

Read A Story Explore the Math



Linking Math & Literature
in Primary Classrooms

by Carole Fullerton
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2014

Read A Story: Explore the Math

Linking Math and Literature in Primary Classrooms

Everybody loves a good story.

Teachers love reading them. Children love hearing them. What better way to set the stage for a math lesson than through a story?

This resource for teachers has been crafted around a series of delightful children's books. Many are newly published, but all have the potential to jumpstart a lesson that will engage your students in thinking about important math. The mathematical concepts explored in these books are appropriate for kindergarten throughout grade 3, and in some cases can be extended to grade 4. Lessons involving number sense, addition, subtraction, beginning multiplication and division, data management and measurement grow out of these stories. There is a lot to explore!

Begin by reading these books aloud to your students. In fact, read and enjoy the story more than once before engaging students in the math on its pages. Remember to enjoy the stories as stories... And then probe their potential for mathematical investigations.

While students explore the tasks on these pages, be sure they have materials to play with. Cuisenaire rods, unifix cubes, counters and ten frames will allow students to make connections to the concepts addressed and to represent their thinking in concrete ways. Dry erase boards or dry erase sleeves are an excellent way to ensure each child is engaging with the math pictorially and abstractly.

All of the story books in this resource are available from amazon.ca – but please do support your local book sellers wherever possible! ISBN numbers have been included for each title, as well as a short description of the story line. A select few are available in French for those teaching in an immersion setting. See the table of contents; books marked with an asterisk* have been translated.

Stories allow us a shared experience. They engage us emotionally, and make us curious about the world. We hope that these stories paired with number-based investigations will inspire rich mathematical thinking in your students!

Carole and Sandra
June, 2014

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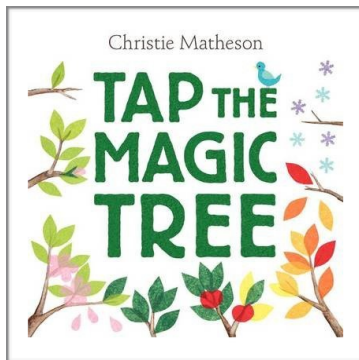
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* Also available in French

Book List and Corresponding ISBNs for Ordering

Title	ISBN
<u>Tap the Magic Tree</u> by Christie Matheson	978-0062274458
<u>Night Light</u> by Nicholas Blechman *(also in French)	978-0545462631
<u>Count the Monkeys</u> by Mac Barnett	978-1423160656
<u>Mice Mischievous</u> by Caroline Stills	978-0823429479
<u>Ten Little Caterpillars</u> by Bill Martin Jr.	978-1442433854
<u>A Mountain of Friends</u> by Kerstin Schoene	978-1554553136
<u>Numbers Everywhere</u> by Elliott Kaufman	978-0789211576
<u>Counting Sheep – A Bedtime Adventure</u> by Kathryn Cave	978-1847804808
<u>How Long? Wacky Ways to Compare Length</u> by Jessica Gunderson	978-1479519149
<u>How Big? Wacky Ways to Compare Size</u> by Jessica Gunderson	978-1479519156
<u>Dog In Boots</u> by Greg Gormley	978-1862338005
<u>Counting Chickens</u> by Flensted	978-1609050337
<u>100 Snowmen</u> by Jennifer Arena	978-1477847039
<u>The House of 12 Bunnies</u> by Caroline Stills	978-0823424221
<u>100 Bears</u> by Magali Bardos *(also in French)	978-1909263154
<u>Guinea Pigs Add Up</u> by Margery Cuyler	978-0802797957
<u>Lion vs. Rabbit</u> by Alex Latimer*	978-1561457090
<u>The Highest Number in the World</u> by Roy MacGregor	978-1770495753
<u>What Do You Do With A Tail Like This?</u> by Steve Jenkins *(also in French)	978-0618997138
<u>How Tall? Wacky Ways to Compare Height</u> by Mark Weakland	978-1404883239
<u>This Plus That – Life's Little Equations</u> Amy Krouse Rosenthal	978-0061726552
<u>Lifetime: The Amazing Numbers in Animal Lives</u> by Lola M. Schaefer	978-1452107141
<u>How Many Jelly Beans?</u> by Andrea Menotti	978-1452102061

Tap the Magic Tree by Christie Matheson



ISBN: 978-0062274458

Book description: Every book needs you to turn the pages. But not every book needs you to tap it, shake it, jiggle it, or even blow it a kiss. Innovative and timeless, Tap the Magic Tree asks you to help one lonely tree change with the seasons. Now that's interactive - and magical! (from www.amazon.ca)

Grade level(s): K-1

Math Concepts: Counting, Subitizing, Part-whole problems for 7

Instructional ideas:

Read and enjoy the book. Be sure to make it available to pairs of students to read together afterwards... The best part of this story is the ability to interact with the pages!

As the flowers on the tree develop, count them. Older children may enjoy counting by 5's to sort out the number of blossoms on the page.

Have students subitize the number of apples on the page in which they first appear. Ask: *How many apples do you see? How do you see them?* Invite many different responses and record them in numbers.

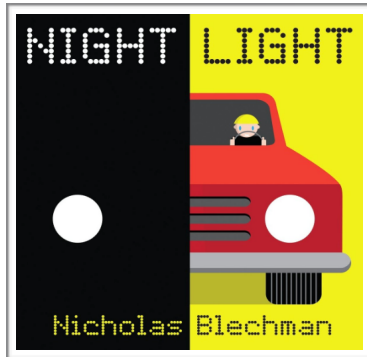
On the following page, ask students: *How many apples are still in the tree? How many have fallen. How do you know?*

Pose the following open-ended problem:

*There were 7 apples.
Some were in the tree. Some were on the ground.
How many of each could there be? How many ways can you find?*

Make handfuls of red counters available to students and have them model as many solutions as they can, recording numbers and/or equations to show their thinking. Celebrate the many ways we have to show 7!

Night Light by Nicholas Blechman



ISBN: 978-0545462631

Book description: 1 light, shining bright? A train!
7 lights, flashing red and white? A fire truck!
And so on all the way to ten lights. Part guessing game, part counting book, Night Light is a boldly imagined book for the preschool child who loves cars, trucks, and anything that goes. (from www.amazon.ca)

AVAILABLE IN FRENCH as Lumières dans la nuit

Grade level(s): K-1

Math Concepts: Subitizing, Doubles

Instructional ideas:

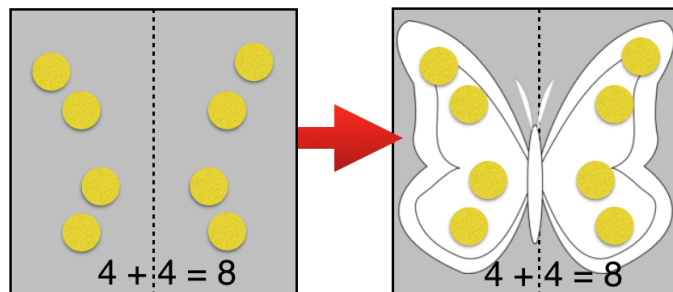
Read and enjoy the book. Students will enjoy the guessing game of predicting what vehicle is pictured.

Subitizing

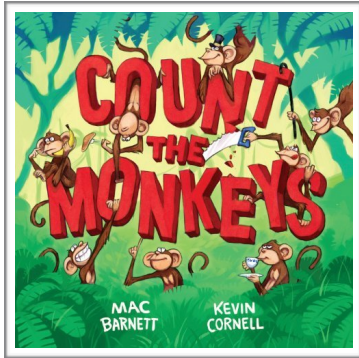
Once you've read the story several times, show the image of the firetruck (6 lights) and ask students how many dots they see. Accept a range of ideas. For Grade 1 students, model how to record an equation to match the parts. ($4 + 2$, $2 + 2 + 2$, etc.)

Exploring Doubles

Point out the holes in the pages of the book. Explain that students will be making a page for a book just like this one. Start with a small piece of paper or tag (about 15 cm x 15 cm). Fold it in half and then use a hole punch to make 3 or 4 holes. Open the page and record the corresponding equation ($3+3=6$ or $4+4=8$, depending). Look at the dots on the page and ask students if they see anything in the picture - a design or an object. Sketch the image they suggest. See image at right for "inspiration"!



Count the Monkeys by Mac Barnett



ISBN: 978-1423160656

Book description: Kids will giggle as they count all the animals that have frightened the monkeys off the pages. Full of fun, this story keeps readers guessing until the very last page! Matching Mac Barnett's brilliant wit are Kevin Cornell's luminous illustrations, which will have young readers begging to count the monkeys all over again. (from www.amazon.ca)

Grade level(s): K-1

Math Concepts: Number Sense Relationships: 1 more, 1 less, 2 more, 2 less

Instructional ideas:

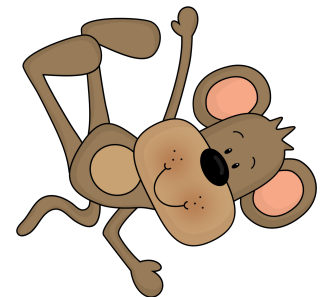
Read and enjoy the book. This one is truly silly... Children will love the progression of the tale and the fact that, in the end there are no monkeys to count at all!

Number Sense – 1 more, 1 less, 2 more, 2 less

Focus on how the number of characters on each page of the story increase by one each time. While you re-read the story, have students record the number of characters on each page, using a 10 frame. Explain that this is a 1 more pattern.

Have students empty their frames and start again. This time, record equations that show one more relationships ($1+1$, $2+1$, $3+1$, etc) and have students build the corresponding numbers.

Once you reach 10, reverse the action and have students remove one from their frames each time. Explain that there were monkeys in the book at the beginning, but that they ran away one by one. Pose images of monkeys (included in the resource) on the whiteboard by attaching a piece of magnetic tape to the back of each one. Have students record subtraction equations to match the action of removing one at a time.



Repeat the above tasks with 2 more and 2 less. Have fun with the appearing and disappearing monkeys!

One more, 1 less, 2 more, 2 less – Cuisenaire Rods

Have students play a comparison game to practice the idea of one more and one less.

Students work in pairs. Player A draws a Cuisenaire rod from the pile and says the number aloud. Their partner finds the rod that is one less than the other and record the equation.

They should read it as:
“One less than 7 is 6.”

The partners change roles and play again.

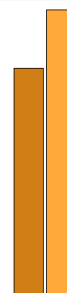
Adapt and replay this game for 2 less, 1 more or 2 more. Here, students have played the game “2 more than”. They record the equation and read it as:

“Two more than 8 is 10.”

