newspaper readership and appreciation of the First Amendment.

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Mathematical Connections in Newspapers for Middle-Grade Students

Introduction

Mathematics may be more important now than ever. Math is the language of technology, and it is used to solve problems in engineering, economics, communication and many other diverse fields. Math enables us to advance our understanding of our ever-changing world and to manage the technologies that help us to live successful and productive lives. Strong math skills are vital as we move forward in the information age.

The middle grades are critical to developing those skills, as students continue to build on the mathematical learning foundation they began in elementary school. Their conceptions about themselves and their abilities will form the strategies with which they approach learning throughout the rest of their lives. Ultimately, those self-concepts will have an impact on their opportunities in life.

It is extremely important, then, that students find the math experience in middle school both demanding and supportive. For this reason and others, teachers are challenged daily to find new ways of engaging students in learning by using meaningful activities and relevant material. It is clear that students learn best when they are motivated and studying material that is relevant to their lives. The newspaper is of tremendous value in bringing the real world of authentic data into the classroom.

Newspapers motivate students by offering them the opportunity to learn with reality. Students can put the concepts they learn into the context of the here and now. In addition, newspapers are adaptable to all levels of ability and interest. The wide variety of features provides something interesting for every reader. From the front-page news to sports to the comics, students are sure to find material that makes them want to interact with the printed word.

Newspapers build lifelong reading habits because they provide material that people can read from childhood through adulthood. Newspapers incorporated into the math curriculum make an impact on lifelong learning.

Remedial Tools

Newspapers are excellent remedial teaching tools, too, because they appear to be an adult medium and yet can be used by learners at lower levels without fear of embarrassment.

Incorporating newspapers into the math curriculum encourages students to take an active role in their learning experience while enhancing their written and oral communication skills.

Consider how numbers are integrally involved in daily life. We cook, travel, work, shop and move from place to place. Numbers can be incorporated into every activity. Because the newspaper chronicles daily life, it is the perfect resource for teaching mathematical concepts through relevant text.

Newspapers are of great use in the classroom because they are inexpensive, readily available, easily tailored to varying learning levels and styles, and useful for individual or cooperative activities. In addition, using a newspaper integrates the math content area with language arts and social studies. In fact, with the emphasis on resource-based teaching, newspapers are being used to complement textbooks. Newspapers provide supplementary and relevant resources in reading, writing, math, science, history, economics, language arts, special education and second-language learning.

In working with newspapers, students apply literacy and mathematical skills while they appreciate the importance of studying current affairs. Studies have shown that students who use newspapers score higher on reading comprehension tests and develop stronger critical thinking skills. Using newspapers enables students to become better informed and more involved citizens as well.

Introducing the Newspaper to Your Students

It is helpful if students have their own copies of the newspaper so they can move at an individual pace. Begin your introduction with a question about the value of newspapers to our society. Ask questions such as, “**What would be different in our lives if we didn’t have newspapers?**”

Then, demonstrate to students how to handle a newspaper — how to open and fold it in order to make it easy to work with in a limited space. You may want to have them sign the tops of their copies, as ownership will encourage students to take better care of their newspapers.

It’s possible that when you introduce the newspaper to your students, it may be the first time that some have encountered it. Take a few moments to guide them through its use. Point out the index and then explore the content of the newspaper as a class. Examine the format, checking out the various sections and what each one contains.

Assess that students can find local news, sports, comics, classified ads and other features. Introduce some newspaper jargon, including terms such as headline, byline, etc., so that students will be able to use and react to these terms when you use them in instructions.

After students become familiar with the features of the newspaper, use the index and send them on a hunt to find various items and articles. Review reading techniques such as *skimming* and *scanning*.

Explain to them that **skimming** is useful when time is limited and they need to get the main idea or concept. In skimming, you move your eyes rapidly over the text just to get a general idea. **Scanning** is useful when you need to find a specific piece of information and do not have to use the entire article. When you know exactly what information you are seeking, you scan until you find it.

These lesson plans follow learning standards from the National Council of Teachers of Mathematics.

Math Scavenger Hunt #1

See if you can find each of these in the newspaper. Write what you found and the page on which you found it.

A fraction that is more than one-fifth ($1/5$) Page _____

A money amount less than \$1 Page _____

A date other than today's Page _____

A five-digit number Page _____

A decimal that is not an amount of money Page _____

A store giving a discount of 20 percent or more Page _____

An ad larger than half of the newspaper page Page _____

A temperature higher than 40 degrees Page _____

A stock that has gained more than one point Page _____

- | | |
|--------------|------------|
| A fraction | Page _____ |
| A decimal | Page _____ |
| An average | Page _____ |
| A percentage | Page _____ |
| A ratio | Page _____ |

