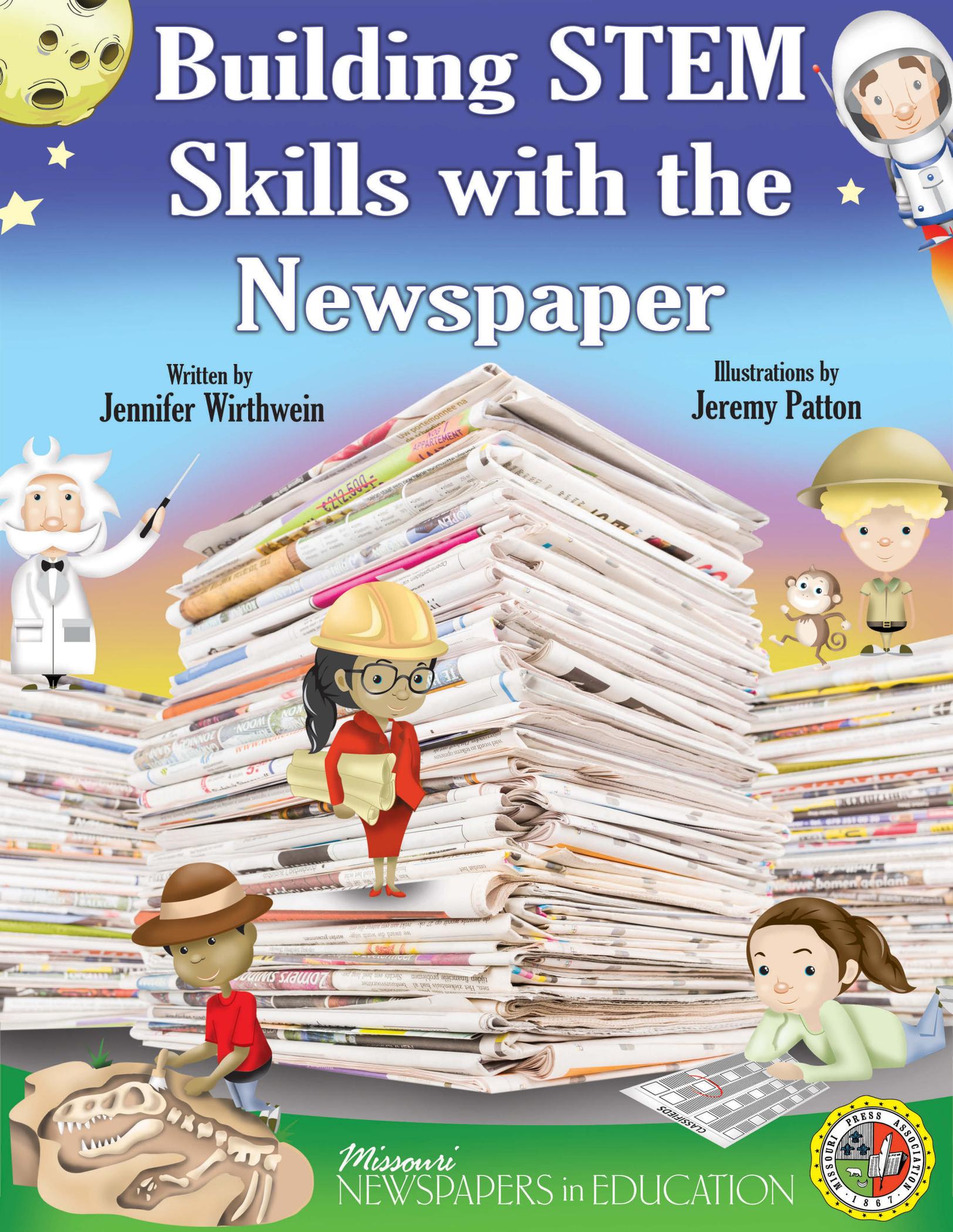


Building STEM Skills with the Newspaper

Written by
Jennifer Wirthwein

Illustrations by
Jeremy Patton

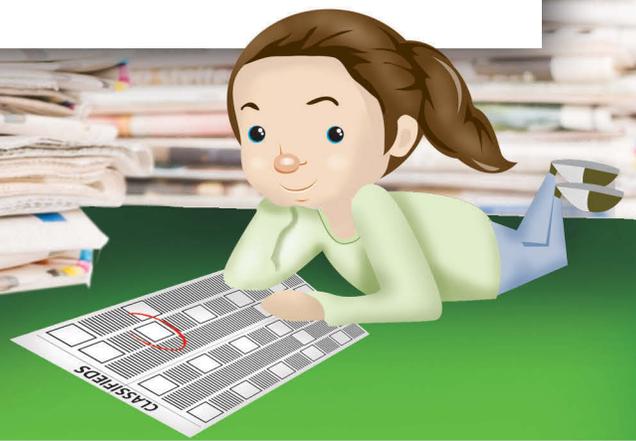


Missouri
NEWSPAPERS in EDUCATION



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WHY STEM?

Dear Educator,

In today's society, STEM (science, technology, engineering and mathematics) education is more important than ever. STEM is all around us. Science—weather, nature, animals; Technology – computers, smartphones, tablets; Engineering—designing buildings, roads, bridges; and Mathematics—grocery store, banks and more. STEM education encourages critical thinking, analyzing and making connections.

According to the United States Department of Labor, the 10 fastest growing careers from 2008-2018 are biomedical engineers, network systems analysts, home health care aides, financial examiners, medical scientists, physician assistants, skin care specialists, biochemists, and athletic trainers. All of these are STEM careers.

The newspaper is an excellent source for students to keep up to date with current events and to sharpen their critical thinking skills. In this guide, you will find a brief overview of the four main branches of STEM, newspaper activities to reinforce those skills, and extension activities.



PHYSICAL SCIENCE



Definition: Physical science is the study of the physical world around you—physics, chemistry, astronomy.

Careers: Astronomer, physicist, organic chemist, astronaut

If you like to study the stars and constellations, experiment with electricity, or complete science experiments, then you are already practicing physical science. Try the following activities using your newspaper.

Read the following article from Physics Today magazine:

www.aip.org/jobs/career-advice/physical-scientists-can-do-anything-heres-how-you-start-your-career-planning

Breakthroughs: Use the newspaper to find an example of a scientific advance or device that will improve the quality of life for you or someone else. Write a summary explaining how the breakthrough will be helpful.

Energy Awareness: Use the newspaper to find an electrical appliance that you use regularly. Next, write an alternative you could use to complete the same function that would save energy. For example, instead of using a hair dryer, you could air dry your hair.