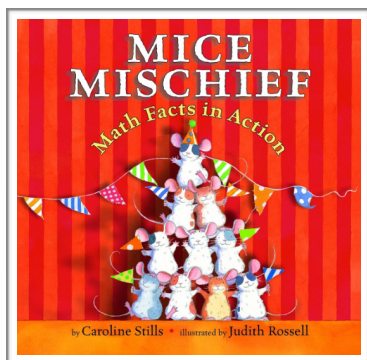
$$7 - 1 = 6$$



$$8 + 2 = 10$$



Mice Mischief by Caroline Stills



ISBN: 978-0823429479

Book description: Ten colourful and acrobatic circus mice demonstrate the different ways that the numbers from 1 to 9 can add up to 10. After awakening, 9 mice tidy their bed while 1 mouse somersaults out of it ... $9 + 1 = 10!$ The day continues in this way until bedtime, while these clever mice tell stories of 10. (in part from www.amazon.ca)

Grade level(s): K-1

Math Concepts: Subitizing, Fact Families for 10 / Complements

Instructional ideas:

Read and enjoy the book. In it, the author shows 10 playful mice in sets that always add up to 10. The images on each page are full of activity.

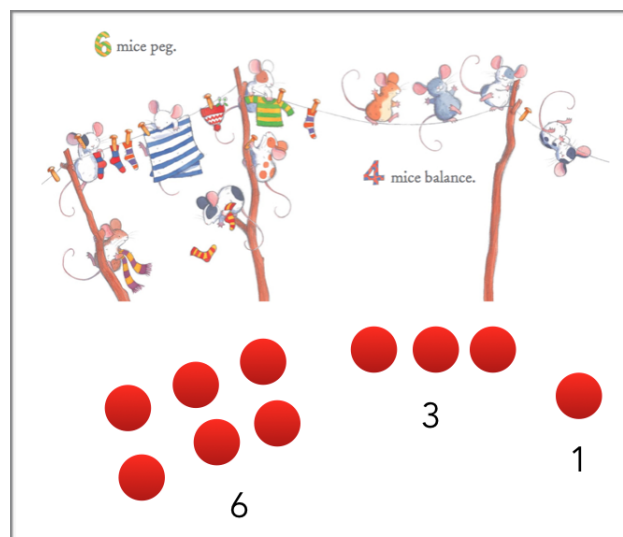
Subitizing

Show select pages of the book and ask:

How many do you see?

How do you see them?

Because the illustrations can be busy and therefore hard to "see" without counting, represent students' ideas with magnets or cubes, and then record in numbers as seen at right.

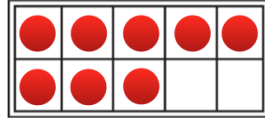


Fact Families for 10 / Complements

Have students work with ten frame egg cartons and counters in 2 colours. (Double-sided counters work best for this.) Show and read a page from the book. Have students build to show the same parts as in the illustration.

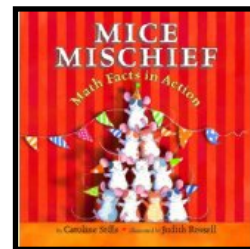
Once they've become familiar with the partnerships, offer up only one of the parts of 10 and have them build the missing part. Record the corresponding equation with a missing part box.

$$8 + \boxed{2} = 10$$



On another day, change the task slightly – show students a ten-frame card and have them record the corresponding equation in the format shown above.

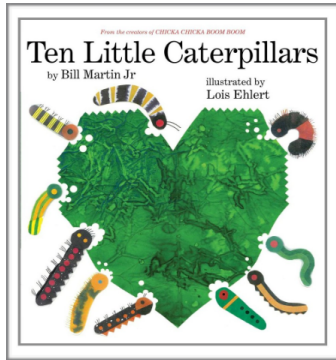
Consider also using dominoes to model the complements.



Making Tens With Dominoes

Draw the Dominoes	Write the Equations

Ten Little Caterpillars by Bill Martin Jr.



ISBN: 978-1442433854

Book description: In this attractive counting book with a scientific flair, 10 little caterpillars creep through gardens, vegetable patches and apple orchards. Ehlert's watercolor collages, in the style of botanical illustrations with identifying labels, eloquently re-create the natural habitat of each creature. An imaginative introduction to ordinal numbers and the process of metamorphosis. (from www.amazon.ca)

Grade level(s): K-1-2
Math Concepts: Ordinals, Patterns, Doubles

Instructional ideas:

Read and enjoy the book. Revel in the beautiful illustrations.

Explore Ordinals

On a second reading, have students record the numbers 1 through 10 on their white boards, and erase one number as each caterpillar is eaten. Alternately, they could draw ten caterpillars and erase the first, the second and the third as they disappear in the story.

Line a group of 10 children up on the carpet in front of the group. Call out instructions to each one, using an ordinal number. Consider:

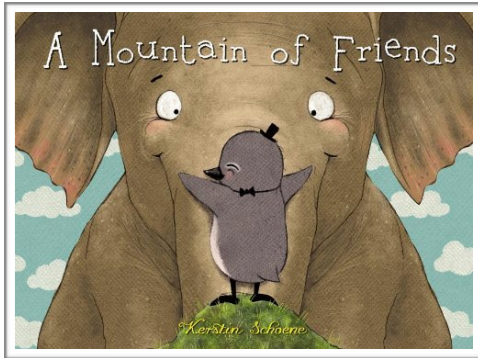
- *The second person in line must clap their hands 5 times.*
- *The 8th person in line must sing the ABC song.*
- *The 5th person must jump up and down until I say stop.*

Give students a turn to be the Ordinal Game Leader!

Play with Doubles

Show the final image of the butterfly in the story. Ask students what they notice about the image. Have them count the dots on the butterfly's wings in different ways. Have students make their own symmetrical butterfly by hand or with stickers. They should include an equation to tell how a mathematician would "read" the number of dots on their caterpillar. (e.g. $6 + 6 = 12$)

A Mountain of Friends by Kerstin Schoene



ISBN: 978-1554553136

Book description: Kerstin Schoene's North American debut picture book shows how working together can accomplish seemingly impossible goals. Readers will enjoy helping penguin achieve his dream by reorienting the book and building a 'mountain of friends' to support him. (from www.amazon.ca)

Grade level(s): K-1-2

Math Concepts: Attributes of 3-D objects, Equality

Instructional ideas:

Read and enjoy the book. Celebrate friendship!

Making Towers: Exploring attributes of 3-D objects

Get several bins of 3-dimensional objects. Use the attached spinner. Have students take turns spinning the spinner 5 times each. With every spin, students should take a 3-D object that has that attribute and add it to a tower. At the end of the game, students compare towers. The tallest tower wins!



Equality

Students should work with Cuisenaire rods for this task.

Have them make the following associations between the rods of various lengths and the animals in the story.

Record the following on the board:

Giraffe is orange	(10)	Goldfish is yellow	(5)
Elephant is blue	(9)	Flamingo is pink	(4)
Camel is brown	(8)	Snake is light green	(3)
Panda is black	(7)	Rabbit is red	(2)
Crocodile is dark green	(6)	Hedgehog is white	(1)

Model with a single orange rod. Call it "giraffe" or 10.

Ask:

What animals can we put together to make a tower as tall as giraffe?

The image at right show one possible answer.

Record **7 + 3 = 10**

or

black + light green is the same as orange

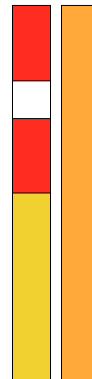
or

Panda and Snake is the same as Giraffe.