- Florida and Alberto Castillo (Dominican Republic), and Luis Ayala (Mexico).
Up Next
vs. Kia Tigers in Viera, 1 p.m.
- QUOTABLE**
"This is something that guys aren't quite ready for yet. I hope everybody else gets hurt except for our guys."
Dodgers 2B Jeff Kent, joking about the possible consequences of the World Baseball Classic
- AROUND THE GRAPEFRUIT LEAGUE**
Pirates SS **Jack Wilson** agreed to terms on a three-year, \$20 million contract extension yesterday.
The 27-year-old Wilson was heading into the last year of a two-year, \$8 million contract. He had one more year of arbitration eligibility and could have become a free agent after the 2007 season.
Wilson has been Pittsburgh's starting shortstop for the seasons and has batted .263 with 35 home runs in 720 games. His best season was in 2004, when he was an all-star and had 201 hits. . . .
Pedro Martinez threw from the top of a mound for the first time at Mets camp, and acknowledged he still has a lot of work to do before Opening Day.
"I'm out of shape," Martinez told a group of reporters before walking off the field in Port St. Lucie, Fla. "I'm just trying to get back to the mound, see how my toe is."
Martinez said he has to concentrate on getting his foot
- healthy before he can strengthen his arm.
"I need to have my legs in good shape," he said. "Without a leg, there is no arm."
He expects to be ready for Opening Day.
Former **P. Rick Ankiel**, trying to make the Cardinals as an outfielder, will miss 10 to 14 days of spring training after injuring his left knee.
Ankiel, 26, suffered the injury during an intrasquad game Monday. An MRI exam revealed a strained patella tendon. . . .
Hideki Matsui and **Gary Sheffield** were held out of the Yankees' intrasquad game for precautionary reasons.
Matsui has a sore left knee, while Sheffield has been slowed by hip spasms. . . .
Tim Lincecum will start Opening Day for the Braves. The change in the rotation comes with the blessing of 2005 Opening Day starter **John Smoltz**, who says it's time to pass the honor to Hudson.
- ations, offered a few in-
handful of contested positions.
Spearster: Brandon Watson
will lead off and play center field
as the team begins to evaluate
- marion Byrd in
in used the few
right fielder Jo
way to start b
Church in righ
third, and Byrd
fifth.
- In WBC Games, R
For Ties After 14 Inn
- Get ready for ties in the
first World Baseball Classic.
Organizers said that
games in the first two rounds
of the tournament will be
ended after 14 innings, even
if teams remained tied.
In addition, the
tournament's technical
committee may suspend
semifinal games after 14
innings if "pitcher availability
for both teams would be
substantially jeopardized by
not suspending the game and
pitcher availability would be
substantially enhanced by
resuming the game as a
suspended game on the next
day."
Ties would count as half a
win and half a loss in
determining a team's
winning percentage,
- organizers
Rain also
situations t
normal maj
Games can
even if they
long enough
regulation q
affects which
advance, org
attempt to s
completion o
the following
is suspended
the first two
game isn't fin
that is ahead
declared the
v regulation ga
a tie if the tea
it would be ru
it hasn't been
game.
- From

Math Scavenger Hunt #2

Clip out the number and paste it next to the description. Note the page number, too.

A date earlier than Jan. 1 of this year Page _____

An age younger than 21 Page _____

A number written as a word ("one") Page _____

A prime number Page _____

A fraction smaller than one-half ($1/2$) Page _____

A decimal not representing an amount of money Page _____

A percentage higher than 50 Page _____

A measurement in inches Page _____

A measurement in miles Page _____

A page number larger than eight Page _____

An odd number greater than 100 Page _____

An even number less than 100 Page _____

Solving Word Problems

You can solve word problems easily with this step-by-step strategy.

The RQ – WQ – CQ Method for Solving Math Word Problems

Each of the letters in R-Q-W-Q-C-Q stands for a step in the strategy.

R = Read

Read the whole problem first. You may want to read it aloud, form a picture of it in your mind or sketch it out on paper.

Q = Question

Find the question to be answered in the problem. Sometimes it's clearly stated, but you may have to search for it a bit.

W = Write

Write the facts you need to answer the question. Cross out any facts that won't help you answer the question.

Q = Question

Ask yourself what equations you must write to answer the question.

C = Compute

Set up the problem on paper and do the computations. Check your work.

Q = Question

Look at your answer and ask yourself if your answer fits the facts as presented. If not, go back through the steps of the strategy.

Working With Proportion/Percentages

In this sample activity, we have incorporated math skills, consumer skills, reading for information, computation and newspaper use.

Students should understand that solving proportion problems is as simple as understanding that a proportion is equal to itself on both sides of the equal sign.

$$\frac{\text{percent}}{\text{whole}} = \frac{\text{part}}{100}$$

By plugging in the correct numbers to fit the situation, the problem can easily be solved.

Percentage problems will usually ask for one of those four parts. By inserting the information known, you can find the unknown quantity. First, students must determine which of the four parts are known and which are missing.

To illustrate that, challenge your students with this math scenario:

Imagine that you are a real estate agent. A client has come to you seeking a house that has room for 12 people to sleep. You have access to the real estate ads in the newspaper's classified section to find a property. You note that a four-bedroom house sleeps eight people. How many bedrooms will you need in order to sleep 12 people?

Here is a proportion equation to help you solve this problem:

$$\frac{4 \text{ bedrooms}}{8 \text{ people}}$$

How can you complete this equation to solve the problem?

Answer:

$$\frac{4 \text{ bedrooms}}{8 \text{ people}} = \frac{X \text{ bedrooms}}{12 \text{ people}}$$

By cross-multiplying $4 \times 12 = 48$ and $8 \times X = 48$, the problem is solved: six bedrooms.

Which houses listed for sale in the newspaper have enough room? Which ones will you suggest that your clients go to see?

LEARNING STANDARD: Students will solve word problems with proportion.

Another Proportion Situation

Newspapers often include locator maps to illustrate where a story takes place. Have students find one such map. With the scale of miles provided, they can use this example to find the distance from point A to point B on that map.

First, set up the problem.

If the scale on the map is 1 inch = 25 miles, and the distance from point A to point B is 3 inches, the problem should be set up as follows:

$$\frac{1 \text{ inch}}{25 \text{ miles}} = \frac{3 \text{ inches}}{X}$$

In order to find the answer, students must cross-multiply:

$$25 \times 3 = 1 \times X$$

or

$$75 = 1 \times X$$

or

$$X = 75$$

And that can be plugged into the original equation as:

$$\frac{1 \text{ inch}}{25 \text{ miles}} = \frac{3 \text{ inches}}{75 \text{ miles}}$$

It can be read aloud as 1 inch is to 25 miles as 3 inches are to 75 miles.

LEARNING STANDARD: Students will use a variety of reasoning processes (e.g., reasoning using proportionality) to model and to solve problems.

- Instruct students to imagine that they are real estate agents, selling houses and earning commission. Provide them with this example:

They have sold a house for \$136,000, for which they will earn a 5 percent commission. How much did they earn?

The formula to solve this problem is $\text{percent over } 100 = \text{amount over base}$.

