How Much Is A Million?

(GPN #120/PBS #1201)
Author: David M. Schwartz
Illustrator: Steven Kellogg
Publisher: Lothrop, Lee & Shepard

Program Description: LeVar explores the concepts of estimation and large numbers in trips to the Crayola factory and to Giants Stadium as the crew prepares for game day crowds.

Math Concepts:

- estimation
- measurement
- time
- money values
- large numbers
- mathematical reasoning
- counting

• **Time relationships and estimation**. Explore time relationships through estimation and experimentation. Post questions such as: "What can you do in a second?" "A minute?" "Two minutes?" "An hour?" Start lists of answers to these questions. Several experiments can be conducted at school, such as how long it takes to blink, smile, raise a hand, tie shoes, etc. Others, such as brushing teeth, will more likely be verified at home. Encourage students to estimate how long it takes to do a variety of tasks.

• **Time relationships and estimation**. Have students estimate in response to this question: "How many numbers can you write in a minute?" Perform the task more than one time, starting at a different place, i.e., start with 1, with 10, with 50, with 100. Compare what they were actually able to write with their estimates.

Reading Rainbow is a production WNED-TV Buffalo, NY and Educate Media Resources, Ltd.

• **Math reasoning and measurement**. In the story, towers of children, stacked upon each other's shoulders, are used as a measurement tool. Reason the solutions to other problems using this tool. For example, how tall is the school building if second graders made a tower? How tall is the school building in sixth graders? Use other tall community structures in the problems, such as office buildings, hotels, water towers, etc.

* **Estimation and measurement**. Using boxes containing different numbers of crayons (e.g., boxes of 64, 96, etc.), have students estimate the length of a crayon line of new crayons placed end to end. With students for whom the concepts of "inches" and "feet" are too abstract, use other reference points, such as estimating that the crayon line will be the length of the classroom or from the classroom door to the corner of the hallway. "Test" these estimations with lines of crayons.

• **Estimation and measurement**. Use a crayon as an alternative unit of measurement. Estimate first, then measure to address such questions as: "How many crayons long is the table?" "How many crayons tall are you?" "How many crayons long is the door?" and others.

• **Math reasoning**. In the story, Marvelosissimo estimated that a goldfish bowl large enough to hold a billion goldfish would be as big as a stadium. Crayola® made its 100 billionth crayon in 1995. Have the students reason how big a crayon box would be if it held 1 billion crayons. (A note from the author, David Schwartz, in the back of the book, explains his reasoning on the goldfish problem.)

• **Math reasoning**. Have students develop creative solutions to the following problem: How many miles can a new crayon color in a straight line until the crayon is completely used? Record the estimates and obtain an atlas and a world map and locate places that are the same distances away as the estimates. Have students explain how they arrived at their estimates. (Remind them that there are many possible solutions.)

• **Estimation**. Using the reproducible graph paper of one-inch squares on the next page, have students estimate how many squares they will need to color, starting with a new crayon, until the crayon is completely used. Record their estimates and then start coloring to find out! Leave sheets of the paper and the crayon in a special place so that students can color a square when they have the opportunity. Discuss the necessity for everyone to color using a similar amount of pressure on the crayon. When the crayon is used, problem solve ways to determine how many squares were colored, in addition to counting by 1's. (For conservation purposes, run the graph paper two-sided and use "odd" crayons that often end up in the recycled crayon box.)

Do-At-Home Activity

- **Estimation and mathematical reasoning**. Invite parents to explore the fun of large numbers with their children by becoming involved in creative math reasoning projects. Here are some suggestions, but there are many other possibilities:
    - According to the Crayola company, children spend 6.3 billion hours a year coloring. Have parents help their children estimate first and then chart the number of hours a week they spend coloring at home.
    - In the video, viewers were able to visit Giants Stadium in New Jersey. Have parents and children work together to find out where a large stadium is located in their state and some additional information needed for creating and solving math problems, including its seating capacity, number of season ticket holders, prices of concession items, and how many sporting events per year take place there. Invite parents and children to think of and creatively reason solutions to appropriate math problems. For example, "If a sellout crowd attends every game, estimate how many people attend in a year?" and "Estimate how much money in concession sales does a stadium make on a game day."

Reading Rainbow is a production WNED-TV Buffalo, NY and Educate Media Resources, Ltd.

