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# MATH!

TEACHER'S EDITION  
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**Welcome to our 16th annual EARTH DAY ISSUE!** It's so encouraging to see the strong interest that today's youth have in protecting their environment. And we never have a problem coming up with great topics for this special issue. On pages 4-5, Victoria Justice from TV's *Victorious* helps us calculate how much we save in trees, landfill space, water, and oil when we recycle paper. On pages 8-9, we meet a lead scientist from the Census of Marine Life—and see how she uses proportions. On pages 10-11, learn the numerical facts about the San Francisco Giants' efforts to go green. Our backpage features a special environmental message from the legendary Tony Hawk. And there's much more! Happy Earth Day....

*Jack Silbert*  
 Jack Silbert, Editor

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## SKILLS GUIDE

= Calculator Use Suitable    = Critical Thinking    = Writing in Math

ARTICLE	MAJOR FOCUS	REAL-LIFE CONNECTIONS	SUPPLEMENTARY SKILLS	NCTM STANDARDS*
ACTIVITY: cover Justice for the Planet!	Whole number $\times$	• Actress Victoria Justice • Paper and plastic waste	• Circumference	1, 3, 4, 8, 9
EARTH MATH: p. 2	Mixed skills	• Threatened African elephants • Eco-City in China	• Percent decrease; metric measure; rate; days in a year; etc.	1, 2, 4, 6, 8, 9
MATH FOR YOUR DAILY LIFE: p. 4 Victoria's Paper Caper	Percent of a number	• Paper-recycling benefits • Production of <i>MATH</i> Magazine	• Completing a chart • Decimal $\times$	1, 4, 8, 9, 10
STATISTICS: p. 6 Garbage Graph!	Reading a double-line graph	• U.S. trash discarded in landfills vs. trash recycled, 1960-2009	• Visual discrimination • Drawing conclusions	1, 5, 7, 8, 9, 10
MATH AT WORK: p. 8 Counting Creatures	Solving proportions	• Career: marine biologist • Census of Marine Life	• Whole number $\times$ , $\div$ • Area of a square	1, 2, 3, 4, 8, 9
SPORTS BY THE NUMBERS: p. 10 More Than the Field Is Green	Mixed skills	• San Francisco Giants' eco-friendly stadium	• Whole number $\times$ , $\div$ ; percents; fraction $\div$ ; decimal $\times$ ; etc.	1, 2, 4, 8, 9
PRACTICE TEST: p. 12 % Change the World V	Percent change	• Standardized test practice • Environmental trivia	• Two-step equations • Writing decimals as percents	1, 2, 7, 8, 9
MATH WIZ COMICS: p. 14 Negative Pollution Powers	Exponents $\leq 0$	• Comic strips as a literacy tool • Pollution	• Whole number $\times$ • Writing fractions as decimals	1, 2, 8
STAR WRAP: back page Hawk Soars on Earth Day	Positive/negative integer $\times$ , $\div$	• Skateboarder Tony Hawk's Earth Day message	• Reading for detail	1, 2, 8

**\*NCTM Middle School Curriculum Standards**

- |                                |                        |
|--------------------------------|------------------------|
| 1. Number and Operations       | 6. Problem Solving     |
| 2. Algebra                     | 7. Reasoning and Proof |
| 3. Geometry                    | 8. Communication       |
| 4. Measurement                 | 9. Connections         |
| 5. Data Analysis & Probability | 10. Representation     |

For more detailed information about the National Council of Teachers of Mathematics Standards, write to: NCTM, 1906 Association Drive, Reston, VA 20191-9988. Phone: (703) 620-9840. Fax: (703) 476-2970. E-mail: [infocentral@nctm.org](mailto:infocentral@nctm.org)

**DON'T MISS OUR LAST ISSUE OF THE YEAR...**  
**MATH FOR YOUR DAILY LIFE:** Harry Potter star Daniel Radcliffe shows us that you don't need magic to understand **interest rates**.

**FEATURE:** *Billboard* created a new chart not based on music artists' sales, but on their popularity on social-networking sites. We take a mathematical look!

**SPORTS:** The Women's World Cup kicks off in late June! We show how to follow the action with a box score.

**SKILLS REVIEW:** It's our popular giant crossnumber puzzle, covering many of the years' skills.

**...AND MUCH, MUCH MORE!**

SUPPLEMENT TO SCHOLASTIC MATH



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# TEACHING TIPS

## COVER

### Justice for the Planet!

Students should estimate. Round 24,902 to 25,000 and multiply by 300 to get 7,500,000 miles.

## PAGES 2 – 3

### Earth Math

**Critic's Corner: *Born to Be Wild*:** Writing 1.2 million as a decimal number (1,200,000) is a helpful first step.

## PAGES 4 – 5

### Victoria's Paper Caper

Group students in teams to complete the computations. Review finding a percent of a number. Example:  $35.6\%$  of  $11.5 = 0.356 \times 11.5$ .