They made 5 percent, so they should put 5 over 100 or

$$\frac{5}{100}$$

The next part of the equation will show the amount that they earned, or X, and how that relates to the whole. We know that the whole in this case is the price of the house, or \$136,000, so this part of the equation can be set up as:

$$\frac{X}{136,000}$$

Thus, the entire equation to solve this problem can be set up as:

$$\frac{5}{100} = \frac{X}{136,000}$$

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To solve the problem, they need to cross-multiply:

$$\begin{aligned}5 \times 136,000 &= 100 \times X \\5 \times 136,000 &= 680,000\end{aligned}$$

so

$$680,000 = 100 \times X$$

To isolate and to find X, they must divide both sides by 100, or

$$X = 6,800$$

This means that the 5 percent real estate sales commission on a \$136,000 home is \$6,800.

After reviewing this example and process, ask students to select five homes in the real estate ads that are listed with their prices. They should compute the sales commission on each one at 5 percent and show the equations they used to solve the problems.

LEARNING STANDARD: Students will solve problems that involve discounts, markups, commissions and profit, and compute simple and compound interest.

Pet Ads and Percentages

Offer your students this explanation of how to compute percentages:

Imagine that a local pet shelter has 60 dogs for adoption and can keep them for two weeks. After the time is up, 45 of the dogs are adopted. What percentage of the dogs are adopted? Create an equation to find this answer.

Step one:

Ask yourself if there is a percentage mentioned in this story. If there isn't one already, that is what you are looking for, and you can represent it in an equation by using X. That figure will go on one side of your equation. You write that percentage this way because a percentage is always out of a possible 100.

$$\frac{x}{100}$$

Step two:

Find the whole. In this case, the whole is 60 because that is the total number of dogs in the story. The whole, or total amount, always becomes the denominator of the fraction on the other side of your equation.

Step three:

You need to fill in the numerator for the other side of the equation. For this, you will need to find the part of the whole that is mentioned in the story. In this case, it is 45.

So, the other side of the equation is:

$$\frac{45}{60}$$

The entire equation is now set up:

$$\frac{x}{100} = \frac{45}{60}$$

Step four:

In order to find the answer, you must solve the equation by multiplying it out. You do this by cross-multiplying the numerator of one side with the denominator of the other.

$$60 \times X = 45 \times 100$$

or

$$60 \times X = 4,500$$

If $60 \times X = 4,500$, you can find X by dividing 4,500 by 60.

Thus

$$X = 75$$

The answer is that if 45 of 60 dogs were adopted, that is 75 percent of the total dogs.

Once you have reviewed this step-by-step process with students, challenge them to find the pets for sale ads in the newspaper and to calculate what percentage of the total ads are selling dogs. Cats? Birds? Other animals?

LEARNING STANDARD: Students will develop, analyze and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.

Money-Related Lessons

- Have students search the classified section to find out how much each line of an ad costs. (If a rate is not listed, call your local newspaper's classified department.) Then, they should find the longest classified ad in the paper. Have them figure out how much the advertiser paid. They should try this with other ads, too.
- Invite students to read the help-wanted ads and find three jobs that list a salary. They should calculate the following: hourly wage, daily wage, weekly wage, monthly wage, annual wage and wages earned over a three-year period.

WAGES						
	HOURLY	DAILY	WEEKLY	MONTHLY	ANNUAL	FOR 3 YEARS
JOB #1						
JOB #2						
JOB #3						

LEARNING STANDARD: Students will apply strategies and results from simpler problems to more complex problems. Students will solve simple open sentences involving operations on whole numbers.

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- Students should select three apartments for rent listed in the classified ads and do the following:
 1. Compute the total annual rent for each of the three;
 2. Determine the average monthly rent based on the three apartments they chose;
 3. Determine which of the apartments appears to be the best choice, and explain why.

	APARTMENT #1	APARTMENT #2	APARTMENT #3
RENT/MONTH			
RENT/YEAR			
AVERAGE MONTHLY RENT			
WHICH APARTMENT IS THE BEST CHOICE? WHY? _____ _____ _____			

- Ask your students to use the food section, if your newspaper contains one, to plan a meal for a family of four. They can use the grocery ads to compute the cost of the meal.
- Students can compute savings on sale items or in grocery ads.

LEARNING STANDARD: Students will compute with currency.

Computing Averages, Mean; Median and Mode

- The weather information in the newspaper provides a significant amount of authentic data for use in math activities. You can have students list temperatures from the weather page from lowest to highest. They can figure median or average of a given geographical area, or they can find the difference between lows and highs of selected cities. They can convert Fahrenheit to Celsius using this formula:

$$T_c = (5/9) \times (T_f - 32)$$

T_c = temperature in degrees Celsius

T_f = temperature in degrees Fahrenheit

For example, if the Fahrenheit temperature is 98.6 degrees and you want to convert it into degrees Celsius using the above formula, you would first subtract 32 from the Fahrenheit temperature and get 66.6. Then you multiply 66.6 by five-ninths and get 37 degrees Celsius.

- Have students find the average cost of renting a 1-, a 2- and a 3-bedroom luxury apartment for a month, a year and five years. They should list their reasons for classifying the apartments as "luxury."
- Begin the next part of the lesson with a brain teaser. Ask your students to pick three consecutive numbers and add them together. Ask one student to tell you the total. You will then take that number and divide it by three. You'll be able to identify the three consecutive numbers from that, because dividing will give you the middle number.

After identifying the numbers of several students, invite them to try and figure out how you are coming up with your answers. Next, assign them to find several averages, such as the average age of their family members. They can calculate this by adding up all of the ages and then dividing that number by the number of people in the family. Finally, ask them to find averages in the newspaper, including:

The average price of a 2004 Cadillac

The average high score in a professional sport, such as basketball, football or baseball

The average age of death of people in the obituaries

The average low temperature in 10 U.S. cities based on information on the weather page

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Assessment: The students can first assess themselves by checking a partner's average answers. They can then be tested orally by the teacher and then by a written exam. This will allow plenty of practice before they are graded on a test.