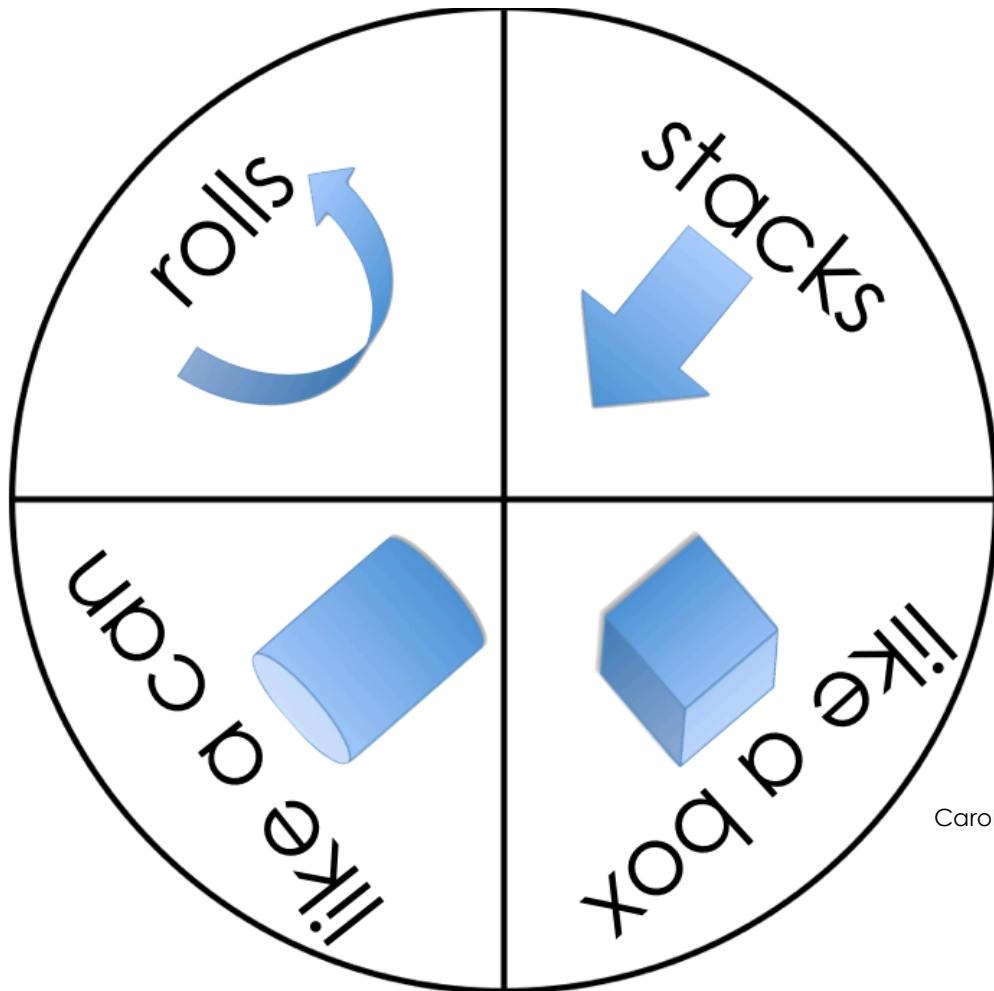
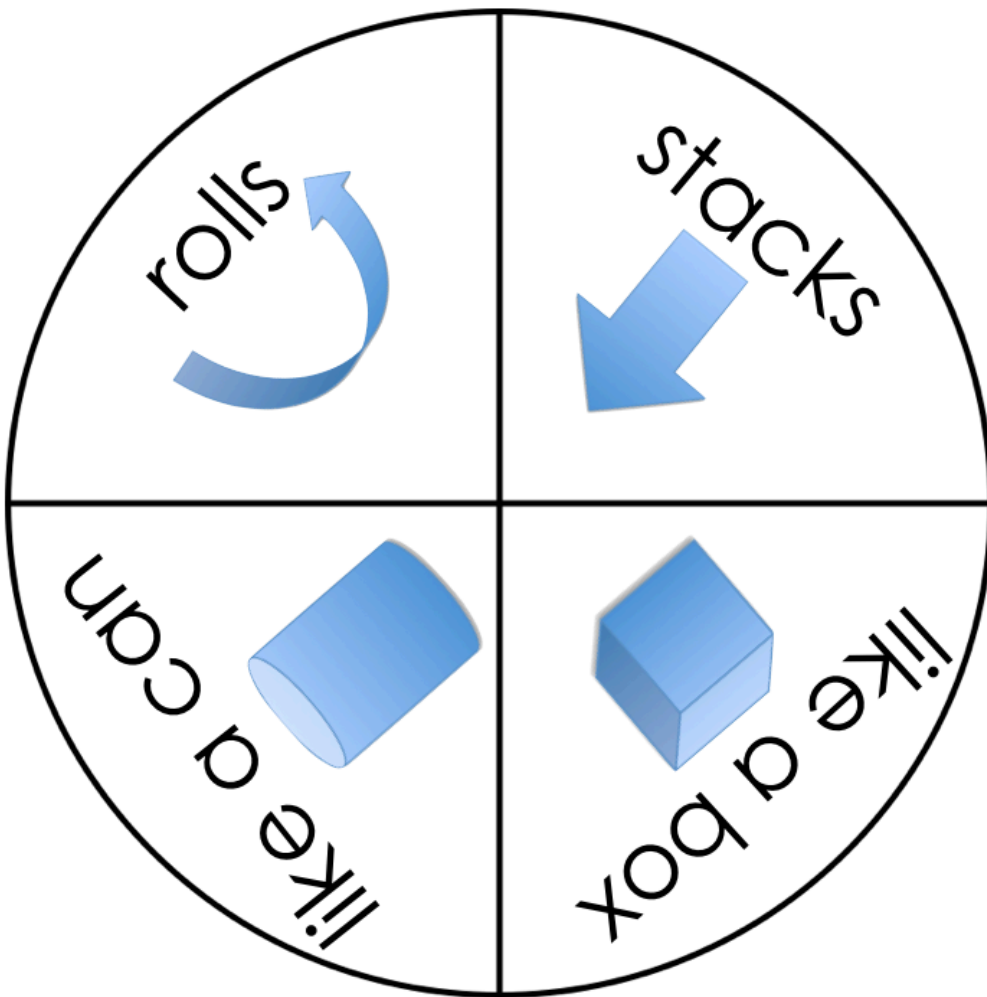
Encourage students to find as many different ways as they can.

Invite them to use more than 2 creatures to create a tower as tall as giraffe! (e.g. $5 + 2 + 1 + 2 = 10$)



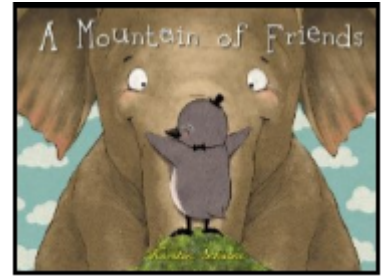
NOTE - Have students build their towers flat on the table rather than upright. They'll have better results and will be less likely to see their towers topple before they can record them.

Extend to 2 giraffes (20) for older students.

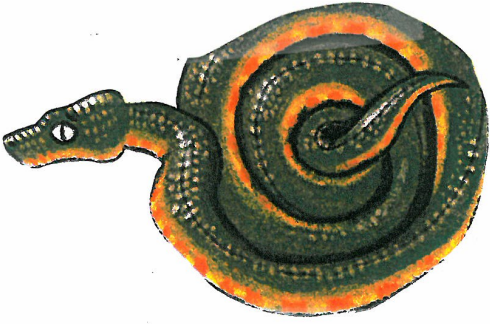


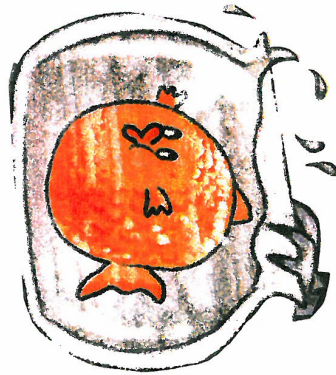
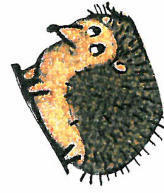
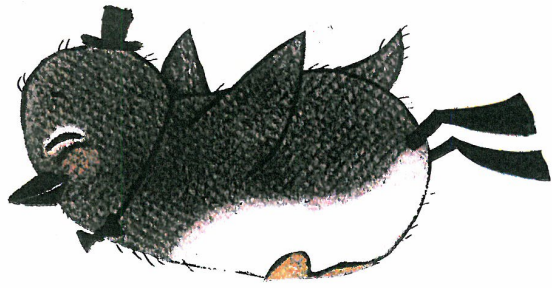
Mountain of Friends

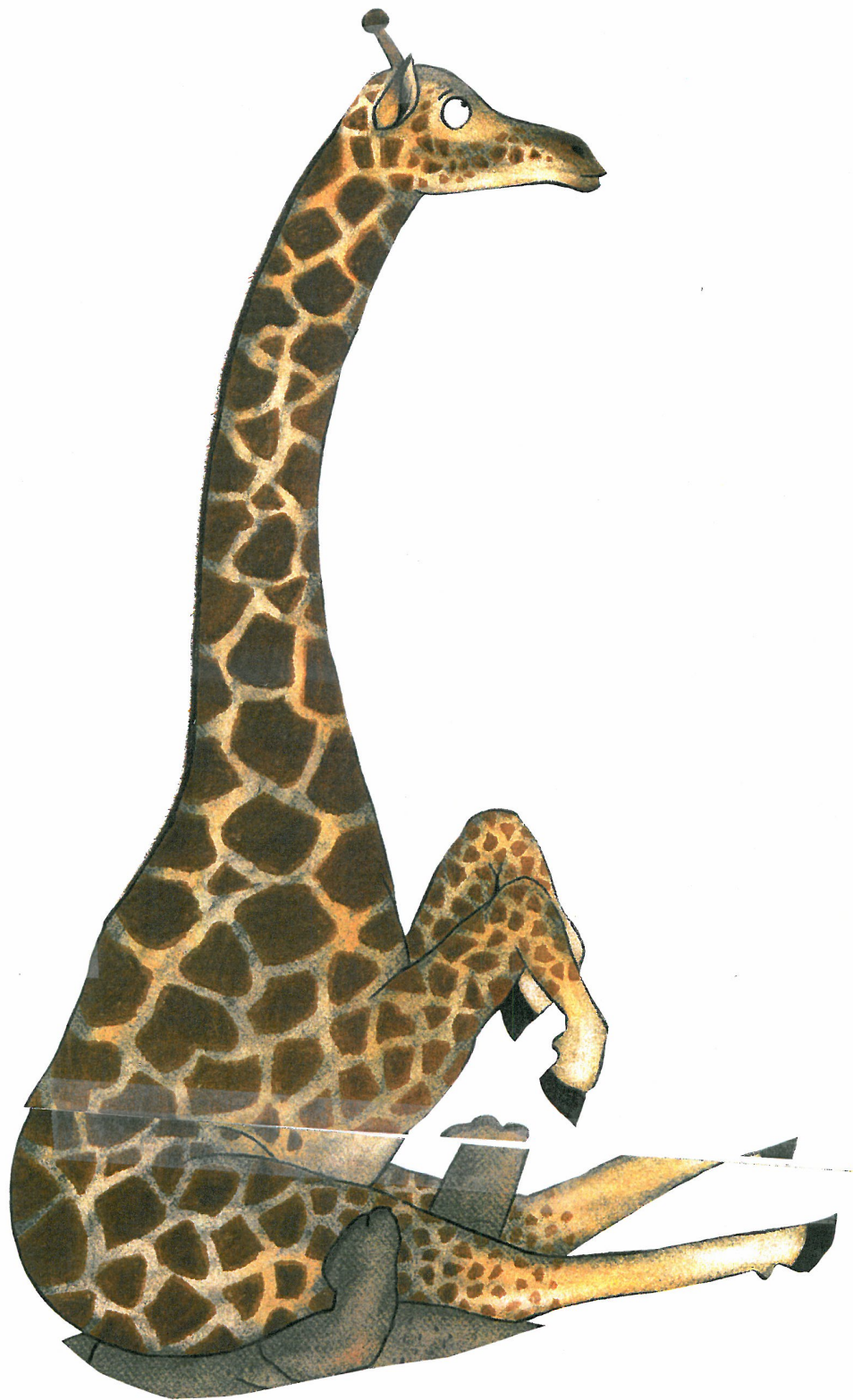
Cuisenaire Towers



Giraffe = orange	10
Elephant = blue	9
Camel = brown	8
Panda Bear = black	7
Crocodile = dark green	6
Goldfish = yellow	5
Flamingo = pink	4
Snake = light green	3
Rabbit = red	2
Hedgehog = white	1

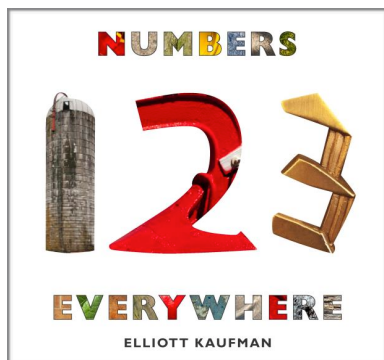








Numbers Everywhere by Elliott Kaufman



ISBN: 978-0789211576

Book description: Elliott Kaufman's creative photography book allows children (and adults) to discover unintended number shapes found in unexpected places. Numbers Everywhere reveals how digits and mathematical symbols can be found in the world around us -- if we know how to look for them. (from www.amazon.ca)

Grade level(s): K-1-2-3

Math Concepts: Identifying digits, Numbers in our world

Instructional ideas:

Read and enjoy the book.