GPN EDUCATIONAL MEDIA
GPN
1001 Fleet St
Baltimore, MD 21202
1-800-228-4630

Cut off edges. There are 70 squares on this page.

HOW MUCH IS A MILLION?

Author: David M. Schwartz
Illustrator: Steven Kellogg
Publisher: William Morrow

THEME:

Although it may not be feasible to count a million of something, we can imagine a million through skills of estimation and mathematical reasoning.

PROGRAM SUMMARY:

Illustrations and text from this feature book help readers visualize how much a million, a billion and a trillion really are.

LeVar explores ways of counting large numbers as he talks to people who share grouping and estimating techniques. In a visit to the Crayola Crayon Factory, workers show how crayons are made and talk about the large number of crayons they handle in their jobs. Then on to Giants Stadium where vendors and stadium employees use estimation to prepare for game day.

TOPICS FOR DISCUSSION:

Before viewing the program, ask the students, "How much *is* a million?" and discuss the variety of responses they offer.

Before viewing the program, discuss what sorts of things logically exist in "millions." Begin this discussion with objects that are more easily visualized, such as things that come in 2's, 3's, 4's, 7's, a dozen, etc.

After viewing the program, obtain a copy of the book and read all the problems and solutions, allowing students to study the illustrations more closely. Discuss which solutions could *possibly* be verified and why others would likely be impossible to check.

Discuss the concept of "estimation" and why it is useful when thinking about very large numbers, such as million, billion, and trillion.

CURRICULUM EXTENSION ACTIVITIES:

Have students estimate in response to this question: "How many numbers can you write in a minute?" Perform the task more than one time, starting at a different place, i.e., start with 1, with 10, with 50, with 100. Compare what they were actually able to write with their estimates. Discuss factors that influenced their ability to do this task depending on the starting numeral.

Explore time relationships through estimation and experimentation. Pose questions such as: "What can you do in a second?" "A minute?" "Two minutes?" "An hour?" etc. Start lists of answers to these questions. Several experiments can be conducted at school, such as how long it takes to blink, smile, raise a hand, tie shoes, etc. Others, such as brushing teeth, will more likely be verified at home.

Marvelosissimo used calendars to represent years. Make a class calendar for the entire school year. Use oversized paper (about 18 x 24) so there is plenty of room for students to write in the squares. Students take responsibility for daily recording of news and events in the squares. At the end of the month, a committee of two or three students can be responsible for making a picture that summarizes the month. (This picture is placed on the back of the preceding calendar page so the class calendar "works" like a wall calendar.) Have students decide how they wish to handle school vacations. Bind the calendar pages with a spiral at the top, to make the calendar into a big book.

Using boxes containing different numbers of crayons (e.g., box of 64, 96, etc.), have students estimate the length of a crayon line of new crayons placed end to end. With students for whom the concepts of "inches" and "feet" are too abstract, use other reference points, such as estimating that the crayon line will be the length of the classroom or from the classroom door to the corner of the hallway. "Test" these estimations with lines of crayons.

Use a crayon as an alternative unit of measurement. Estimate first, then measure to address such questions as: "How many crayons long is the table?" "How many crayons tall are you?" "How many crayons long is the door?" and others.

Using boxes of 96 crayons, sort crayons into different color categories. Allow students to choose their own categories and then describe how they sorted the crayons. Possible categories for sorting include: by specific color (all the greens, blues, etc.); warm and cool colors; primary and secondary colors; light and dark colors; earth and sky colors; etc. It might be useful to co-direct this activity with the art teacher.

Crayola® crayons have "colorful" names. Have students research the backgrounds on such colors as "fuchsia," "wisteria," and "cerulean." Discuss why names such as "macaroni and cheese" and "tickle me pink" are appropriate for the colors. Discuss the difference between "red violet" and "violet red." Begin lists of vocabulary words on pieces of colored construction paper and add to these lists as students encounter new color words. For example, the "red" list might eventually contain "scarlet," "crimson," and "vermilion" in addition to "rose" and "brick red."

©2005 WNYPBA. All rights reserved

Have students create new names for some of their crayons and justify why their new names would be appropriate. Some students might choose to put their justifications in the form of a letter and send it to the Crayola company.

In the program, the concession vendors at Giants Stadium were preparing for *crowds* of people. Brainstorm synonyms for "crowd" and locate other collective nouns, including group names for animals as well as people. (For ideas, see Ruth Heller's *A Cache of Jewels*, Patricia MacCarthy's *Herds of Words*, and three books by Brian Wildsmith—*Wild Animals*, *Birds*, and *Fishes*.)