- Have students circle all of the numbers they can find on the front page of the newspaper, and find the mean, median and mode of those.
- Have students check the classified ads for recreational vehicles, such as a boat, snowmobile, 4-wheeler or camper/trailer. They should choose several that are similar and find the average price.
- Using the classified ads for used cars, have students select 10 ads for cars for sale that list their mileages. They can compute the average mileage of the 10 cars.

CAR	MILEAGE
#1	_____
#2	_____
#3	_____
#4	_____
#5	_____
#6	_____
#7	_____
#8	_____
#9	_____
#10	_____
AVERAGE MILEAGE: _____	

LEARNING STANDARD: Students will compute averages and find mean, median and mode.

Finding Percentages

- Challenge your students to use the television listings to practice computing percentages. There are several possibilities. They can add up the total amount of possible viewing minutes for prime time this evening and then check off the shows they intend to watch. Then, they can figure out what percentage of prime time they plan to spend watching TV. It may be interesting to have them compute the percentage of time they plan to spend reading and compare that to the time spent watching TV.

HOW WILL YOU SPEND YOUR TIME FROM 8-10 P.M. TONIGHT?

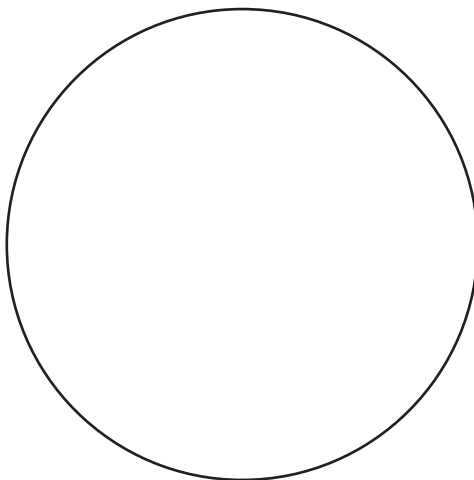
Create a pie chart:

Watching TV (____%)

Reading (____%)

Homework (____%)

Other (____%)



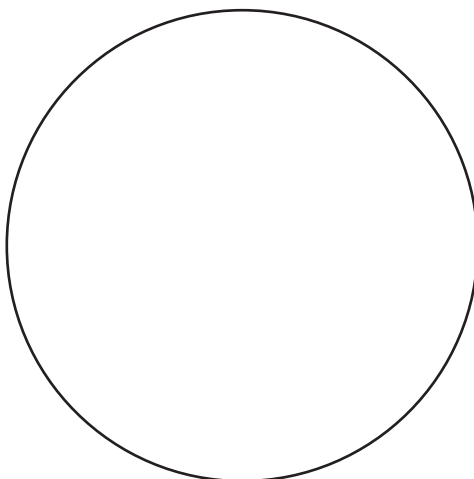
- Students can skim the television listings and check off any shows airing during the after-school hours of 3 and 6 p.m. that might be considered educational or informative (news). Then, they can compute the percentage of educational/informative TV shows versus pure entertainment programming airing during that same time period. Which shows do they think kids are most likely to watch? Why? Which do they watch? Why?

EDUCATIONAL VS. ENTERTAINMENT TELEVISION PROGRAMMING

Create a pie chart:

■ Entertainment programming aired between 3 and 6 p.m.

□ Educational programming aired between 3 and 6 p.m.



- # Job Percentages

[illegible]

Measurement

Share this example with your students.

Imagine that a rectangle's length is 2 centimeters (cm) more than 5 times its width. If the perimeter of the rectangle is 52, what are the dimensions of the rectangle?

Step one:

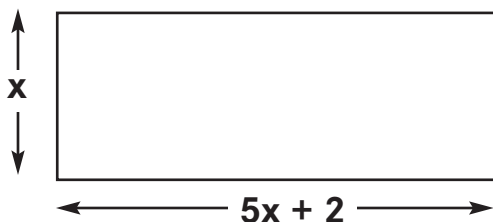
What aspect of the dimensions do you know the least about? The story gives you some information about the length, but none about the width. So, you'll have to call the width X.

Step two:

Write an equation using what you do know. The length is five times the width plus 2 centimeters. You can write that equation as

$$\text{Length} = 5x \text{ (five times the width)} + 2$$

Hint: When working with shapes and measurements, it helps to draw a picture. You can write what you know about each side.



You know the perimeter because the story gave you that information. You know the perimeter is the sum of all of the sides. Now you can write your equation by adding up all of the sides and filling in the answer.

$$12X + 4 = 52$$

Remember, to solve an equation, you must get X alone on one side. To do that you must subtract 4 from each side.

$$\text{Thus, } 12X = 52 - 4$$

or

$$12X = 48$$

If you divide by 12 on each side, you'll find the value of X, which is the width.

$$X = 4$$

Now that you know that the width is 4, you can put that into your equation and solve the problem.

$$\text{Length} = (5 \times 4) + 2$$

or

$$\text{Length} = 20 + 2$$

or

$$\text{Length} = 22$$

Now you have the dimensions of the rectangle. The length is 22; the width is 4.

When you have reviewed this example with your students, challenge them to choose several photos from the newspaper and measure them. They should then write a similar math story, leaving out one of the dimensions and exchanging with a partner to solve the problems.

LEARNING STANDARD: Students will understand the relationship between length, perimeter and width.

Math Scavenger Hunt #3

Using the classified ad section of the newspaper, do the following:

Calculate the average price of a 2003 Cadillac _____

Find what fraction of the newspaper is composed of classified ads _____

Figure out the cost of running a 30-word ad for one week _____

Estimate the total number of classified ads (based on ads per column and columns per page)

LEARNING STANDARD: Students will develop, analyze and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.

Math Anxiety

Some students may experience anxiety about math. This is very common. It may help to facilitate a discussion on this topic. Begin by asking these questions:

Do you ...

