

Embedding Literacy into the Primary Mathematics Classroom



presented by
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The Phantom Tollbooth by Norton Juster

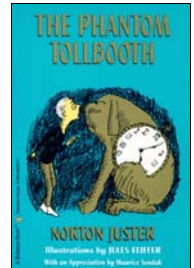
A Kingdom Divided

Land of Dictionopolis

"Words are more important than wisdom" thought one brother.

Land of Digitopolis

"Numbers are more important than wisdom" thought the other.



The Phantom Tollbooth by Norton Juster

A Kingdom United

"Words and Numbers are of equal value for in the cloak of knowledge one is warp and the other is woof. It is no more important to count the sands than it is to name the stars. Therefore, let both kingdoms live together in peace."

Family Circus by Bil Keane



"Reading is easier than math. There are only 26 letters, but millions of numbers."

Literacy and Numeracy



- Create a list where you encounter literacy daily.
- Now create a list where you encounter numeracy daily.
- Match items on the literacy list with items on the numeracy list.
- The links between literacy and numeracy show the relevancy of mathematics on an everyday basis.

Examples

Literacy

- Newspapers
- Menus
- Recipes
- Television Guides
- Books

Numeracy

- Data tables
- Money-prices
- Measurement
- Time
- Page numbers



Language is Part of Every Mathematics Lesson

- Language arts objectives are present in any mathematics lesson because language is used whenever one

- Talks
- Reads
- Listens
- Writes



We Learn



- 10% of what we read
- 20% of what we hear
- 30% of what we see
- 50% of what we both see and hear
- 70% of what is discussed with others
- 80% of what we experience personally
- 95% of what we teach someone else.

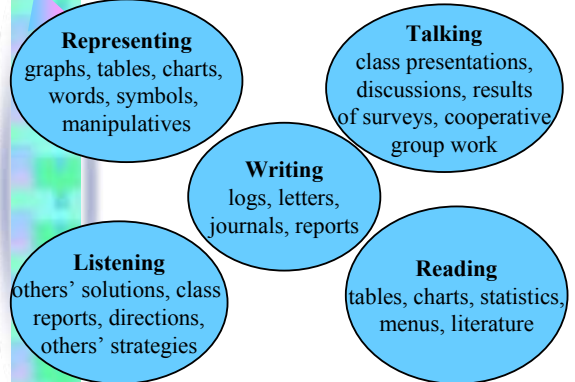
-William Glasser

Language is Part of Every Mathematics Lesson



Teachers should bring the natural connections between the subject areas to a conscious level and deliberately plan to use speaking, listening, reading and writing to enhance learning in mathematics as well as facilitate language arts objectives.

Language is Part of Every Mathematics Lesson



The Language of Mathematics

- Listen to the following words.
- What do these words mean to you?

base	intersection	product
set	angle	mean
pi	slope	power
chord	face	cup
leg	area	net
pair	sum	pattern
decompose	difference	cube
point	plane	line

The Language of Mathematics

- Make vocabulary knowledge a part of every lesson.
- Strategies are similar to those used in Language Arts instruction.
- Use picture and word cards to introduce mathematics words.
- Matching Game

Developing Mathematics Vocabulary

A _____	N _____
B _____	O _____
C _____	P _____
D _____	Q _____
E _____	R _____
F _____	S _____
G _____	T _____
H _____	U _____
I _____	V _____
J _____	W _____
K _____	X _____
L _____	Y _____
M _____	Z _____

Vocabulary Strategies

- **Preteach mathematics vocabulary**
 - Removes cognitive barriers that may prevent children from grasping the new concepts.
 - When taught only at the “point-of-use” the vocabulary words are often lost or misunderstood as students are focusing on learning the mathematics.
- **Model vocabulary when teaching new concepts**
 - Use examples that children can see and manipulate as well as discuss and write about.
 - Use graphic illustrations when appropriate.