Sink or Float: Find 10 items pictured in the newspaper. Classify the item as “sink” or “float.” Defend your choices with specific facts. Compare your answers with your classmates.

Space Travel: Imagine you are visiting Earth from another planet. Your mission is to study earthlings. Use the newspaper to learn about earthlings. Write your report to submit to your home planet. What did you observe? What conclusions could you make?

For more physical science ideas, visit:

siemensscienceday.discoveryeducation.com/activities/hands-on-science-activities.cfm



Learning Standards I can use the newspaper to locate information. I can make text-to-world connections. I can ask questions as part of the scientific process. I can classify and analyze information. I can write for a specific purpose and audience.

LIFE SCIENCE



Definition: Life science is the study of plants, animals and other living things.

Careers: Zoologist, veterinarian, geneticist, botanist, pharmacist, doctor, psychologist, and biochemist.

If you are interested in taking care of your pets, growing a garden, or sports/fitness—you are practicing skills in life science. Open up the newspaper to try these activities.

Newsworthy Science: Newsworthy science topics may include weather, natural disasters, health, medicine, and space exploration. Find a science related story in the newspaper and summarize using the 5Ws—who, what, when, where, and why.

Fitness Fads: Look through the newspaper to find advertisements for fitness classes and equipment. Based on the ads, what are the most popular forms of exercise? Find pictures that promote exercise in the newspaper. Label each picture with the benefits of that particular exercise—muscle tone, endurance, etc.

Wild or Domesticated: Find pictures of animals in the newspaper and categorize them as wild or domestic. For each animal, state the criteria you used to sort them.

Natural Habitats: Habitats provide food, water and shelter for plants and animals. Habitats may include woodlands, prairies, oceans, marshes, deserts, etc. Look in the newspaper for references to different habitats. List the habitats and the plants and animals that live there.

For ideas and hands-on activities for life science? Visit: www.education.com/activity/life-science



Learning Standards

I can use the newspaper to locate information. I can make text-to-world connections. I can classify and analyze information. I can summarize information. I can write for a specific purpose and audience.