- **Feel nervous before a math test?**
- **Panic and freeze while taking math tests?**
- **Feel helpless doing your homework?**
- **Think that it's hopeless – you just don't get math and never will, so it's no use even trying?**

After allowing students to talk about their feelings, you can offer some strategies for dealing with this problem.

Suggest to students that they try the ideas on the following handouts to relax before a math test and to alleviate math homework stress.

MATH ANXIETY AT SCHOOL

Taking math tests? Have anxiety?

There are ways to keep your cool when taking a math test. Here are some ways to attack a test, starting the night before the exam.

1. Study, but not so much that it is overwhelming.
2. Calm your fears by having a set routine to follow. For example, knowing that you always eat scrambled eggs on test days might just help. (And the protein in the eggs is good brain food.) Go to bed on time. In the morning, eat breakfast, put on your lucky sweater or socks, and pack yourself a treat for lunch. Do the same things before every test so that the routine is calming and comforting.
3. Begin taking the test by thinking about something you know for sure, like your name. Thinking of something that you know is the first step in remembering more complex math rules.
4. You can stretch and free your mind by stretching your body. Give yourself a quick stretch. You can do this from your seat so there's no need to get up and disrupt the class. Simply clench and contract your foot muscles and then make tight fists and release those. Take a deep breath and think to yourself, "I'm fine." Then you will be.
5. Look through the test and find something you can do easily. Do that first. This will help you feel confident so that you can go back and finish the rest of the problems.

MATH ANXIETY AT HOME

You sit down to do your math homework. You're in a good study spot: It's quiet and has lots of light with a good chair. Yikes! You attack the first problem and you're immediately lost. What to do?

1. Draw a picture. Try a new way to solve it. Talk it out. Sometimes, just telling someone else about the problem can help break that mental block. Drawing and talking use different parts of your brain than math-oriented tasks do – let your brain help you out.
2. Avoid the issue by doing your homework earlier. If math is not your best subject and you've left your math homework until last, you may be too tired to tackle it. Do it first, even if you don't really want to.
3. If you're still stuck, take a short break. The key word there is **SHORT**. Get up, walk around, eat a piece of fruit. Then go back to work. Even doing a different problem can help you get the brain juices flowing again.

And, when all else fails ...

1. Ask for help. There are lots of people around who can help if you just ask. Ask a friend who's good in math. Find a tutor or ask your teacher. Your school may have tutors set up for you. Just ask.
2. Try to remember if something happened earlier in your life that turned you off to math. It's possible that long ago, you took one really hard test that stuck in the back of your mind and made you feel uneasy about math. Sometimes, just recalling and talking about the first incident can help you deal with the anxiety.

Remember that you can overcome math anxiety. It's just a matter of attacking the problem head-on with the determination to overcome the obstacle. It helps if you recognize that math isn't just tests and problems. Find things about math, such as puzzles and games, that you do like.

Money Matters

The newspaper is an exceptional resource for teaching about money – earning, spending, saving and more.

Begin with a discussion to assess what your students already know about money. Ask them to talk about how they get spending money and what they do with it when they have it. You may distribute newspapers to facilitate the discussion. Have them skim the pages to find expensive items, inexpensive items, etc. You can also ask them to identify the ways pictured that people can earn money.

Teaching Saving and Investing

Explain to your students that in order to accumulate money for saving or investing, people earn money by selling either a good or a service. They can make the most money either by selling a lot of something or by being good at the service they sell. They can make more money if they are productive and they sell more things. They can also make more money by being trained well to provide better service.

Usually, those with more training or schooling are paid more. People pay more for smart, well-trained workers. That's why people who work as stock checkers in a warehouse where not much training is required aren't paid as much as lawyers, who go through years of schooling to learn how to practice law. That's also why people who don't finish high school often earn less money than people who do get their diplomas. Then, students should understand that once people earn money, they need to decide how to spend or save it.

Students should know that previously, people saved money by banking whatever was left after paying their bills. Because the cost of living has gone up, saving can no longer be something that gets done with extra money. Instead, it must be purposely planned. Students should learn that the younger you are when you start saving, the easier it is to accumulate larger sums of money.

Explain to your students that it's a great idea to start saving early in life because they can begin to enjoy something called "compounding." Compounding means that interest is earned not just on what you put into a bank account, but also on the interest that the bank pays you.

Other Lending Institutions

Many businesses or institutions will pay some kind of “rent” for people’s money. When money is invested by lending it to a business or institution, there is a risk that the loaned money will be lost. Savings bonds, for example, are very safe. One of the biggest borrowers is the U.S. government. A bond is a piece of paper showing that the government owes a person money. The amount of interest people earn from the government depends on how long they will wait to get back their money. The longer they agree to wait, the more interest they will earn.

- Ask your students what they think about the importance of saving money. Do they save now? How?

Budgeting

- Begin by asking students to list things they have wanted that their parents have said they couldn’t have because they cost too much money – designer clothes, games, bikes, electronic equipment, etc. Explain what is meant by the “high cost of living.”

GROUP ACTIVITY

- Divide the class into pairs. Give a newspaper to each pair. Challenge students to imagine that they are high school graduates who have chosen to live together for a while. They plan to get jobs before deciding whether to go on to college.
- Using the newspaper and the worksheet, students will learn to budget their money. (Students will need to ascertain salaries for jobs they might find in the newspaper. If salaries are not available in employment ads, teachers can estimate them for students.) After the worksheets are completed, discuss the activity with the class. With what sum of money did each pair of roommates start out? How much was left at the end of the activity? What weren’t they able to afford? Did the roommates have any disagreements about how to spend their money?

Budgeting for an Apartment

Use the classified ads to answer the following questions. If you run out of money before number 5, start over.

1. You and a friend want to share an apartment. Each roommate must find a job for a high school graduate. Look in the help-wanted section of the classifieds. List the name of the job and the monthly salary. (If pay is not given in the ad, search online for an estimate.)

