

MATH SMARTS

Introduction

Math is so much a part of our everyday lives that it is hard to think of how we would function without a fundamental understanding of numbers and number systems. Showing students the importance of math in all aspects of their lives is an important step toward convincing them of the relevance of learning about the rules of math, how numbers work, and how numbers are used.

This teacher's guide helps young adults learn more about using math skills. Students will have varying familiarity with the topics covered in the book and the detailed explanations will help them understand more about the basic study of mathematics. This guide provides cross-curricular ideas to reinforce their learning and their review.

National Standards

This series supports Math, Language Arts, Social Studies, Music, and Science curriculum. Go to www.enslowclassroom.com and click on the Curriculum Correlations tab. Click on your state, grade level, and curriculum standard to display how any book in this series backs up your state's specific curriculum standard.

Classroom Activities

Activities for teaching five curriculum areas: Reading/Language Arts, Money and Finance, Measurement, Science, and Music can be found in this teacher's guide. Students will appreciate how math is so closely tied to everything they do and the activities are designed to show a wide range of examples to show how math is not just a subject to learn in school but a tool to master and use throughout their lives.

Guided Reading Level: O

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Percent and Ratio Smarts!

Teacher's Guide for Percent and Ratio Smarts!

Warm Up

Have the students look at the book's cover and read the title aloud. Discuss together what they may already know about the topic or topics mentioned in the title. Then have the students review the table of contents to see how the book is organized -- show the students that the book builds on each chapter and skill. Turn to some pages to show the students how important words, concepts, and ideas are highlighted and boxed on pages. Tell the students that when they see boxed text on a page, they should reread it and think about what it says.

Assess Readiness

Consider preparing and administering a short pretest prior to discussing new concepts to assess prior knowledge and to maximize class time for all students.

Introducing New Concepts

Although new math concepts are often taught in a whole-group setting, some teachers may find it useful to create three or four small groups and work with each individually when concepts and strategies are introduced. As the teacher works with one group for ten or fifteen minutes, the other students may be reviewing previous lessons or concepts, working on math fluency, or reinforcing what they have already learned.

Practice New Concepts

Provide ample time for students to review and practice each new concept as it is presented, always keeping in mind the ability levels of all students. Remember that in most cases, it is not: *Can the student learn it?* but: *How can the student learn it?* It is important to know and use the tools and materials students will need to practice and master concepts.

Make an assortment of tools and materials available to engage all types of learners: manipulatives, computers, conferencing with peers and/or the teacher, writing on the board or on paper, and plenty of time and unlimited practice to reinforce each new concept before moving on. Tell the students that an important part of the learning process is actually doing it. They must do multiple problems to master each concept and become proficient.

Mastering Fundamental Skills

Remind the students that basic math skills should be practiced until they are automatic and they should work toward knowing addition, subtraction, multiplication, and division facts without conscious thought. Make them aware that these facts will be used constantly in all higher-level math skills.

Provide timed practice sessions for fundamental skills as appropriate and encourage pairs of students to quiz each other as time permits. Have flash cards, practice sheets, games, and manipulatives easily accessible for students to work on mastery of basic math facts.

Encourage Discussion

Strive to keep learning and class time comfortable and fun for all students. They should be encouraged to ask questions and talk about what they do not understand and may need extra help with.

The Five Curriculum Activities

Before any activity, make sure your students do not have any allergies to items you may use. Never use anything sharp that may cut a student. Do not use anything too hot or too cold which may injure a student. Always have an adult supervise all activities to ensure the safety of your students and provide an appropriate setting, such as a gym or an outdoor space, for physical activities. Make sure the students are supervised when using the Internet.

Reading/Language Arts Activity

Ask the students to recall what a golden rectangle is and why it is important. Discuss how the book tells us that the Parthenon in Greece was constructed as a golden rectangle. Ask the students to research when the Parthenon was built, the significance of building it in this way, and to provide some details about it. Have the students create presentations showing what they have learned.

Money and Finance Activity

Ask the students to imagine that a bicycle is listed for sale at \$325.00. This weekend it is offered at 25% off. The bike does not sell even at the sale price, so the bike store owner offers a one-day sale at an additional 25% off. Ask the students whether this is the same as the bike being 50% off its list price. Have the students calculate to find 25% off and then 25% off the sale price versus 50% off the original price and then come to a conclusion about percent discounts.