EARTH SCIENCE



Definition: Earth science is the study of the planet Earth and its atmosphere.

Careers: Meteorology, paleontology, archeology, and oceanography.

If you like studying weather patterns, prehistoric periods, or rock formations, you are already applying earth science skills.

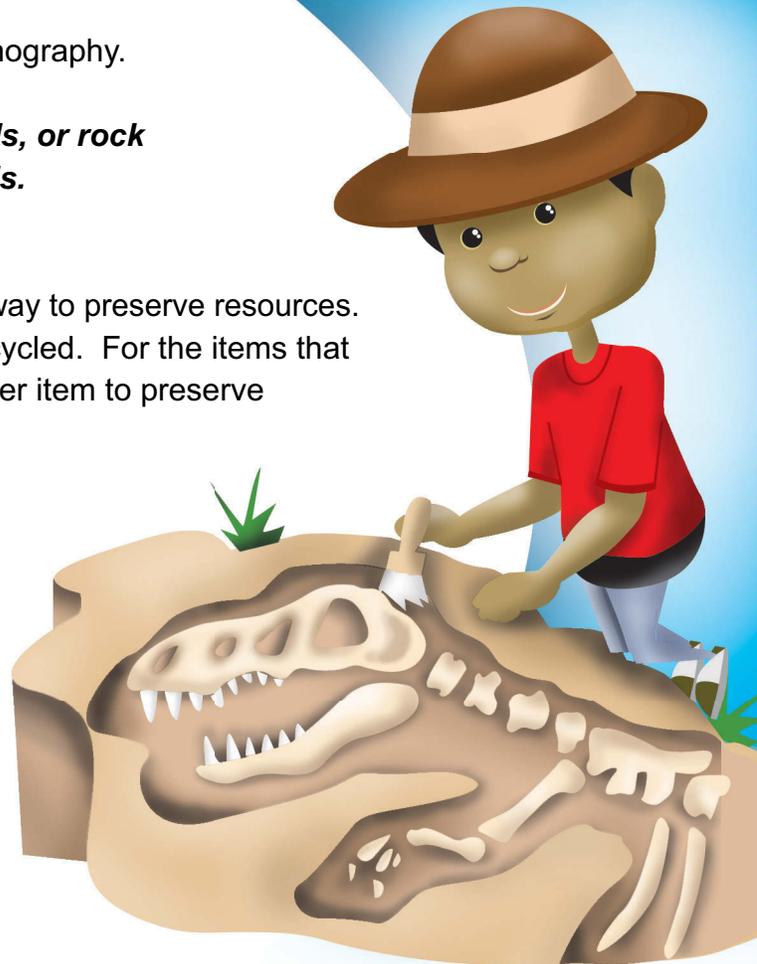
Try the following activities to sharpen your skills.

That Can Be Recycled: Recycling is an easy and effective way to preserve resources. Use the newspaper to find items that can and cannot be recycled. For the items that cannot be recycled, list ways you can use this item or another item to preserve resources.

Caution Ahead: Human activities can cause hazards to the environment—land use, natural resources, chemicals, and waste disposal, to name a few. Collect newspaper stories, pictures and commentaries about human activities that cause hazardous living conditions.

Save the Earth: Think about ways human activity affects our environment. Locate pictures of people solving environmental problems in your community.

Weather Works: Look at the weather report in the newspaper. What symbols are used to represent the following weather conditions: sunny, cloudy, partly cloudy, thunderstorms, snow, etc. Next, find newspaper ads for businesses affected by different types of weather. Based on the weather forecast, what types of sales can these businesses expect in the upcoming week? Explain your answer with supporting details.



For more activities involving earth science, visit: www.sciencekids.co.nz/earth.html

Learning Standards

I can use the newspaper to locate information. I can make text-to-world connections. I can ask analyze cause and effect relationships. I can make predictions and inferences. I can write for a specific purpose and audience.

SCIENCE REFLECTION PAGE

1. What are the three main branches of science?

2. Name five careers you could have with a science background.

3. Why is the study of science important?

4. What hobbies could help you develop science skills?

Learning Standards

I can restate the main idea.

I can make text-to-world and text-to-self connections.