Vocabulary Strategies

- **Use appropriate labels clearly and consistently**
 - Mathematical language is used and understood around the world.
 - Children must be given the appropriate vocabulary words to describe and reinforce the mathematical concepts and functions they are learning.
- **Integrate vocabulary knowledge in assessments**
 - Vocabulary should be placed strategically in questions to reinforce vocabulary knowledge along with conceptual knowledge.

More Vocabulary Ideas

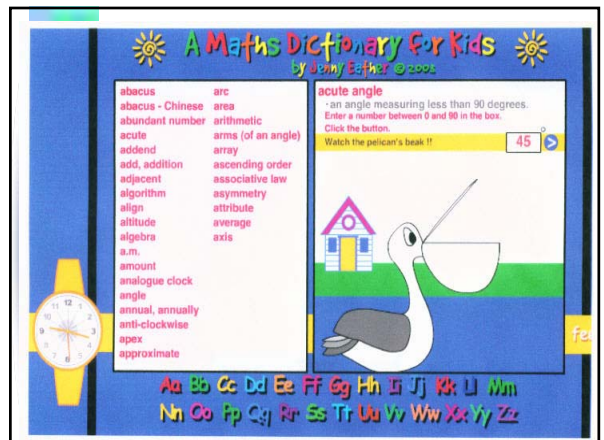
- Create sentences using three or four mathematics words.
- Create a story using mathematics words.
- Illustrate a mathematics word.




Developing Vocabulary



<http://www.amathsdictionaryforkids.com/>




Harcourt School Publishers

Math Glossary K 1 2 3 4 5 6

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

equal parts



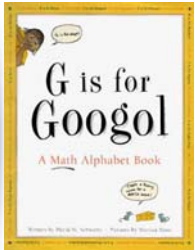
This shape has 4 equal parts.

<http://www.harcourtschool.com/glossary/math2/index1.html>

Vocabulary Test

1. What do you call a man who spent all summer at the beach?
2. What do you say when you see an empty parrot cage?
3. What do you call an adorable angle?
4. What do you use to tie up a package?
5. What do you call a fierce beast?
6. What do you call more than one L?
7. What do you call people who are in favor of tractors?
8. What do you call a crushed angle?
9. What did the Italian say when the witch doctor removed the curse?
10. What did the little acorn say when he grew up?

G is for Google by David Schwartz



Linking Literature and Mathematics

- To explore the relationship of mathematics to the world around us.
- To assist students in their acquisition of mathematical concepts.
- To motivate and enhance students' interests in mathematics through the imaginative ideas encountered in children's literature.
- To provide an incentive for students to read.
- To make the reading of good literature a natural part of mathematics.
- To use writing as a means to communicate an understanding of mathematical concepts.

Mathematics Concepts Found in the Language Arts Curriculum

- Positional Words
- Directional Words
- Comparing Words
- Sequence Words
- Language of Time
- Shape Words
- Number Words
- Measurement Words

Positional Words

- Positional words help children develop an understanding of space.
- The most difficult words in the positional group refer to the concept of left and right.
 - *"Your cup is on the right."*
- Positional words include:

in	inside
out	outside
under	over
top	bottom
together	middle

Directional Words

- Directional words involve movement
- In order for children to experience these words, children can perform actions either in the form of a musical game or an interesting gym activity.
- Directional words include:

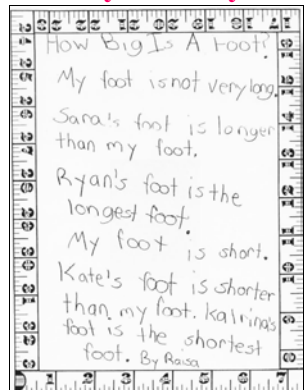
forward	backward
up	down
toward	away from
to the left	to the right
around	

Comparing Words

- When using comparison words children begin to gain confidence in observing difference in a variety of characteristics such as size, temperature, or loudness.
- Comparing words include:

big-little	high-low
hot-cold	near-far
young-old	loud-soft
large-small	tall-short
heavy-light	fast-slow