Have students identify the numbers they see in the images. Some are tricky - give students time to make sense of the images!

Hand out dry erase boards and have students record and share the digits they see as you share the book. This is a good way to support students with the correct formation of the numerals. As they focus on the images, they will likewise concentrate on their shape and direction.

Take your students on a "number search". Start in the classroom. Begin by looking for actual numerals that appear on book covers, posters, over classroom doors or on students' t-shirts. Once they understand the task, consider exploring the exterior of the school, the neighbourhood or have students do a number search at home.

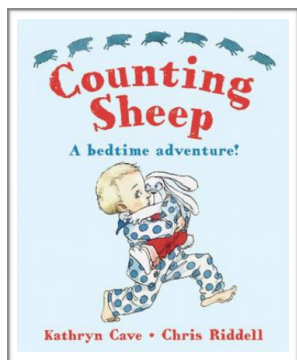
Have students record what they find. Young students could record their findings on paper attached to clipboards or on dry erase boards.

If you have access to iPads, tablets, iPods or digital cameras, consider having students take photos of what they find.

As a more complex task for older children, have them use digital cameras to capture images in the style of Elliott Kaufman's book, in which the shape of common objects is seen to resemble digits. This is trickier than it sounds, but will no doubt inspire older learners. Publish student images in a digital story book and share widely.

Consider having students put their digits together into number sentences!

Counting Sheep – A Bedtime Adventure by Kathryn Cave



ISBN: 978-1847804808

Book description: When Tom finds it hard to get to sleep, counting sheep is just the beginning - counting pythons, pirates, vampire bats, and ghosts is a lot more fun. Young readers are led on a wild and woolly counting adventure that goes all the way up to one hundred.
(from www.amazon.ca)

Grade level(s): 1-2-3

Math Concepts: Skip Counting / Multiplication, Addition of 2 & 3-digit numbers

Instructional ideas:

Read and enjoy the book.

Share the first picture of Tom in bed with all of his toys.

Ask:

How could you figure out how many feet are in the bed?

What materials do you need to prove it?

What equation will you write to show it?

Note that students may record addition or multiplication equations here, depending on their understanding...

Exploring Skip Counting Patterns

This book features images that are arranged in 10's to facilitate their counting. That said, there are many other things that can – and should – be counted!

Have students count the wolves' ears by 2's.

Ask - *What else could we count by 2's?* (Wolves' ears, eyes...)

Have students count the penguin toes by 3's.

Have students count the bear's legs by 4's.

Have students count the bats and ghosts by 10's and some more.

Focus on how the total remains the same no matter how we count!

Make the book available to students at reading time so they can continue to practice counting by touching the pictures.

Better yet, extend the task by having students count collections of different amounts (16-20 for Grade 1, 50-100 for Grade 2 and up to 1000 for Grade 3). Consider shells, coins, buttons, farm animals, insects, toy cars, etc to make it more interesting!

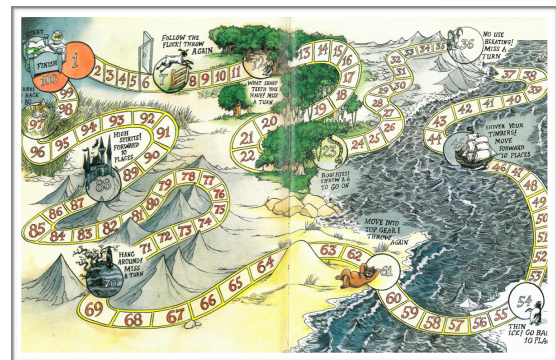
How many in all?

Have students add up all of the creatures that Tom counts in an effort to get to sleep. Ask:

- How many creatures are there? (493)
- What strategies did you use to figure it out? (Make tens, then Make 100's!)
- How many more to get to 500 creatures?
- About how long would it take you to count to 500?
- How many minutes?

Play the Number Game

In the front flyleaf of this book is a game board for student use. Scan and print it in colour, or use the version included in this book.



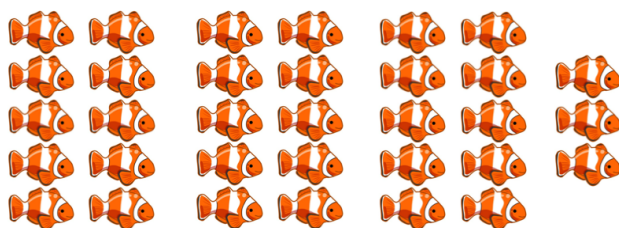
Make a new page for the story

Pose this problem of your students:

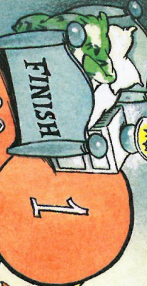
*Like Tom, you can't sleep.
What would you count?
How would you count them?*

Use graphics software or stamps or stickers and have students create their own page for the book. They should tell how many they included on the page and all the ways they could count to get there. For example:

I'd count 33 clown fish, in tens and ones. 10, 20, 30, ...31, 32, 33!



START



FINISH
100

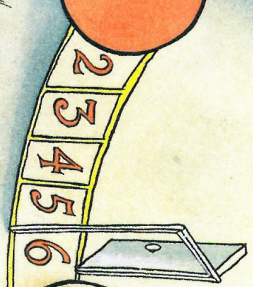
RRR!
BACK
80



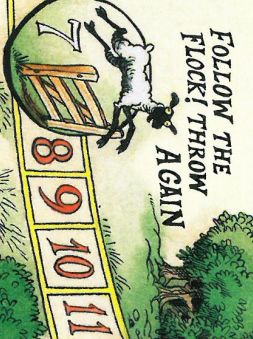
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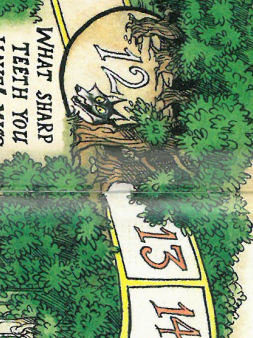
96



1



2



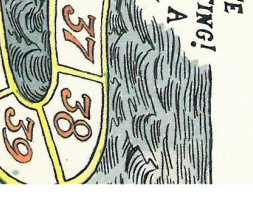
3



4



5



6

FOLLOW THE
FLOCK! THROW
AGAIN

7

8

9

10

11

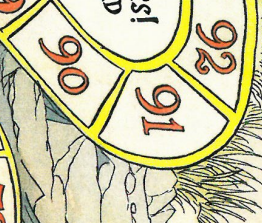
WHAT SHARP
TEETH YOU
HAVE! MISS
A TURN



12



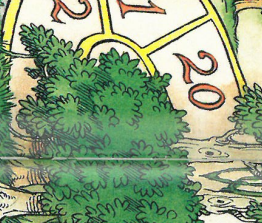
13



14



15



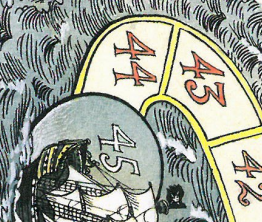
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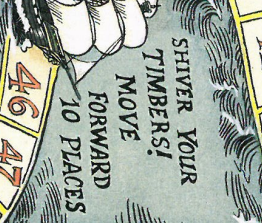
17



18

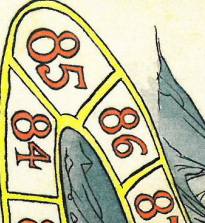


19



20

BOO HISS!
THROW A 6
TO GO ON



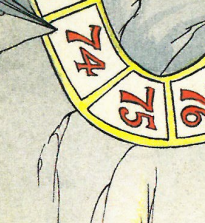
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23



24



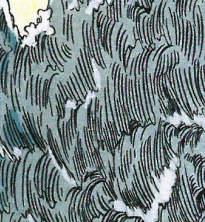
25



26



27



28



29



30



31



32



33



34



35



36

NO USE
BLEATING!
MISS A
TURN



37



38



39



40



41



42



43



44



45

SHIVER YOUR
TIMBERS!
MOVE
FORWARD
10 PLACES



46



47



48



49



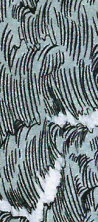
50



51



52



53



54

THIN
ICE! GO BACK
10 PLACES



55



56



57



58



59



60



61

MOVE INTO
TOP GEAR!
THROW
AGAIN



62



63



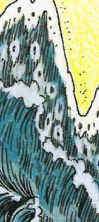
64



65



66



67



68



69

HANG
AROUND!
MISS
A TURN

70



71



72



73



74



75



76



77



78



79

80

81

82

83

84

85

HIGH
SPIRITS!
FORWARD
10
PLACES

88



89



90



91



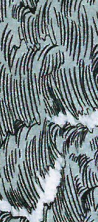
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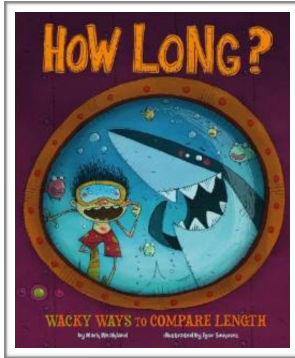
97

98

99

100

How Long? Wacky Ways to Compare Length by Jessica Gunderson



ISBN: 978-1479519149

Book description: This book presents some interesting comparisons between objects. Written with a sense of fun, some of these illustrations and comparisons may be confusing for younger learners but will certainly inspire conversations about the act of comparison!

Grade level(s): 1-2-3

Math Concepts: Measurement (Length)

Instructional ideas:

Read and enjoy the book. The illustrations and comparisons are indeed wacky - have fun with the wildness of them!

Exploring Measurement

Show the children the illustration of the elephant and fire hydrants on pages 2 and 3. In it, the elephant's trunk is being compared to 42 peanuts.

Ask:

*How big is a peanut in the shell?
(5 cm long)*

*What in our classroom is about the same length as a peanut?
(2 unifix cubes, a yellow Cuisenaire rod)*

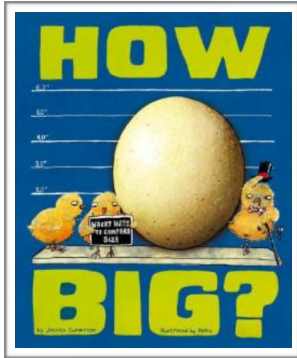
Collect 42 yellow Cuisenaire rods and put them end-to-end. Problem-solve with the children when you run out – because you will! :o) (Students may choose to substitute an orange for 2 yellows, for example.) Make a Cuisenaire train that is as long as 42 peanuts (210 cm / 2.1 m).