Roommate 1: _____ \$ _____ monthly
(name of job)

Roommate 2: _____ \$ _____ monthly
(name of job)

Total income for two roommates: \$ _____

Minus 25 percent for taxes: \$ _____

Final income: \$ _____

2. Using the total monthly income above as a guide, find an apartment you can afford. Look in the real estate or apartments for rent section. List the number of bedrooms and monthly rent below.

3. Water, electricity and gas cost money. Estimate their cost as 10 percent of the rent money. Cost is \$ _____ a month.

LEARNING STANDARD: Students will analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.

4. You will need a phone. Plan to spend a one-time fee of \$25 for a phone and the hookup. How much will you allow yourselves to spend each month for calls?

\$ _____

Or, skim the newspaper for ads for cell phones and see if you can get a better deal with one of those.

5. Your apartment needs furniture. How many pieces will you buy with the money left over after rent and utilities? Buy the pieces you can afford and list them below, along with their prices. You may buy furniture advertised in the newspaper's display ads or you may buy used furniture advertised in the classifieds. What is the total amount you plan to spend on furniture?

_____ \$ _____

_____ \$ _____

_____ \$ _____

_____ \$ _____

Total for furniture: \$ _____

6. Do you have any money left over for food and entertainment?

How much? \$ _____

The Million-Dollar Mission

Can you spend a million dollars buying just what is advertised in today’s newspaper? Do exactly that by playing this game.

- You cannot spend more than \$1 million dollars, but you need to spend as close to \$1 million dollars as possible. The student who gets closest to spending \$1 million dollars wins the game. Take the assignment a step further and see if you can spend exactly \$1 million dollars. You are allowed to use your calculators on everything except for the subtraction.

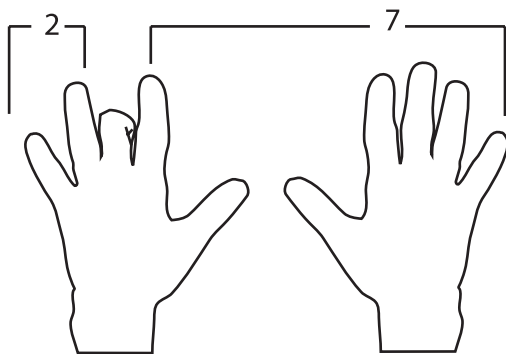
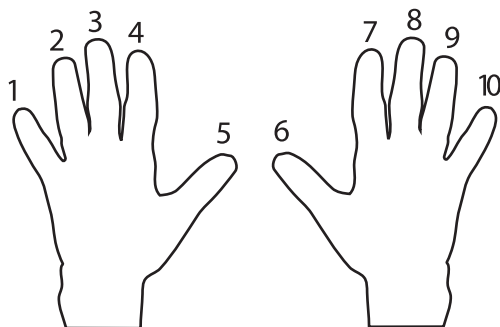
HOW ARE YOU GOING TO SPEND YOUR MONEY?			
Quantity	Item purchased	Unit cost	Total cost
Total:			_____
Target:			\$1,000,000.00

LEARNING STANDARD: Students will understand situations in which an estimate is more appropriate than a calculation and will use rounding to check the reasonableness of computation results.

Fun Math Tips and Tricks

Explain to students that they always have the nine times table right in their hands. Make a large set of hands to put up on the board. Number the fingers on the hands from 1 to 10. Use these hands to show that 9×3 , for example, can be visually seen by bending down the third finger of one hand and there you have 2 and 7 fingers, or the answer to 9×3 (27). Have students practice and drill on this. The students should do the finger-bending with their own hands so that they can actively learn this.

“9 x” Table



Other Financial Literacy Lessons

Saving on Purpose

In today's economy, saving has to be something people plan for and do intentionally. Have the students look through the newspaper to find advertised interest rates. Are banks offering people any incentives to encourage them to save? About how much can students earn on their money if they save \$1,000 in a year?

LEARNING STANDARD: Students will understand the basics of banking.

All About Investments

Explain the meaning of investment to your students. An investment is the placing of money in hopes of a profitable return. Investments may include stocks and bonds, real estate, mutual funds, art, jewelry or a limited partnership in a small business.

Have the class turn to the business section of your newspaper and find the page with the stock market information. (If your newspaper does not include stock pages, students can find that information online to complete this task.) They should take a few moments to familiarize themselves with this page. Then the students can find the answers to the questions below from the financial data. The ability to read and interpret the stock market summary enables students to understand financial data and successfully manage their money.

1. Name three of the most active stocks on the NYSE (New York Stock Exchange).

2. Of these stocks, which one had the most shares traded (volume)?

_____ How many? _____

3. Name three of the most active stocks on the AMEX (American Stock Exchange).

4. Name three major stocks that were gainers from this list.

5. Now, name three of the most active stocks from the NASDAQ (National Association of Security Dealers Automated Quotations system).

Invest in Property

Explain to students that when prices of real estate rise, that is called appreciation. Real estate prices have been appreciating in recent years and investors are making huge profits.

- Have the students find a property to purchase in the classified ads. How much will the property be worth if the price increases by 25 percent? How about 30 percent? Fifty percent?
- The students will have to borrow money from a bank or mortgage company. Have them find the lowest interest rate advertised in the newspaper.

LEARNING STANDARD: Students will recognize investment opportunities.

Prices Inflate

Explain to students that inflation means prices go up. It's not good for the economy, because people can't buy as much. Here's an example you can give them to illustrate the point. A pair of shoes cost \$15 last year. If you had \$30, you could have bought two pairs. But suppose inflation raises the price to \$25 a pair this year. Now you can buy only one pair with your \$30.

If people can't buy as many pairs of shoes, factories need fewer workers to make shoes and stores need fewer salespeople to sell shoes. When more people are out of work, they can't spend money. So you can see how inflation, and its rising prices, hurts the economy.

- Have the class select five items from the newspaper with prices and determine what the costs of the items will be in five years if inflation causes prices to double. What if the prices triple in 10 years? Then students can complete the chart to show their results.