"Equipped with his five senses, man explores the universe around him and calls the experience science." - Edwin Powell Hubble



TECHNOLOGY



Definition: Technology is the use of science to invent things or processes to function more efficiently. At one time, technology was the invention of the wheel. Today, technology includes computers, smart phones, etc.

Technology includes the following branches: Computer science, information technology, communication, computer engineering, information, and programming.

Careers: Computer programmers, computer engineers, graphic designers, photographers, systems analysts, and web designers.

Visit the U.S. Bureau of Labor Statistics for kids to find out more about these careers:

www.bls.gov/k12/content/students/careers/career-exploration.htm

If you are interested in computers, video games, robotics, Photoshop, problem solving, and creating new things, you are technology minded. Check out these newspaper activities that explore technology.

Technological Top Ten: Use the newspaper to find examples of technology. Choose 10 items and rank them in order of importance. What would life be like without your top-ranked item? Write a paragraph that defends your top choice.

Diversity in Science: When you think of scientists, do you think of men and women? Do you think of people of all races? Technological advances have been made by a diverse group of people. Use the newspaper to observe how an informative news article is written. Next, write a news article about a scientist you have studied and his or her technological advance and how it has changed society.

Progressive Science: Science and technology can help to solve a number of social, economic and environmental problems. Use the newspaper to find a problem that can be solved by the use of technology. Explain the causes of the problem and how technology will help to solve or prevent the problem.

Future Artifacts: Scientists learn about history through artifacts. Locate a picture of an item in the newspaper that could be used as an artifact someday. What would scientists learn about our culture and society from this artifact?



For hands-on technology ideas, visit: www.sciencekids.co.nz/lessonplans/technology.html

Learning Standards

I can use the newspaper to locate information. I can make text-to-world connections. I can analyze the benefits of technology. I can analyze cause and effect relationships. I can write for a specific purpose and audience.

TECHNOLOGY REFLECTION PAGE

1. How is technology used in your daily activities?

2. What technological advances have been developed in the past five years?

3. What skills do you need if you are interested in a career in technology?

4. What are the pros and cons of technology?

Learning Standards:

I can restate the main idea.

I can make text-to-world and text-to-self connections.



"Any sufficiently advanced technology is indistinguishable from magic."

- Arthur C. Clarke

ENGINEERING



Definition: Engineering is the process of using scientific methods to create large structures, products or systems. Engineering includes many branches, such as: chemical, civil, electrical, environmental, mechanical, agricultural, aeronautical, etc.

Careers: Architect, automotive engineer, CAD technician, HVAC technician.

If you enjoy building new things, then check out these engineering activities in the newspaper.

For more information on engineering jobs, visit:

www.sciencekids.co.nz/sciencefacts/engineering/typesofengineeringjobs.html

Transportation Engineers: Look through the newspaper to find an example of transportation. How was this form of transportation developed? How has this form of transportation helped society?

Mechanical Engineers: Look through today's newspaper for pictures of things that were designed and created by mechanical engineers. Keep a tally of each item found, circle them or cut them out.

Electrical Engineering: Find a newspaper article about something an electrical engineer created. This could be a mobile phone, tablet, lighting, wiring, etc. Summarize the article with main idea and supporting details.

Teamwork: Engineering requires a lot of teamwork. Find a story that focuses on a project that used teamwork. Why was teamwork necessary?

Problem and Solution: Engineers identify problems and strive to seek a solution for them. Find an article in the newspaper and circle the problem. If a solution is listed, underline it. If a solution is not listed, brainstorm possible solutions.

Teachers, visit: www.discovere.org
www.teachengineering.org

Students, visit: www.engineergirl.org
<http://www.instructables.com/id/Project-Based-Engineering-for-Kids>



Learning Standards

I can use the newspaper to locate information. I can make text-to-world connections. I can draw conclusions and make inferences. I can write for a specific purpose and audience.

ENGINEERING REFLECTION PAGE

1. Normally, civil engineers specialize in one or two major disciplines: transportation, structural, water resources, environmental, and/or geotechnical. If you were to become a civil engineer, on which of these disciplines would you focus? Why?

2. Write down everything you use during the course of a regular day that you believe a mechanical engineer has designed. Share your list with your classmates.

3. If you were a pharmaceutical engineer, what sickness or disease would you focus on finding a cure for? Why?

4. Write about it: Research a famous engineer and write a news article that summarizes your findings. Create an advertisement that persuades others to pursue a career in engineering. Be sure to cite your sources.