Alternately, use 42 sets of 2 unifix cubes (84 cubes) to make a train that is the same length as 42 peanuts.

Have students compare the length of their nose to the length of an elephant's!

How Big? Wacky Ways to Compare Size by Jessica Gunderson



ISBN: 978-1479519156

Book description: This book presents some interesting comparisons between objects. Written with a sense of fun, some of these illustrations and comparisons may be confusing for younger learners but will certainly inspire conversations about the act of comparison!

Grade level(s): 1-2-3

Math Concepts: Measurement (Mass), Money, Repeated addition

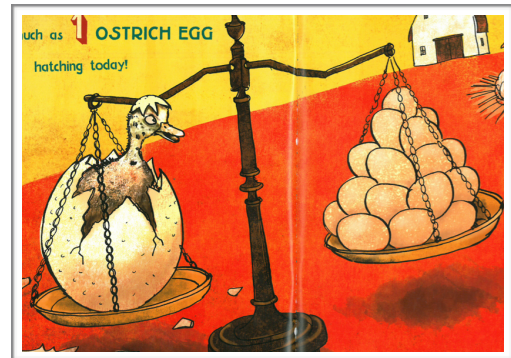
Instructional ideas:

Read and enjoy the book. The illustrations and comparisons are indeed wacky - have fun with the wildness of them!

Exploring Measurement

Show the children the illustration of the eggs on pages 4 and 5. In it, one ostrich egg is being compared to 24 chicken eggs.

Ask students if they know how heavy a chicken's egg is. If possible, bring in hard boiled egg(s) and have students feel how heavy they are, to develop a real referent. In a pinch, use a coin collection to simulate the weight of an egg. 20 pennies (or 10 nickels) weighs 50 grams, or the same as an egg.



Once they've had the chance to feel how heavy an egg is, have students explore the classroom in order to find something that is about the same weight (mass). This may be a bit tricky...!

Collect 24 of these objects and put them all in a cloth bag and have students play with lifting it. Explain that this is the same weight as a single ostrich egg!

Exploring money

Extend the task by asking:

A chicken egg is worth 20¢ in pennies (or 50¢ in nickels).

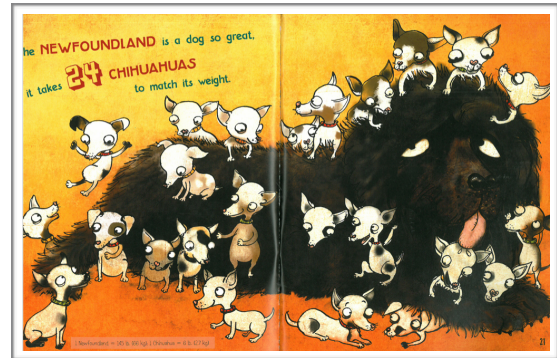
If we used pennies to make a collection as heavy as an ostrich's egg, what would it be worth?

If we used nickels, what would it be worth then?

Repeated Addition / Skip Counting

Have students look at the picture on pages 20 and 21 in the book. In it, 24 chihuahuas are being compared to a Newfoundland dog.

Pose the following question:



A chihuahua weighs almost 3 kg.

How can you figure out what a Newfoundland dog weighs?

Make sure that students share and compare their strategies.

Next, share the following information:

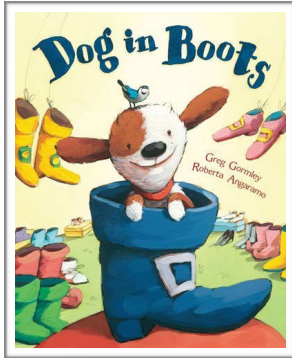
A Labrador Retriever (Lab) weighs about 30 kg

A Beagle weighs about 10 kg

A Scottish Terrier (Scottie) weighs about 8 kg

How many Labs / Beagles / Scotties do you need to weigh the same amount as a Newfoundland dog? How did you figure it out?

Dog in Boots by Greg Gormley



ISBN: 978-1862338005

Book description: Inspired by his favourite story about a cat with fantastic boots, Dog heads to the local shoe store and emerges with some splendid footwear. But Dog soon discovers that his fancy shoes won't let him do doggy things. He tries flippers, high heels, even skis, but can't find anything that is just right. Could the perfect solution be right under his nose? (from www.amazon.ca)

Grade level(s): 1-2-3

Math Concepts: Skip Counting, Multiplication, Data Management

Instructional ideas:

Read and enjoy the book! Consider also reading Puss in Boots to set the stage.

Skip Counting; Repeated Addition and Multiplication

Recall that there are 5 different kinds of footwear in the story:

1. the splendid blue boots
2. the yellow rubber boots
3. the pink flippers
4. the fashionable high heels
5. and the fast skis

Ask:

How many boots did the dog buy in all? How could we count them?

Using cubes as boots, or better yet, pictures of the boots themselves, count the footwear collection in 4's, in 2's, and then by ones. Be sure the totals are always the same! Try counting by 5's and 10's as well, reorganizing the boots each time to create groups of that size.

Record an addition sentence to match each set: e.g. $4 + 4 + 4 + 4 + 4 = 20$

For older children, record the multiplication sentence to match:

5 groups of 4 is 20

$5 \times 4 = 20$

Skip Counting and Problem-solving

Ask:

How many boots would we need to outfit all the students in our classroom?

What about just the boys?

Just the girls?

How could we figure it out?

Provide cubes, Cuisenaire rods, etc to support students in modelling the answer.

Problem-solving

Pose the following:

Dog decides he can only keep 2 sets of shoes and no more.

Which ones could he keep?

How many combinations can you find?

Model a couple of responses to start. For example, dog might keep:

The rain boots and the flippers, or

The flippers and the high heels, or

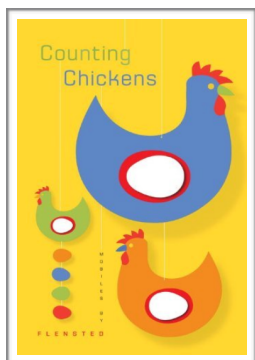
The skis and the blue boots, or

etc...

Data Management

Post a picture of each of the 5 kinds of footwear and have students vote for their favourite ones. Have students use a sticky note for their "vote".

Counting Chickens by Flensted



ISBN: 978-1609050337

Book description: Don't count your chickens ... but do count your eggs, fish, and elephants! Distinctive Flensted Mobiles are featured in this innovative counting book. Young readers can count from one to ten and back again, by twos or threes, and can even find solutions to simple word problems.
(from www.amazon.ca)

Grade level(s): 1-2-3

Math Concepts: Equality and Inequality, Fact Families

Instructional ideas:

Read and enjoy the book. Celebrate the images and how they are balanced.

Equality and Inequality

Use a pan balance like the one pictured here. Put 6 unifix cubes, in a single stack, in one pan, and a train of 4 and another train of 2 in the other pan. Focus on how the pans are balanced. Explain that this means that 6 is the same as 4 and 2.

Record the corresponding equation:

$$6 = 4 + 2$$

Ask:

How else could we make 6?

Encourage students to come up with different ideas. Include those in which there are 3 or more addends (1 + 1 + 4, etc).

Have students explore this idea with their own pan balances. They should record their balanced equations and share them.



Inequality

Likewise, explore the idea of inequality by building and testing the following:

$6 + 3 \neq 5$

$2 + 7 \neq 8$

$10 \neq 3 + 5$

$13 \neq 9 + 6$

Mix each of these inequalities by adding or subtracting cubes, then have students re-write the true statement.

$6 + 3 = 5 + 4$

$2 + 7 = 8 + 1$

$10 - 2 = 3 + 5$

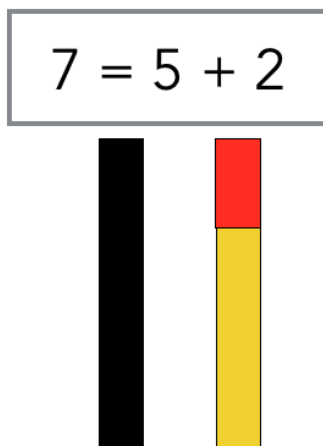
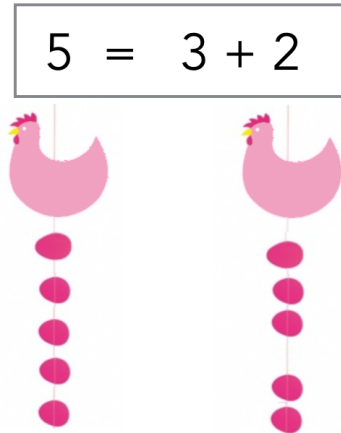
$13 + 2 = 9 + 6$

Fact Family Art

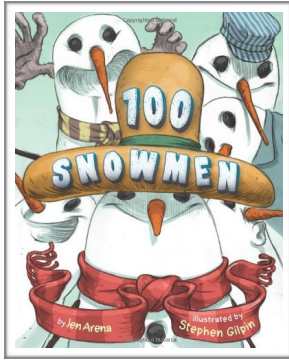
Have students make mobiles of their own, with beads and pipe cleaners, as shown at right. Have them write the corresponding equation on heavy cardboard and suspend the mobile from it.

Alternately, have students draw and colour pictures of possible balanced equation mobiles for different facts families. Encourage them to be as creative as possible!

Have students test and/or represent their mobile ideas with Cuisenaire rods as suggested below.



100 Snowmen by Jennifer Arena



ISBN: 978-1477847039

Book description: One lonely snowman has a carrot nose. / Two other snowmen join him when it snows." Underneath the second line of text is the equation "1+2=3." And so it goes as more snowmen join in the fun (snowball fights, sledding, hide-and-see). Kids can count along as the snowmen appear, and then tally the spread's total. The text counts up to 10 snowmen and then moves backwards from 9 to 1, with a surprising total. (from www.amazon.com)

Grade level(s): 1-2-3

Math Concepts: Near Doubles Facts, Complements (to 10, to 100), Addition

Instructional ideas:

Read and enjoy the book. The story is very cleverly written in "near doubles" pairings (7+8, 3+4, 8+7, 6+5, etc). As students listen to the story, see if any of them notice the number pattern that is so integral to the tale.

Near Doubles Facts

Once you've taught the near doubles strategy, highlight and record the near doubles facts in the story. To practice the near doubles strategy, have children play a game using the Doubles Plus One game board, attached.

Each child needs their own game board and a handful of clear counters. They take turns to:

- Roll a ten-sided die
- Build the number
- Build one more than the number
- Cover the sum with a transparent counter in the strip of sums at the top of the page.