How Big is a Foot by Rolf Myller



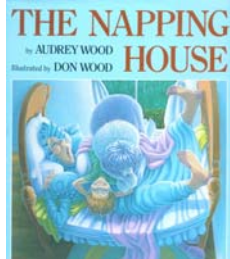
Sequencing Words

- Sequencing words are very important because they develop a sense of order and time.
- Order is an important aspect of our number system.
- Sequencing words include:

first	last
beginning	end
before	after

The Napping House by Audrey Wood

- After reading the story, have children sequence the events.
- Ask questions such as,
 - “Who was the first one in bed?”
 - “Who was next after the dog?”
 - “Who was the last one in bed?”
- Provide an opportunity for students to retell the story in sequence.

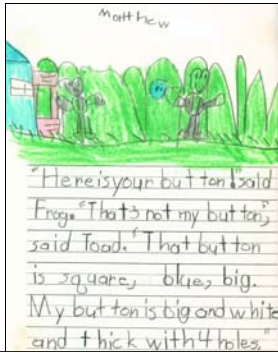


Shape Words

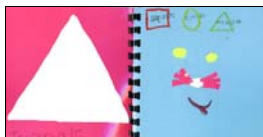
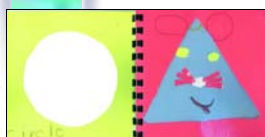
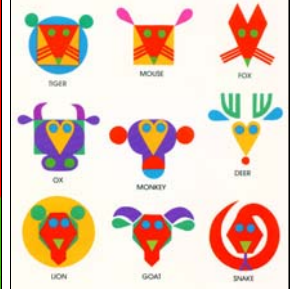
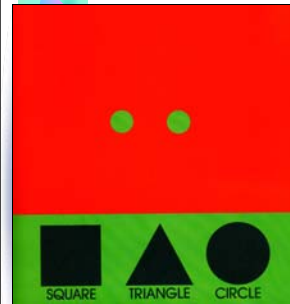
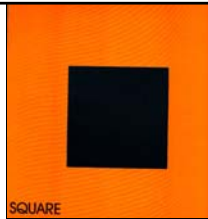
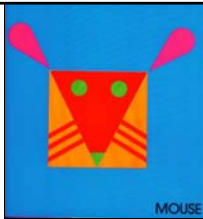
- Shape words help children describe everyday objects.
- Shape words include:

round	circle
sides	square
corners	triangle
flat	rectangle

The Lost Button from Frog and Toad Are Friends by Arnold Lobel

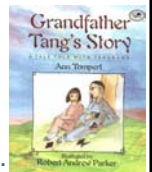


Color Zoo by Lois Ehlert



Grandfather Tang's Story by Ann Tompert

- Read *Grandfather Tang's Story* by Ann Tompert.
- Have students create their own tangram creatures using their tangram pieces.
- Have students use their tangram pieces to create various polygons.
- For example:

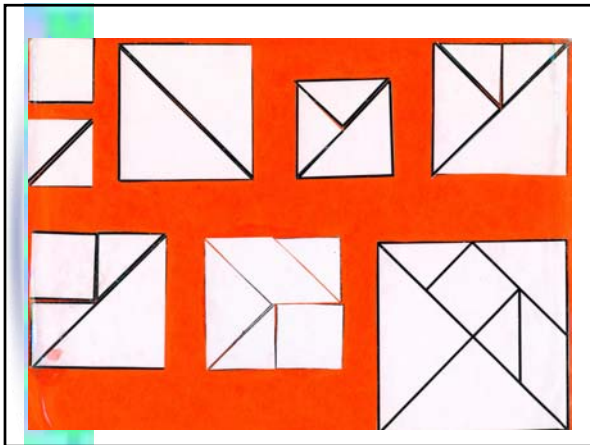


- Create a square using 1, 2, 3, 4, 5, 6, or 7 pieces.
- Create a rectangle using 1, 2, 3, 4, 5, 6, or 7 pieces.
- Create a triangle using 1, 2, 3, 4, 5, 6, or 7 pieces.
- Create a pentagon using 1, 2, 3, 4, 5, 6, or 7 pieces.