## PAGES 6 – 7

### Garbage Graph!

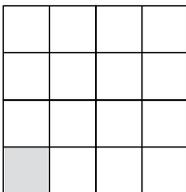
To make a greater impact, ask students to model what 4.5 pounds would be. For instance, how many math textbooks would equal the amount of trash produced (on average) by one American in one day? One week? Now consider the whole class, and all of their families' members. How long before the class (and their families) produce a ton of trash?

## PAGES 8 – 9

### Counting Creatures

Simulate sampling by placing 10 objects in a paper bag that differ by one attribute: color. Example: 8 blue markers and 2 red markers; 7 silver paper clips and 3 gold paper clips. Model sampling by selecting a few

items out of the bag. Have students make a prediction about the contents of the bag based upon the sample drawn. Repeat several times.



You could also use a simple area model to help students understand how the marine biologist is taking a sample. Knowing the fish content in the shaded square would help you to predict the fish content in the whole square.

## PAGES 10 – 11

### More Than the Field Is Green

Before reading the story, ask students if they can think of how a major-league ballpark could “go green.” Chances are students won't think about all the resources consumed in a ballpark. This will help in thinking about things that might be done at your school to reduce consumption of natural resources. After finishing the questions, students may be inspired to act locally to reduce consumption.

## PAGES 12 – 13

### % Change the World V

Review the formula for percent

change with students. A common error is to compare the amount of change (numerator) to the *new* amount versus the *original* amount.

## PAGES 14 – 15

### Negative Pollution Powers

It is helpful to relate negative exponents to what students know about place value (powers of 10) and something familiar like powers of 2.

**Example 1:**  $10^3 = 1,000$   
 $10^2 = 100$   
 $10^1 = 10$

**Example 2:**  $2^3 = 8$   
 $2^2 = 4$   
 $2^1 = 2$

Discuss the patterns. When the exponent is decreased by 1, the result is divided by 10 (or by 2 in Example 2). If the pattern continued,  $10^0$  would equal 1 ( $10 \div 10$ ). Continuing again,  $10^{-1}$  would equal  $\frac{1}{10}$  ( $1 \div 10$ ).

## BACK PAGE

### Hawk Soars on Earth Day

A quick review of multiplying and dividing integers may be necessary. You might review by telling students that you're thinking of two numbers whose product is 24. After they finish guessing the obvious factors ( $1 \times 24$ ,  $2 \times 12$ ,  $3 \times 8$ ,  $4 \times 6$ ) they might think about fractions ( $\frac{1}{2} \times 48$ ). Hopefully, a student will finally think about two negative integers which would then allow for a quick review.

For a list of  
**ONLINE RESOURCES**  
related to this issue, visit:  
[www.scholastic.com/math/links](http://www.scholastic.com/math/links)

# EXTENSION ACTIVITIES

## COVER

### Justice for the Planet!

Have students research how much waste is produced in other countries and how it compares to the United States.

## PAGES 2 – 3

### Earth Math

**Born to Be Wild:** Students may also be interested in the movie *African Cats* opening on Earth Day.

**Greenest Town Around:** Have students create a visual of what 100 gallons of water would look like. They could do this by determining how many classroom waste baskets equal 100 gallons, or how many classroom cubbies equal 100 gallons. Ask your students what they can do to reduce their water use.

**Green Numbers:** Ask students how many single-serving plastic water bottles end up in landfills every year in the U.S.:  $.80 \times 28,000,000,000 = 22.4$  billion.

## PAGES 4 – 5

### Victoria's Paper Caper

Make a bulletin board display of how paper is used daily by students in your class. They should include things such as cash register receipts, paper towels, and food wrappers.

## PAGES 6 – 7

### Garbage Graph!

Discuss recycling with your science colleague and others. What could your school be doing today to reduce waste and recycle more?

## PAGES 8 – 9

### Counting Creatures

Have students estimate the number of dandelions on a grassy location near school. Teams of students count the number of dandelions in a small sample area (1 yard by 1 yard), and use their results to predict the number in a larger region. Ask: How does the size of the sample affect the result?

As your sample size gets larger, will your prediction likely get closer to, or further from, the actual population size? Why?

## PAGES 10 – 11

### More Than the Field Is Green

Have students research what steps have been taken by their favorite teams—regardless of the sport—and their respective arenas to “go green.”

## PAGES 12 – 13

### % Change the World V

Encourage students to find additional environmental data that could be used to find percent change and share their findings with the class.

Teaching tips and extension activities  
written by **Dr. Laurie Boswell**  
*Laurie is a teacher and the headmaster of  
Riverside School in Lyndonville, Vermont.*

## WHAT'S ON OUR WEBSITE FOR YOUR STUDENTS? PLENTY!

- Glossary of math terms covered in the magazine
- Student poll based on a topic from the issue
- The super-fun math game KenKen—new puzzles posted daily!
- Links to safe Internet sites related to the articles in the issue
- Forms to submit Major Math Mistakes, original puzzles, and Critic's Corner ideas

## WE WANT TO WRITE ABOUT YOUR STUDENTS!

Do any students in your class...

- run their own business?
- have a unique hobby?
- help out the community?

If you know a student who you think could be the subject of a *MATH* Magazine article, let us know!

Send story ideas to:

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