Measurement Activity

Invite the students to suggest ways knowing how to create and solve a proportion will help them with real-life word problems. Discuss how converting metric measures to inches can be helpful in some lines of work. Ask the students how they would create and solve a proportion if they knew that 12 inches equals 30.48 centimeters, and they wanted to know how many centimeters are in a yard. Guide the students to create this proportion to solve the problem:
inches/centimeters = 12/30.48. Then have the students discuss how to solve a word problem with proportion: A poster board is 21 inches and needs to be cut into two pieces that have a 2:5 ratio. How long will the pieces need to be? Guide the students to seeing the ratio $2:5 = x : (21 - x)$ and solve $2/5 = x / 21 - x$. Invite the students to create their own proportion word problem involving measurement.

Science Activity

Ask the students to research online how scientists often tag some fish in a lake or pond as a way to find out the fish population in that body of water. They tag a set number of fish, place them back into the water, and after a period of time catch a sample of fish. They use the ratio of tagged fish to untagged fish in their sample as a way to estimate total fish. Provide the students with the example that in a small pond, 50 fish were tagged and tossed back. Two weeks later, 50 fish were caught and it was found that 5 of the fish were tagged. Invite the students to set up a proportion to figure out about how many fish are in the pond ($5/50 = 50/f$). Discuss how the tagging method may work better than other methods, such as draining the pond.

Music Activity

Discuss with the students how many songs played toward have three or four beats per measure. These beats tend to be a steady pattern whether they are fast or slow. Play a song and have the students count the beat to themselves and discuss together how it remains steady. Ask students why they think this three- or four-beat strategy works so well.

Handout

Name: _____

Outcomes and Probability

Your friend tosses a dime in the air three times, and each time it comes up tails. She says that there is more of a probability of her next coin toss coming up heads than tails. You want to prove her right or wrong.

Use the chart below and toss a dime in the air 25 times. Record whether it lands on heads (H) or tails (T).

1/	6/	11/	16/	21/
2/	7/	12/	17/	22/
3/	8/	13/	18/	23/
4/	9/	14/	19/	24/
5/	10/	15/	20/	25/

How many times did the coin come up as heads? _____/25

How many times did the coin come up as tails? _____/25

Predict what the outcome would be if you had tossed the dime 100 times:

Heads: _____

Tails: _____

What makes you say that?

Think and Write About It: Was your friend lying when she said the dime landed on heads three times in a row – is that possible? What would you tell her about probability and outcome as it pertains to coins?

Assessment

- When is a ratio in lowest terms?
 - When neither number is an even number
 - When it can be written as a fraction
 - When only 1 can be divided evenly into both terms
 - When each term has been divided by the same number
- When an event has a probability of 1, what does that most nearly mean?
 - It may happen.
 - It probably won't happen.
 - It has a good chance of happening.
 - It definitely will happen.
- What is a true statement about compound interest?
 - It is the sum of the principal and the interest previously earned.
 - It is less than the principal.
 - It is the only type of interest offered by banks.
 - It is rarely used for savings accounts.
- (T/F) Whole numbers are all the counting numbers plus 0.
- What is the smallest number that goes into both sets of multiples for two numbers called?
 - Lowest terms
 - Whole number ratio
 - Greatest common factor
 - Least common multiple
- What number is found by multiplying the diagonals of the proportion?
 - Cross product
 - Least common multiple
 - Proportional amount
 - Known ratio
- What is a whole number and a fractional part called?
 - Proportion
 - Improper fraction
 - Mixed number
 - Discount rate
- Which example is not a way to write a ratio?
 - 20:100
 - 20/100
 - 20 out of 100
 - (20)(100)
- What is a true statement about the fraction $15/12$?
 - It is an improper fraction.
 - It is reduced to lowest terms.
 - It is less than 1.
 - It is the same as 75%.
- (T/F) If a customer leaves their interest in the bank, more interest will be added.

Answers: (1-3=supporting facts; 4-7=vocabulary; 8-10=inference)

1	C
2	D
3	A
4	T
5	D
6	A
7	C
8	B
9	A
10	T