Student Sample



Student Samples



Number Words

- **Counting Numbers**
• 1, 2, 3, 4, 5, 6, 7, 8, 9 ...
- **Whole Numbers**
• 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 ...
- **Cardinal numbers**
• This number names the total in a set.
- **Ordinal numbers**
• Refers to the order or position such as first, second, third, ...
- **Nominal numbers**
• Numbers used to name objects
• Address, license plate, elevator floors, team players



How Many Bugs in a Box? by David Carter



Ten Black Dots by Donald Crews



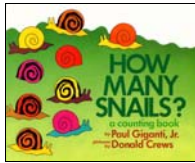
Each Orange Had Eight Slices by Donald Crews



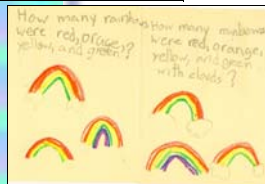
On My Way
by Elliot Rodstein
On my way to St
Louis I saw 10
insects. Each
insect had 6 legs.
Each leg had 3
hairs. How many
insects, legs and
hairs did I see?
The answer is
 $10 \times 6 = 60$,
 $60 \times 3 = 180$,
 $10 + 60 + 180 = 250$.



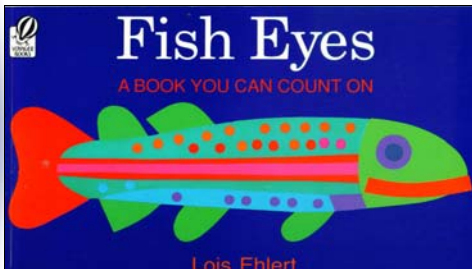
How Many Snails by Paul Giganti



Student Sample



Fish Eyes by Lois Ehlert



Student Sample



Splash by Ann Jonas



Measurement Words

- Measurement includes a variety of topics and words such as:
 - Length
 - Area
 - Volume
 - Capacity
 - Mass/Weight
 - Time
 - Temperature
 - Angles
 - Money

The Language of Time

- A number of words comprise the language of time.
- General time words include:

morning	night	evening
early	late	afternoon
tonight	noon	tomorrow
- Clock words

short hand	minutes	alarm clock
long hand	hours	seconds
watch		
- Calendar words

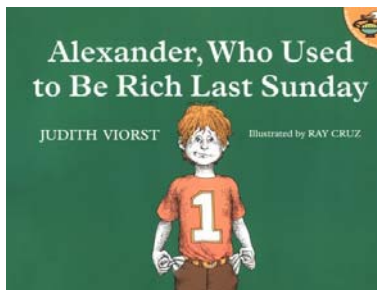
today	yesterday	tomorrow
holiday	birthday	weekend
- Days of the week
- Months of the year

Today is Monday by Eric Carle



**Today is Sunday.
Sunday is popcorn.**

Alexander, Who Used to Be Rich Last Sunday by Judith Viorst



How does Alexander spend his money?

Item	Cost	Decimal	Amount Left
Bubble gum			
Bets			
Snake rental			
Bad word			
fine Lost money			
chocolate			
Magic trick			
Kicking fine			
Garage sale			
TOTAL			

Money Riddles

- There are three coins.
 - They are worth 45 cents.
 - What are the coins?
- There are five coins.
 - They are worth 57 cents.
 - What are the coins?



- There are six coins.
 - They are worth 10 cents.
 - What are the coins?
- There are three coins.
 - They are worth 60 cents.
 - What are the coins?



The Phantom Tollbooth by Norton Juster

“There’s so much to learn,” Milo whispered!

“Yes, that’s true,” admitted Rhyme and Reason, “but it’s not just learning things that’s important. It’s learning what to do with what you learn and learning why you learn things at all that matters.”