Snowmen Doubles Plus One									
1	3	5	7	9	11	13	15	17	19

The first player to cover all of the sums wins.

Thanks to Chris Hunter of Surrey SD36 for this idea. Check out the December 2013 post on his blog at reflectionsinthewhy.wordpress.com for more!

Complements to 10

Give each student a ten frame egg carton. Assign a number from 1 to 9 to each student and have them build their number in the frame, using the ten-frame structure. On a signal, have each student find their complement – the partner whose number allows them to get to 10. (6+4, 7+3, for example).

Have each pair of students record their “get to 10” equation.

Complements to 100

Have students use the 90-10 rule to find the complement of a double digit number. They should roll a double die (or a pair of dice) to generate a 2-digit number, then find the missing part to get to 100.

For example, to find the complement of 21, think:

$$\begin{array}{l} 20 + \underline{70} = \mathbf{90} \quad \text{How much do I need to get to 90?} \quad (70) \\ 1 + \underline{9} = \mathbf{10} \quad \text{How much do I need to get to 10?} \quad (9) \\ \mathbf{21 + 79 = 100} \quad \text{How much do I need to get to 100?} \quad (79) \end{array}$$

Addition – Number strings

Using the strategies above, present the following to students and have them find the sum, sharing their strategy.

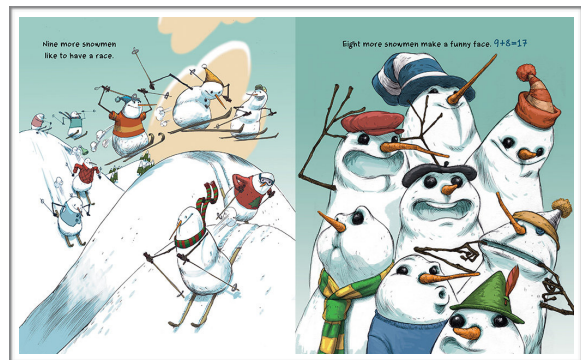
$$6 + 3 + 8 + 7 + 4 + 5$$

Note that there are many ways to find the sum – using near doubles or complements – celebrate the many ways your students use! Have your students model their thinking with ten frames and Cuisenaire rods.

Next, present the numbers of snowmen from each page of the story in a long number string:

$$1+2+3+4+5+6+7+8+9+10+9+8+7+6+5+4+3+2+1=$$

Have students work with ten frames or Cuisenaire rods to model the addends and find the sum. Focus on the patterns and strategies that make this an easy problem!



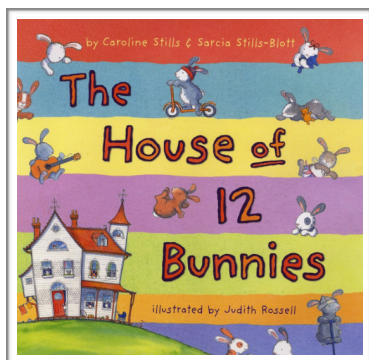


Snowmen Doubles Plus One



1	3	5	7	9	11	13	15	17	19
---	---	---	---	---	----	----	----	----	----

The House of 12 Bunnies by Caroline Stills



ISBN: 978-0823424221

Book description: In the house of 12 bunnies it is nearly bedtime, but Sophia has lost something. She looks in the kitchen cupboard with 5 cups, 4 plates, & 2 bowls; in the bathroom with 4 spotted towels, 5 striped ones, and 1 with a hole; even in the bedroom with 4 bunk beds, 3 cots, and 1 trundle bed. Finally Sophia finds her treasure; a bedtime story! (from www.amazon.ca)

Grade level(s): 1-2-3

Math Concepts: Fact Families for 12, Skip Counting / Multiples

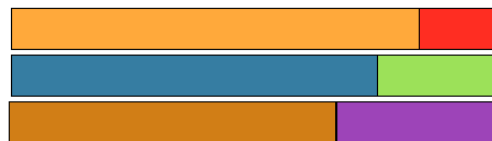
Instructional ideas:

Read and enjoy the book. The story line explores the idea of 12 broken into many pieces – mathematically speaking, showing 12 with multiple addends.

Fact Families for 12 (2 Addends)

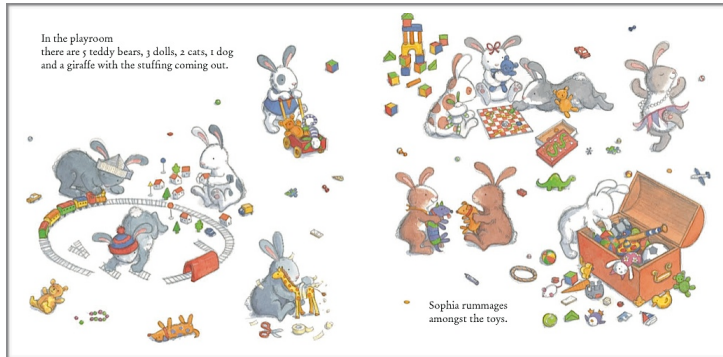
Have students work with Cuisenaire rods for this task. They should create a train of length 12 (an orange and a red rod together) and then find as many ways as they can to make a train that's just as long. To start, restrict students to 2 addends (8+4, 6+6, for example) and have them work systematically to create all the possibilities. Record their part-part trains in a T-chart and talk about how it helps to work using a pattern.

Working with a partner, and with their trains still built, students call out an equation (e.g. $9+3$) and have their partner find the corresponding train.



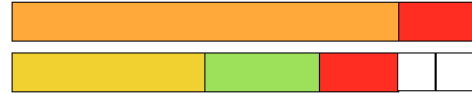
Making 12 with Multiple Addends

Gather students on the carpet. Have them use their Cuisenaire rods to build each page of the story as you read it.



This page shows
 $5 + 3 + 2 + 1 + 1 = 12$

Students build:



Skip Counting and Multiples

Have students re-make a train of 12 with their Cuisenaire rods.

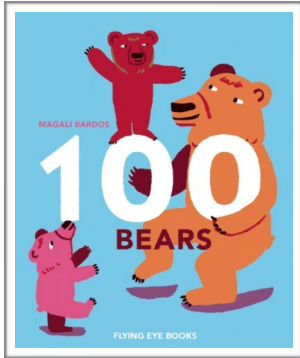
This time, they are to make trains of all the same colour that are the same length as the 12. See below for some possibilities.



Have students select a train and describe it as a repeated addition sentence (e.g. $2+2+2+2+2+2=12$), and then skip count to be sure of the total: 2, 4, 6, 8, 10, 12.

Explain that, when we build a train all in one colour, we have shown multiples of that number. The numbers we say when we count by a number are the multiples of that number.

100 Bears by Magali Bardos



ISBN: 978-1909263154

Book description: Math has never been this much fun! Way better than your ordinary counting book, this real bear caper tells a wacky, witty, wonderful story too! In an anarchic tale of hunters, feasts, and marauding beasts, we chase the numbers 1–100 through mountains, forests, and cities. (from www.amazon.ca)

AVAILABLE in FRENCH as Jusqu'à 100

Grade level(s): 1-2-3

Math Concepts: Number sense, Measurement, Skip counting, Multiplication...

Instructional ideas:

Read and enjoy the book. This is a volume chock full of possibilities – and in many ways is far too much to read in a single sitting. Instead, read only select pages and then pause to explore the key math ideas every couple of pages. In this way, you can stretch the math out over several days or weeks!

On the page with 1...

Explore ideas of how many things can be 1. Have students brainstorm different situations in which this is so – 30 kids, one class, 12 eggs, one dozen, 5 people, one family – and then illustrate their favourite.

On the page with 4...

Have students count the paws in the the air. Have them count by 4's and 2's.

On the page with 6...

Explore doubles equations. Have students build with materials to show doubles stories of their own.

On the page with 7...

Explore doubles and one more, as shown in the illustration. Have students roll a die and then double the amount and add one more to find the doubles plus one fact.

On the page with 16...

Explore perimeter.

Ask: *How many creatures can fit around this table? What other tables could hold as many? What are the dimensions? How many ways can you find?*

On the page with 20...

Ask: *How many ways can you arrange 20 objects in rows?*

What patterns could you make with 4 elements?

On the page with 24...

Count balloons in groups of threes to 24. Ask: *What else comes in 3's?*

Brainstorm a list and then create pictures using stamps or digital images to count by threes.

On the page with 26...

Ask: *There are 26 ears. How many rabbits in all?*

On the page with 40...

Have students explore capacity.

Ask: *How big is the bottle of syrup? How could you figure it out?*

On the page with 42...

Ask: *What division sentence can you write to match the picture?*

On the page with 44...

Have students explore the parts.

Ask: *How many blue? How many white?*

What equations can you write?

On the page with 54...

Ask: *What addition / multiplication sentence could you write to match this page?*

On the page with 59/60...

Have students look closely at the feathers surrounding each of the masks. Ask:

I am looking at a mask. Its feathers show $6 + 2 + 2$.

Which mask am I thinking of? How do you know?

Have students pose riddles of their friends in the same way.

On the page with 69...

Ask: *There are 69 moons on this page. What will the date be 69 nights from now?*

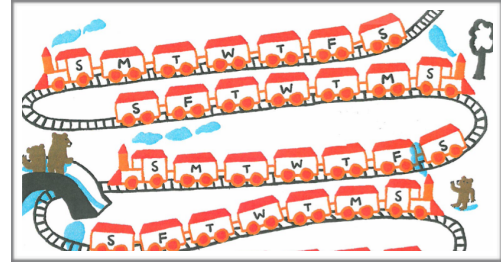
On the page with 70...

Ask: SMTWTFs...

What pattern is meant by these letters?

How long is 10 weeks?

What happened 10 weeks ago?



On the page with 72...

Ask: The bear in this picture is celebrating his 72nd birthday. The total of the other 5 bears' ages is also 72. How old might the other bears be? How many ways can you find? Explain how you figured it out.

On the page with 78...

Play "Target 78". Roll two dice and find the sum.

Add this to the sum of the previous rolls. The first player to get to 78 wins. But watch out! If you roll double ones, you have to start over at zero!!

On the page with 80...

Ask: Count the toes! How many are there? How did you count them?

The fishermen had 80 toes. They caught 80 fish. If you went fishing with the toes at your table group, how many fish would your table group catch? How did you figure it out?

On the page with 81...

Ask: How can you count the ducks? (by 9's)

What patterns do you notice in the numbers?

On the page with 88...

Pose the following question: There are 88 brides on this page!