	ITEM	CURRENT PRICE	IN FIVE YEARS	IN 10 YEARS
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____



LEARNING STANDARD: Students will understand an economic system.

A Decade Ago

During times of inflation, people may worry that prices will go even higher, so they might choose to save their money rather than to spend it. When people don't spend, the economy slows down.

- Have the students create a list of products from the newspaper and record the current prices. Then they can take their lists home and have an adult approximate the prices of those items 10 years ago.

LEARNING STANDARD: Students will compare and understand the historical record of market economics.

Collections of Value

- Have students take surveys of collections kept by their classmates. List below the most popular collections in your class (stamps, coins, trading cards, etc.).

Most popular _____

Second most popular _____

Third most popular _____

- Have students look in the classified section of the newspaper under “wanted to buy.” What collections are in demand? Write at least five items collectors are seeking to buy.

LEARNING STANDARD: Students will understand supply and demand.

It's the Economy

Students should understand that people often vote for candidates they believe will be good for the economy. What does your class think the government can do to control inflation? Have students use their newspapers to investigate what the government is doing to direct the economy. They can write a brief explanation of any stories involving the government and the economy. They should include the "Five Ws" of the story – who, what, where, when and why.

WHO?

WHAT?

WHERE?

WHEN?

WHY?

LEARNING STANDARD: Students will understand the role of government in an economy.

Save Money

It is recommended by financial advisers that 10 percent of income should be saved. However, many people are unable to save that much. Have students select five jobs from the help-wanted ads in the newspaper that indicate salary. How much money would workers have to put aside if they want to save 10 percent of their salaries? How about 5 percent or 3 percent?

	JOB	SALARY	10% SAVED	5% SAVED	3% SAVED
1.	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____

LEARNING STANDARD: Students will design a saving strategy.

Weekend Plans

Students are in charge of planning a weekend of fun for their families. Have them estimate what they will need to spend. Using the newspaper, the students can plan five activities and the cost of each. Have them calculate the total expense for the weekend and complete a graph to show how much they would spend.

COST OF ACTIVITIES

Example: Friday night at the movies with parents and brother. Parents' tickets cost \$7 each; brother's ticket and mine cost \$5.50 each. Cost of activity: \$25.

ACTIVITY	COST
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

TOTAL COST of weekend fun with family: _____

LEARNING STANDARD: Students will use computation to solve problems.

Business Opportunity

Successful businesses need thorough planning and require hard work. Have the students look in the classified ads for a business opportunity. They can select the business opportunity in the newspaper that they think has the most potential to succeed. Have them decide what additional information they will need to find out about the business in order to make an informed decision as to whether this is a good investment. They should write five questions to ask the current owner.

1. _____ ?
2. _____ ?
3. _____ ?
4. _____ ?
5. _____ ?

Challenge students to develop their own business ideas. They should write a business plan with some of the following information:

1. What is the business idea?
2. Do they need to invest money in the business?
3. Will they need to advertise? (They can design a newspaper ad.)
4. What specific work will they perform?
5. Why do they believe this business can be successful?

LEARNING STANDARD: Students will make business decisions.

Inheritance Challenge

Have students imagine that they have just received an inheritance of \$20,000. They want that amount to grow, so they decide to invest in the stock market. Encourage them to develop what is called a diversified portfolio featuring a number of different stocks.

To choose their stocks, they should first skim the newspaper looking for stories that may have an impact on the stock market. Is there an article in the business section about an up-and-coming company, or a merger that might change stock prices? Is there a cold winter predicted that might encourage an investment in home heating oil companies? Is there a new, hot sporting-good item that's making news?

Have them choose at least five stocks and decide how much to invest in each. Emphasize that they must invest the entire \$20,000. They should watch the stocks for seven business days and note the changes in value. At the end of seven days, have them determine how much money was made or lost. Do they think that investing in the stock market is a good way to make money?

STOCK	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7

Financial Literacy Glossary

Discuss with the class the meanings of the words below. Have each student select a word and write a sentence for it. Ask students to see how many of these terms can be found in the newspaper.

Banking – To transact business with a bank or maintain a bank account.

Bonds – A certificate of debt issued by a government or corporation guaranteeing payment of the original investment plus interest by a specified future date.

Borrowing – Getting something on loan with the promise of returning it.

Budget – An itemized summary of estimated expenditures for a given period.

Compound – To compute interest on the principal and accrued interest.

Dividend – The part of corporate net earnings distributed to stockholders

Inflation – An increase in the level of consumer prices or a decline in the purchasing power of money.

Interest – Payment for the use of borrowed money.

Investments – Property or other possessions acquired for future financial return or benefit.

Profit – Income received from investments or property.

Real estate – Property consisting of houses and land.

Saving – To accumulate money.

Stock – The capital or fund that a corporation raises through the sale of shares.

Roman Numerals

Students are generally fascinated by Roman numerals, as they are similar to a secret code. Although they are not an essential component of math, they should be considered as a part of our cultural heritage. They can also be incorporated into a study of number systems and computation.

Present Roman numerals to your students, either as a handout or on the board.

I – 1

V – 5

X – 10

L – 50

C – 100

D – 500

M – 1,000

Discuss their history. Roman numerals were developed around 500 B.C., in part from Greek alphabet symbols. Using an addition method, they are read from left to right. The symbol I was based on one finger. The V of five was the shape that was made when all five fingers were being counted and the space between the thumb and the first finger formed a “V.” The X for 10 may have been the result of 10 ones, written in a row and then crossed out with an “X” to simplify counting. Eventually, just the X came to signify 10. The “C” for 100 came from the Latin word “centum,” or hundred. The “M” for 1,000 came from “mille,” or thousand.