Learning Standards

I can restate the main idea.

I can make text-to-world and text-to-self connections.

“Engineering is the greatest job there is! People count on engineers to help solve the world’s problems. The impact of engineering spans the environment we live in to the energy we need to the products we use. Engineers take great ideas and help turn them into reality.”

- Charles A. Clerecuzio, biochemical engineer



MATHEMATICS



Definition: Mathematics is the study of numbers, quantity, shapes, patterns and relationships.

Mathematics is used on a daily basis: Whether you are shopping at the store, calculating travel distance, or creating a schedule to make use of your time, you are using math.

Mathematic skills include: Computation, ratio, place value, percentage, mean, median, and mode.

Careers: Accounting, actuarial science, finance, statistics, teaching.

If you enjoy numbers, patterns, and problem solving, mathematics is a good fit for you.

Try these math activities using the newspaper.

Convert That Number: Partial numbers can be displayed as a fraction, a decimal or a percent. Use the newspaper to find a percent and convert that number to a decimal and a fraction.

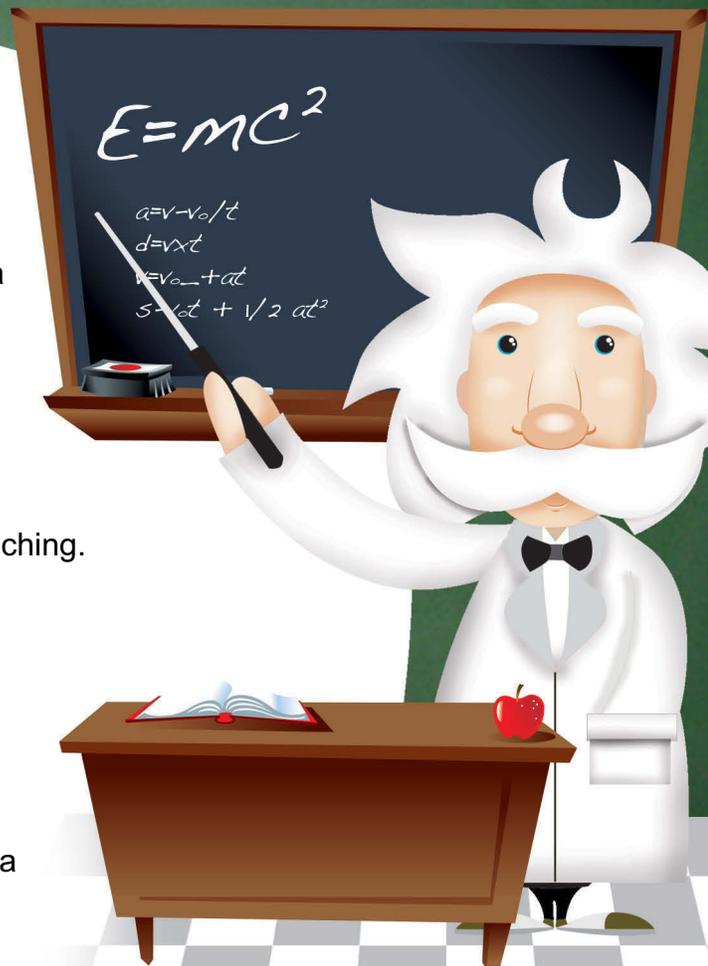
Notation: Find a number greater than 100,000. Write the number in scientific notation. What is the biggest number you can find in the newspaper? Write the number in expanded notation.

Layout Design: Choose three pages of the newspaper.

Calculate the amount of space that is devoted to advertisements, pictures, and text. Compare the answers for each page. Which sections have the most text? Which sections have the most advertisements?

Scale Factor: Choose a logo in the newspaper that you would like to sketch. You can either reduce or enlarge the size of the original in your sketch. Next, measure the difference between the two images and create a scale that explains the difference in representations.

Newspaper Road Map: With a friend, choose a news story to be your make-believe road map. Both of you cut the story from two separate newspapers. Your starting point will be the first word. Your partner will give you cardinal directions (ex: two words east, four words south, one word west, etc.) while they also navigate the route. When they say "stop," compare your maps. Choose another article so you can give your partner directions.