Make a train of 88 with Cuisenaire rods, in any way you like. How tall a wall could you make with these same 88 cm worth of Cuisenaire rods?

On the page with 90...

Have students count by 10's to 90.

Then have them count by 9's and see what happens!

On the page with 95...

Ask: Are you shorter or taller than the bear? How much taller or shorter?

On the page with 96...

Ask: Bear weighs 96 kg. He's on one side of a teeter totter.

The 6 bears come and balance on the other side.

How much could the other bears weigh?

What if they were all the same weight? Different?

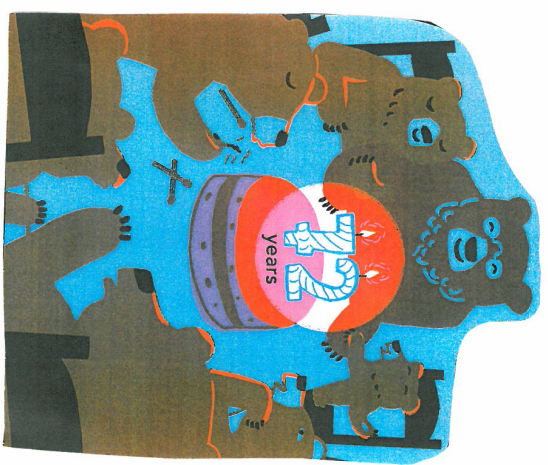


6 bears in the forest

The oldest bear is 72 years old today. The total of all the other bears' ages is 72.

How old might each of the other bears be? Can you find another way?

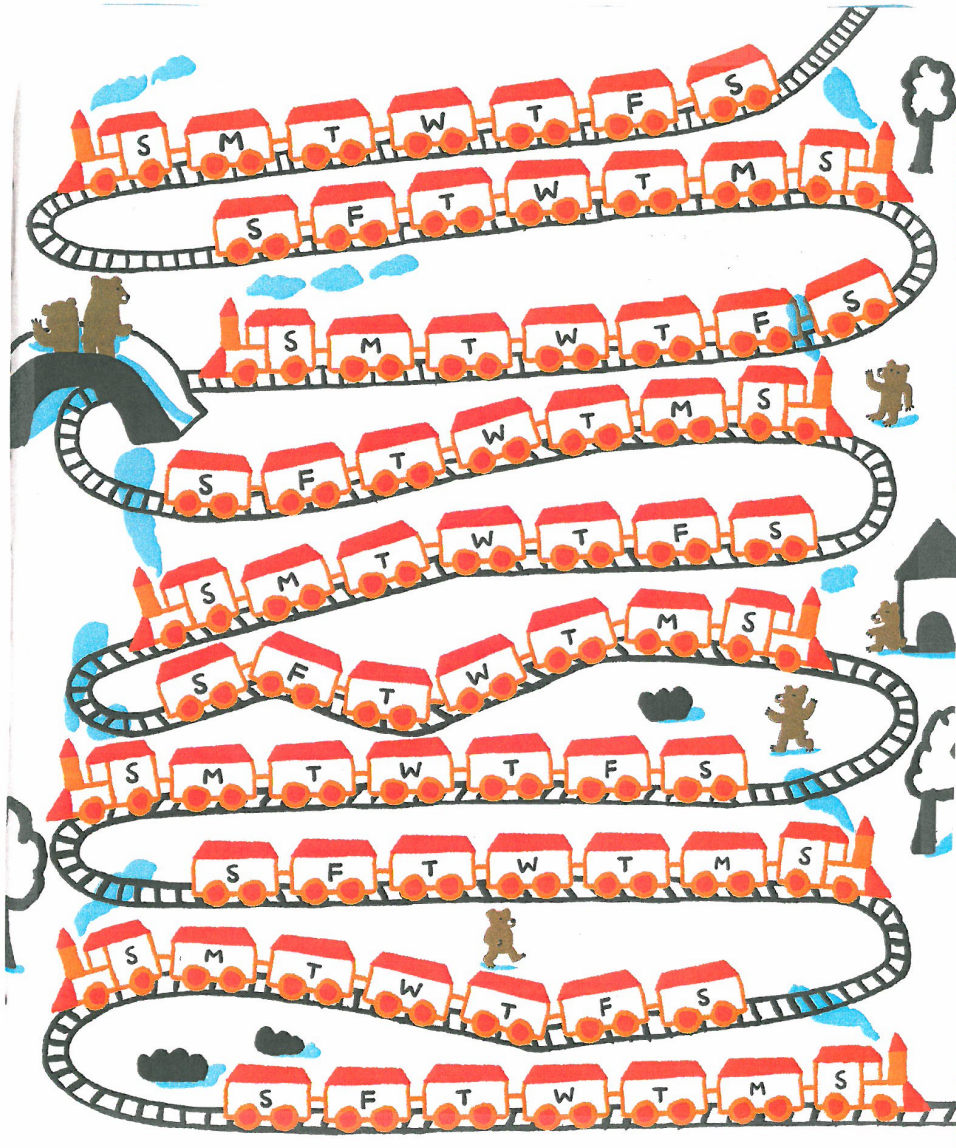
Explain how you determined their ages.





Each of the bears is wearing a mask with feathers and designs.
What equations could you write?

How many? How would you count them?



Target 78

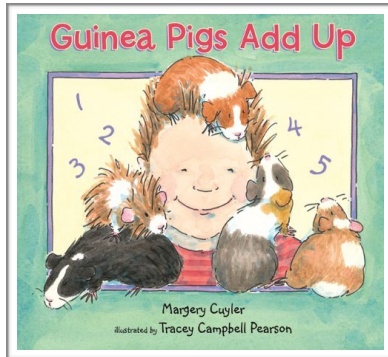


1. First player rolls the dice and finds records the sum on their side.
2. Second player takes their turn.
3. The players continue to alternate rolling the dice, finding the sum and adding the sum to the total.
4. If a player rolls two 1's, he/she must start again.
5. The first player to 78 wins!

*

*

Guinea Pigs Add Up by Margery Cuyler



ISBN: 978-0802797957

Book description: Welcome to a classroom with a hairy problem—guinea pigs that keep adding and adding! From one lonely guinea pig to two to five and all the way up to twenty, the kids find that having a classroom pet is more than they bargained for! (from www.amazon.ca)

Grade level(s): 1-2-3

Math Concepts: Data Management, Missing Parts, Subtraction, Adding Up

Instructional ideas:

Read and enjoy the book.

Data Management

Show the tally marks indicated on the side of the Guinea Pig's cage (bottom left hand corner in the first part of the book). Ask:

Why did the class decide to call him "Toot"?

Explain to your students that a survey is a way to make a decision when it involves a large group.

Ask:

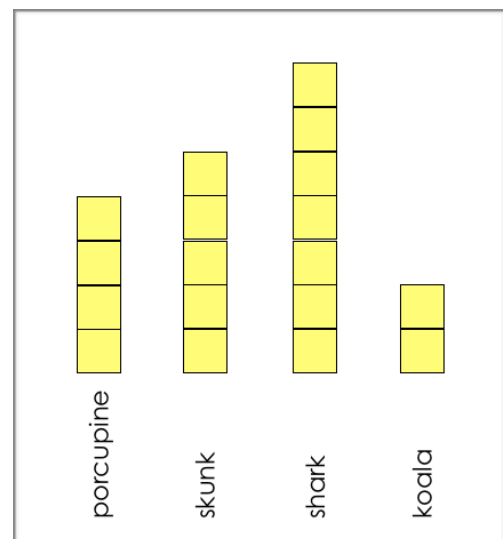
If we got a class pet, what pet would be best?

How would we make a choice?

Invite many ideas, and then, if necessary, reduce the list to only 4 choices.

Have children raise their hands for their favourite among the choices. Record their ideas in the form of a tally.

Alternately, have children write their names on a sticky note and post it on the whiteboard above their choice, making a virtual bar graph. Have a conversation about the best choice and how it is shown graphically.



Tell your students that, if you got a new pet shark (as indicated here!), you'll have to come up with a name by doing a survey. Have students mirror the same process for deciding on a shark name. They should think of 4 names each, then poll their classmates to see which of the names is most popular. Focus on the way they organized and made sense of their information!

Exploring Missing Parts (Grades K&1)

Share the pictures of the 5 Guinea pigs playing on the rug or on the grass. Model the number 5 on the board with magnets. Cover three of them with your hand or a piece of paper and tell this story:

*There were 5 Guinea Pigs.
Some were hiding. 2 were on the rug.
How many were hiding?*

Have students share their guesses and tell how they know.

Record this equation: $5 = 2 + \underline{\quad}$

Explain that this shows a missing part, or the part that is hiding. Fill in the 3.

Repeat with different numbers hiding. Have students record their own missing part equations to match.

Exploring Missing Parts (Grades 2&3)

For older students, transition to ten frames to allow for interaction with bigger numbers. Have them complete the attached line master, filling in the 10-frame spaces with counters and writing the corresponding missing part equation in the space below. Consider laminating this form so students can use dry erase pens to do their work.

Guinea Pig Problems

17 + 3 = 20

Exploring Subtraction

Eventually all 20 of the Guinea Pigs are adopted out to different children. Look at the page with the numbers 20 through 19 written at the top. The children at the front of the line have 3 in a box, so does the child just behind, etc. Have students record this act of subtraction in equations, where the subtrahend represents the number being removed from the total. For example:

$$20 - 3 = 17 \quad 17 - 3 = 14 \quad 14 - 1 = 13, \text{ etc}$$

Model the action on the number line as well, keeping track of the new minuend each time (20, then 17, then 14, etc)

Exploring Adding Up to Find the Difference (Grades 1–3)

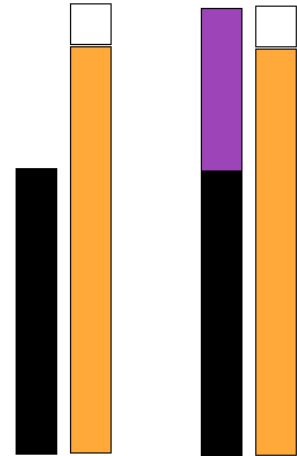
At the end of the story, Mr. Gilbert adopts a rabbit for the classroom.