After reviewing the history, you can explain the decoding process. The largest numeral is at the left, with smaller numbers on the right. Numbers are added as you go, thus VIII is $5 + 1 + 1 + 1$, or 8. If there is a smaller numeral before a larger one, the instruction is to subtract the smaller from the larger. Thus, IX is one less than 10, or nine. Forty – as in the 2006 Super Bowl – is XL, or 50 minus 10.

Your students will be able to see that Roman numeral decoding is a bit labor-intensive and that may be the reason that Roman numerals were replaced. However, they are a distinctive way to represent numbers.

LEARNING STANDARD: Students will recognize and identify Roman numerals and will translate them into Arabic numbers.

Math Scavenger Hunt #4

See how many Roman numerals you can find in the newspaper. Translate them here.

Then, write the following in Arabic and Roman numerals:

Your birth year _____

The number of people in your immediate family _____

The price of one new car advertised in today's newspaper _____

The temperature of the coldest city in the United States, according to the newspaper's weather page _____

Today's date _____

A five- and a six-digit number, as found in today's newspaper _____

Word Problems

Encourage your students to write word problems based on material from the newspaper. Using the movie listings, for example, they might write a problem such as this one:

There is a multiplex theater showing three movies. The entire theater seats 800 people. There are 270 seats in the first theater and 150 more seats in theater two than there are in theater three. How many seats are there in theater two?

After they have written a problem such as this one, they also would have to set up an equation to solve the problem. In this case, they might set it up as follows:

$$\begin{aligned}
 x &= \text{seats in theater 3 (T3)} \\
 x + 150 &= \text{seats in theater 2 (T2)} \\
 T1 + T2 + T3 &= 800 \text{ seats} \\
 270 + (150 + x) + x &= 800 \\
 420 + 2x &= 800 \\
 x &= 190 \\
 x + 150 &= 340 \text{ seats in theater two}
 \end{aligned}$$

Or, they can use statistics in the sports section to write word problems, or even the ads in the automotive section. The challenge is to use the authentic data and weave it into solvable word problems. For assessment, they should exchange problems with a partner, solve the problems and check each other's work.

LEARNING STANDARD: Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable, and provide justification for each step.

Writing Word Problems

Your students can use the material in any day's newspaper to write word problems for a partner to solve. You can facilitate this activity by reviewing the strategies for writing word problems (see page 7).

Begin by reviewing key words that might appear in word problems of addition and subtraction. Addition problems might include total, sum, in all, etc. Subtraction problems might include difference, less and more.

Then, explain that just as addition and subtraction problems have key words, so do multiplication and division problems. For example, read aloud this multiplication problem:

Sarah has a collection of baseball cards that she wants to sell at a garage sale. She has five boxes of cards and each box contains 15 cards. How many cards does she have to sell in all?

Have students note that the key words in that problem include “each” and “in all.” Students should recognize that multiplication is repeated addition and that is why the key words are similar. Finally, model the equation to solve this problem:

$$5 \text{ boxes} \times 15 \text{ cards} = 75 \text{ cards}$$

You can also present a similar division word problem.

Sarah has 75 baseball cards to sell. She wants to sell them in boxes of 15 cards each. How many boxes will she have to sell?

The key words there are “how many” and “each.”

The correct equation here is:

$$75 \text{ cards} \div 15 \text{ cards} = 5 \text{ boxes}$$

Finally, allow students about 15 minutes to look through the newspaper's sports section to find statistics upon which they can base the writing of several word problems. They should write at least three problems and exchange them with a partner so that each can solve the other's problems. At the end, they should check each other's work.

If either partner has difficulty solving the problems, the other must offer instruction about the correct equation to use to find the answer. The goal here is that each person is able to write problems correctly and develop equations to solve problems. It's a great activity for peer tutoring and you can have students of differing abilities work together.

Math Quick Hits

- Students can use the temperatures listed on the weather page to make line graphs of the temperatures.
- Television viewing offers lots of different choices. Have students study the listings for prime-time viewing – 8 to 11 p.m. – on the three major broadcast networks and note the types of shows. Then have them compute the percentage of time geared to comedy, news, drama and sports. They should gather the data and create a pie graph showing the result.
- Have students use the weather page to choose 10 cities that are listed with their high and low temperatures. Have them compute the percentage of difference between the two for each city.
- Invite students to check out the help-wanted ads. They can determine the ratio of manufacturing jobs to sales jobs.
- Students can locate three examples each of perpendicular and parallel lines in the news photos.
- Here is a great activity that combines language arts and math. Have students skim the comic strips to find any slang expressions. For each strip in which they find slang, have them compute what percentage of the total words the slang comprises. You can do this same type of lesson having students identify pronouns, adverbs, etc.
- Have students use the used car ads to determine the percentage of the total that is represented by each make of car. How many Fords? How many Chevrolets? How many Nissans? Hondas? Toyotas? Saturns, etc.? Can they show each total as a fraction? As a decimal? As a percentage?
- Have students select a page from the newspaper that includes news stories and ads. Have them determine what fractional part of the page is taken up by ads.
- Challenge your students to brainstorm on easy ways to determine the total number of words and/or paragraphs on one page of the newspaper. Allow different groups to try out different methods and have one group actually count the words. See which method comes closest to the actual total.
- This activity will help students to understand the step-by-step method of transferring and transposing amounts and variables on paper. They should select a recipe from the newspaper's food section and use their addition and multiplication skills to convert the amounts so that the recipe serves 28 people for a party.
- Another good activity using the information in the food section is to have students estimate the cost of a meal using advertised food items. They can estimate the cost of one meal for four people and then estimate the cost of serving a family of four for one day, then a week, and ultimately a year.

Resources

Fun math games and puzzles can be found at:

www.funbrain.com

A great source for all levels of math can be found at:

www.mathforum.org/teachers

Lots of great lesson plans are at:

www.awesomelibrary.org

Look for brain teasers at:

www.eduplace.com/math/brain/index.html

Parents and teachers can make use of the information at:

www.middleschool.net/curlink/math/mthmain.htm

Visit the National Council of Teachers of Mathematics at:

www.nctm.org