MATHEMATICS (CONTINUED)

Recipes Abound: Newspapers can be a great source for finding recipes. Imagine you have found an excellent recipe and you would like enough to share with your classmates. Convert the serving size and ingredient list to accommodate your class size.

Weather works: Arrange the temperatures in the predicted weather forecast from highest to lowest. Next, round each temperature to the nearest ten, compute the average high temperature, and find the mean and median temperatures. Evaluate the accuracy of the predicted weather. Record the actual temperature next to the predicted temperature. Plot the difference between the predicted temperature and actual temperature for 10 days. What was the average difference?

Distances: Find five U.S. cities mentioned in the newspaper. Estimate the distance from your city to these cities. Next, use a map to calculate the actual distance. Use the sports section to find an event you'd like to attend. Next, find two routes you could take to travel to the event. Which is the shortest route? Which route is the quickest? What are the pros and cons of each route?

Carpeted Area: Locate an advertisement for carpeting and find the cost per square foot. Next, measure your classroom and determine how much carpet would be needed and the estimated cost.

Help Wanted: Using the Help Wanted ads, create a graph that shows the number of jobs advertised that require a high school diploma, a college degree, and a master's degree or higher. Write three conclusions based on the information displayed in the graph.

Averages: Use the birth announcements to find the average birth weight for baby boys and baby girls. Write a ratio to compare the two numbers. Use the Classified ads to find apartments for rent. Calculate the average price for a one-bedroom, two-bedroom, and three-bedroom apartment.

For more information about hands-on math activities, visit: www.education.com/activity/math



Learning Standards

I can use the newspaper to locate information. I can make text-to-world connections. I can convert fractions to numerals and decimals. I can write numbers in scientific notation. I can create a scaled drawing.

MONETARY MATHEMATICS



Definition: Monetary math is the mathematics of money, which includes calculating sales tax, interest rates and planning a budget.

Careers: Loan officers, retail personnel, accounts payable/receivable, bankers and more.

Sold By the Pound: Look through the grocery ads in the newspaper. Find an item that is sold by the pound. Calculate the cost for 3, 5 and 10 pounds.

A Taxing Matter: Discuss sales tax rates in your city. Use the newspaper to find examples of goods and services that can be purchased. Practice calculating sales tax on those items.

Shopping Savvy: Use the newspaper to find a sales ad. Calculate the difference between the regular price and the sale price. What is the percentage of discount?

It's Classified: Choose 10 different Classified ads. Calculate the cost to run a Classified ad. How much would it cost to run each of the 10 selected ads?

Making a Commission: Car salesmen and real estate agents make commissions, which means they get to keep a portion of the sale in exchange for the work they did to sell the item. Choose five cars and five houses listed for sale in the newspaper. If the agent made a 15-percent commission, how much would they make for each sale?

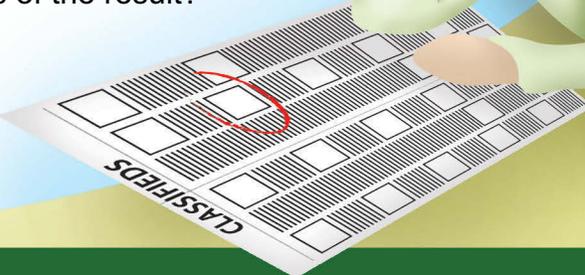
Bank It: Find an advertisement for a bank. What percent interest is advertised? How much interest would you earn in one year? Three years? Ten years?

Take It for a Test Drive: Choose a car you would like to buy that is listed in the newspaper. If you were to save \$75 per week, how many weeks would it take you to save for the car? If you planned to purchase the car in two years, how much would you need to save each week?

Did You Know: The sum of the digits of the number added to 9 is always equal to the sum of the digits of the result?

For more fun math facts, visit:
www.kidsmathgamesonline.com/facts.html

\$75/Week?



Learning Standards

I can use the newspaper to locate information. I can make text-to-world connections.

I can add, subtract, multiply, and divide to solve a problem.

MATHEMATICS REFLECTION PAGE

1. How is math used in your daily activities?

2. What careers rely on mathematics?

3. What hobbies develop mathematic skills?

4. Why is it important to study mathematics?

Learning Standards

I can restate the main idea.

I can make text-to-world and text-to-self connections.

"Without mathematics, there's nothing you can do. Everything around you is mathematics. Everything around you is numbers."

– Shakuntala Devi, known as the "human computer"