RELATED THEMES:

large numbers
estimation
crayon art
mathematical reasoning

ABOUT THE AUTHOR:

David M. Schwartz had a "sense of wonder" about science and math ever since he was a boy. He published his first piece, an article about weather vanes in *Smithsonian* magazine, when he was an elementary school teacher. He and Steven Kellogg also collaborated on *If You Made a Million*. Schwartz makes his home in Yountville, California.

ABOUT THE ILLUSTRATOR:

Steven Kellogg enjoyed writing and illustrating stories when he was a small child and often entertained his younger sisters with them. His humorous, highly detailed drawings are the trademark of his many books, which include *Paul Bunyan* and *Best Friends*, both **Reading Rainbow** feature books, and *The Island of Skog*, a **Reading Rainbow** review book. Steven lives in Connecticut with his wife, Helen.

BOOKS REVIEWED BY CHILDREN:

ONE HUNDRED HUNGRY ANTS
by Elinor J. Pinczes, illus. by Bonnie MacKain (Houghton Mifflin)

ONLY ONE
by Marc Harshman, illus. by Barbara Garrison (Cobblehill/Dutton)

HOW MANY STARS IN THE SKY?
by Lenny Hort, illus. by James E. Ransome (William Morrow)

©2005 GPN/University of Nebraska-Lincoln. All rights reserved.

SUPPLEMENTARY BOOKLIST:

THE RAJAH'S RICE: A MATHEMATICAL FOLKTALE FROM INDIA
by David Barry, illus. by Donna Perrone (W. H. Freeman)

THE KING'S CHESSBOARD
by David Birch, illus. by Devis Grebu (Dial)

COUNTING ON FRANK
by Rod Clement (Gareth Stevens)

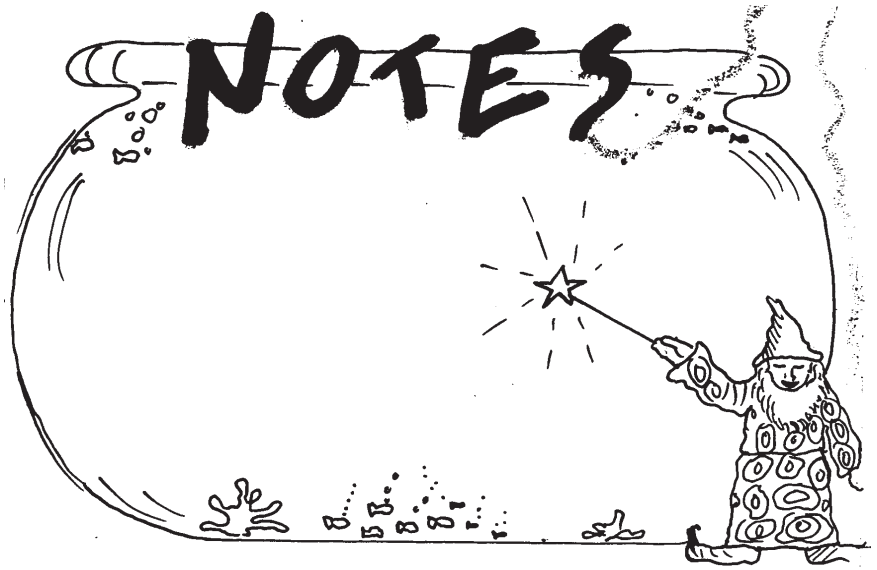
MY CRAYONS TALK
by Patricia Hubbard, illus. by G. Brian Karas (Henry Holt)

A MILLION FISH...MORE OR LESS
by Patricia McKissack, illus. by Dena Schutzer (Knopf)

ONE ZILLION VALENTINES
by Frank Modell (Greenwillow)

THE MILLIONTH EGG
by Bernice Myers (Lothrop, Lee & Shepard)

THE CRAYON COUNTING BOOK
By Pam Munoz T Ryan and Jerry Pallotta, illus. by Frank Mazzola, Jr. (Charlesbridge)

HOW IS A CRAYON MADE?
by Charles Oz (Scholastic)

IF YOU MADE A MILLION
by David M. Schwartz, illus. by Steven Kellogg (Lothrop, Lee & Shepard)