Continue to use missing part sentences (with a box or line for the missing part) to show the next concept. Pose the following question:

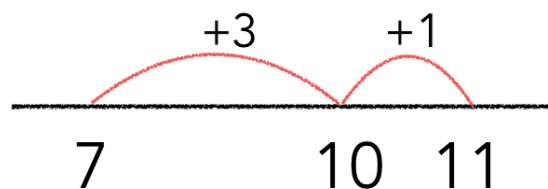
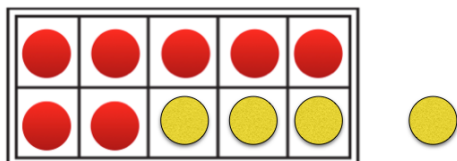
*On Monday there were 7 rabbits in the cage.
On Tuesday there were 11.
How many more rabbits were born overnight?*

Show students how to write the question:
 $7 + \underline{\quad} = 11$

And ask them how they could solve it.
Make Cuisenaire Rods available for modelling.
At right, the shorter black rod is a 7.
The orange and white rods together make 11.
The missing part to make them equal is a 4, or a purple rod,
so
 $7 + \underline{4} = 11$



Some may make connections to ten frames: "It takes 3 more to get to ten, and then one more is 11. 3 and 1 is 4."
Four more rabbits were born overnight."



Continue to ask "adding up" questions like the following:

- $11 + \underline{\quad} = 16$
- $16 + \underline{\quad} = 23$
- $23 + \underline{\quad} = 26$
- $26 + \underline{\quad} = 34$
- $34 + \underline{\quad} = 44$
- $44 + \underline{\quad} = 46$

When bridging a ten, encourage students to get to a round number first, then move into the next decade, as shown above with the $7 \rightarrow 11$ example.

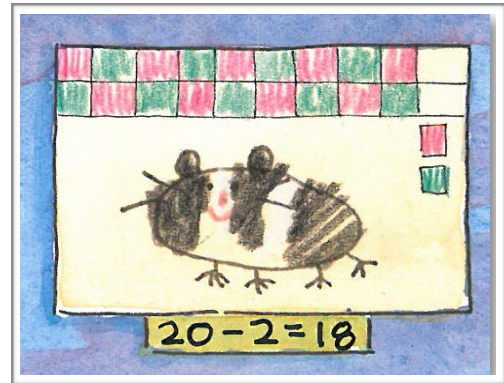
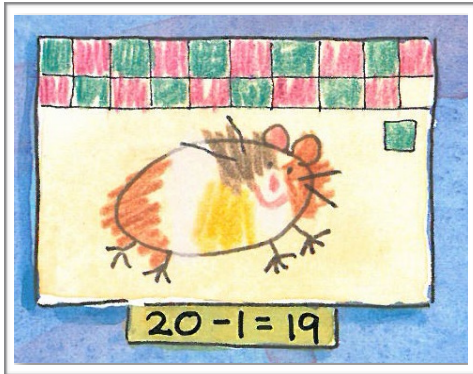
Adding up to find the Difference – Part 2

Have students work with counters on their “Guinea Pigs Add Up” line masters or with a pair of ten frame egg cartons.

Point out these images from the story.

Ask:

- How can you model the equation in this picture? (20 counters, take away 1)
- What Guinea Pig adoption story matches each one? (There were 20 Guinea Pigs. One went home to live with a classmate. Now there are only 19.)

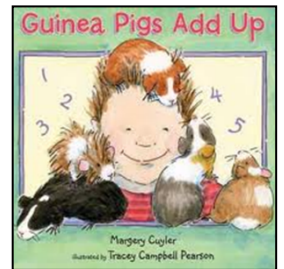


Now look at these pictures. Have students model, tell an adoption story, and then record the corresponding equation for each of the following pictures.



Guinea Pig Problems





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Lion vs. Rabbit by Alex Latimer



ISBN: 978-1561457090

Book description: Small turns out to be more powerful than big in this hilarious story about outwitting a bully. Lion bullies all the other animals until finally a rabbit arrives to stop him. No one thinks that such a small animal will be strong enough to defeat Lion. But perhaps this rabbit is **smart** enough? (from www.amazon.ca)

AVAILABLE IN FRENCH as Lion contre lapin

Grade level(s): 1-2-3-4

Math Concepts: Capacity, Estimation, Number sense, Difference, Time, Beginning Multiplication, Beginning Division

Instructional ideas:

Read and enjoy the book.

Capacity and Estimation

On a second reading, ask:

Lion and rabbit have a marshmallow eating contest. They eat until their bellies are full! How many marshmallow do you think they ate?

Accept all responses and then try some estimation activities of your own.

Put 5 large marshmallows in a small dish. Show students another container (a clear jar, like a mayonnaise or pickle jar would work well) and have them estimate how many would fit, using the referent of 5 as a point of comparison. Record their thinking.

Next, present groups of students with a set of cups / containers of different sizes. Give each group only 5 marshmallows to start (5 regular size or 10 mini marshmallows), and have them estimate and record the number they think would fill their container, then repeat with other containers in the set. The important thing here is to use the referent and to explain their estimations!

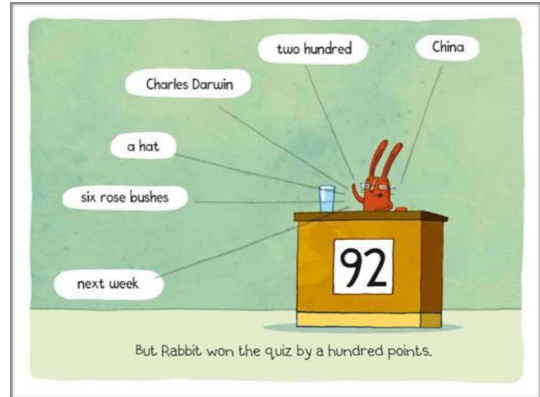
Afterwards, students can check the actual number of marshmallows. Explain that they should fit loosely, and not be jammed in... :o)

Number Sense

Show the picture of Rabbit and Lion in the quiz show. Point to the numbers in the bubbles above Rabbit's head. Explain that these are the answers to some questions that were asked of him.

Ask:

Rabbit and Lion participate in a quiz show. Rabbit got a lot of answers right! We can't see the questions, but we know the answers.



- *If the answer is 200, what could the question have been? How many ways can you find?*
- *If the answer is "6 rose bushes", what do you think the question might have been?*
- *The answer is "next week". What could the question have been?*

Point to the number of points on Rabbit's podium score card.

Ask:

Rabbit has 92 points so far. Lion has zero!

If each question is worth 2 points, how many questions did Rabbit get right? How did you figure it out?

If each question is worth 4 points, how many did he get right so far? What connections did you make?

Could questions be worth 5 points each? How do you know?

Exploring the difference

In the end, Rabbit "won by 100 points".

What could the scores be? How many ways can you find?

What do you notice?

Exploring time & Multiplication

Flip to the page on which Lion and Rabbit are engaging in a hopping contest.

Have students hop like a rabbit for exactly 10 seconds, and count how many hops they made in that time.

Ask:

How many hops did you do in 10 seconds?

(h)

How many would you do in 1 minute?

$(h \times 6)$

What about 10 minutes?

$(h \times 6 \times 10)$

How many in an hour?

$(h \times 6 \times 10 \times 6)$

How many in 6 hours?

$(h \times 6 \times 10 \times 6 \times 6)$



Use a calculator for younger students (Grades 1&2). Do not expect that they will be able to keep pace with the complexity of the math, but have fun with it nonetheless. Older students should be able to use repeated addition for many of the problems. When the going gets too tough, use a calculator to find the final answer. Support older students (grades 3&4) in making sense of the numbers we use to multiply by each time (Why 6? Why 10?)

Exploring time & Division

Consider the following as an extension for older students (grades 3&4).

Rabbit counted his hops.

In 6 hours, he hopped 36,000 times!!

(h)

How many hops did he do in one hour?

$(h \div 6)$

In 10 minutes?

$(h \div 6 \div 6)$

In 1 minute?

$(h \div 6 \div 6 \div 10)$

How many would he do in a whole day?

$(h \times 4)$

How many in a week?

$(h \times 4 \times 7)$

Beginning division

This investigation involves the trip up the mountain.

Explain that the total trip is 24 km. Ask:

If 4 rabbits shared the trip evenly, how many kilometres did each of them run?

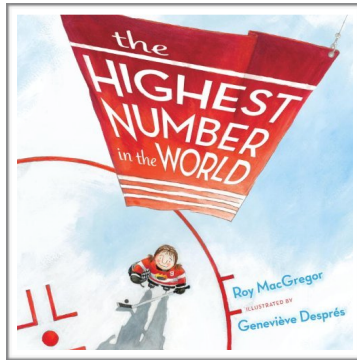
If 8 rabbits shared the trip evenly, how many kilometres did each of them run?

What if there were 12 rabbits?

Suggest that students use Cuisenaire rods to model solution to these problems.



The Highest Number in the World by Roy MacGregor



ISBN: 978-1770495753

Book description: 9-year-old Gabriella Murray lives and breathes hockey. She wears the same number as her hero, Hayley Wickenheiser: number 22. But when her coach hands out the team jerseys, Gabe is stuck with number 9. She wants to give up hockey altogether. A lovely history of the storied number 9 in hockey, The Highest Number in the World is a must-have for any hockey fan. (from www.amazon.ca)

Grade level(s): 2-3

Math Concepts: Attributes of Number, Addition – Mental Math Strategies

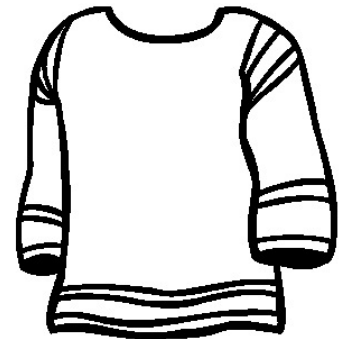
Instructional ideas:

Read and enjoy the book. Have your students share connections to their favourite jersey numbers, and the hockey stars that wear them!

Number Sense – Attributes of Number

Use the line master attached. Have your students create a hockey jersey with their favourite number on the front.

Cut them out, and put a small piece of magnetic tape on the back of each one. Have 8 -10 students put their numbers on the board and have the other students sort them into groups according to an attribute. (odd, even, bigger than 50, less than 50, etc).



Addition – Mental Math Strategies

Post the following on the board.

Vancouver Canucks Team Roster

Jersey number	Player's name
2	Hamhuis
3	Bieksa
5	Garrison
6	Webber
7	Booth
9	Kassian
14	Burrows
15	Richardson
17	Kesler
18	Stanton
20	Higgins
21	Dalpe
22	Daniel Sedin
25	Santorelli
27	Matthias
33	Henrik Sedin
31	Lack
36	Hansen
46	Jensen



Ask:

I am thinking of 2 players.

When I add their jersey numbers, I get 20 as my sum.

Which players could I be thinking of?

Extend by asking:

20 is a round number. It ends in a zero.

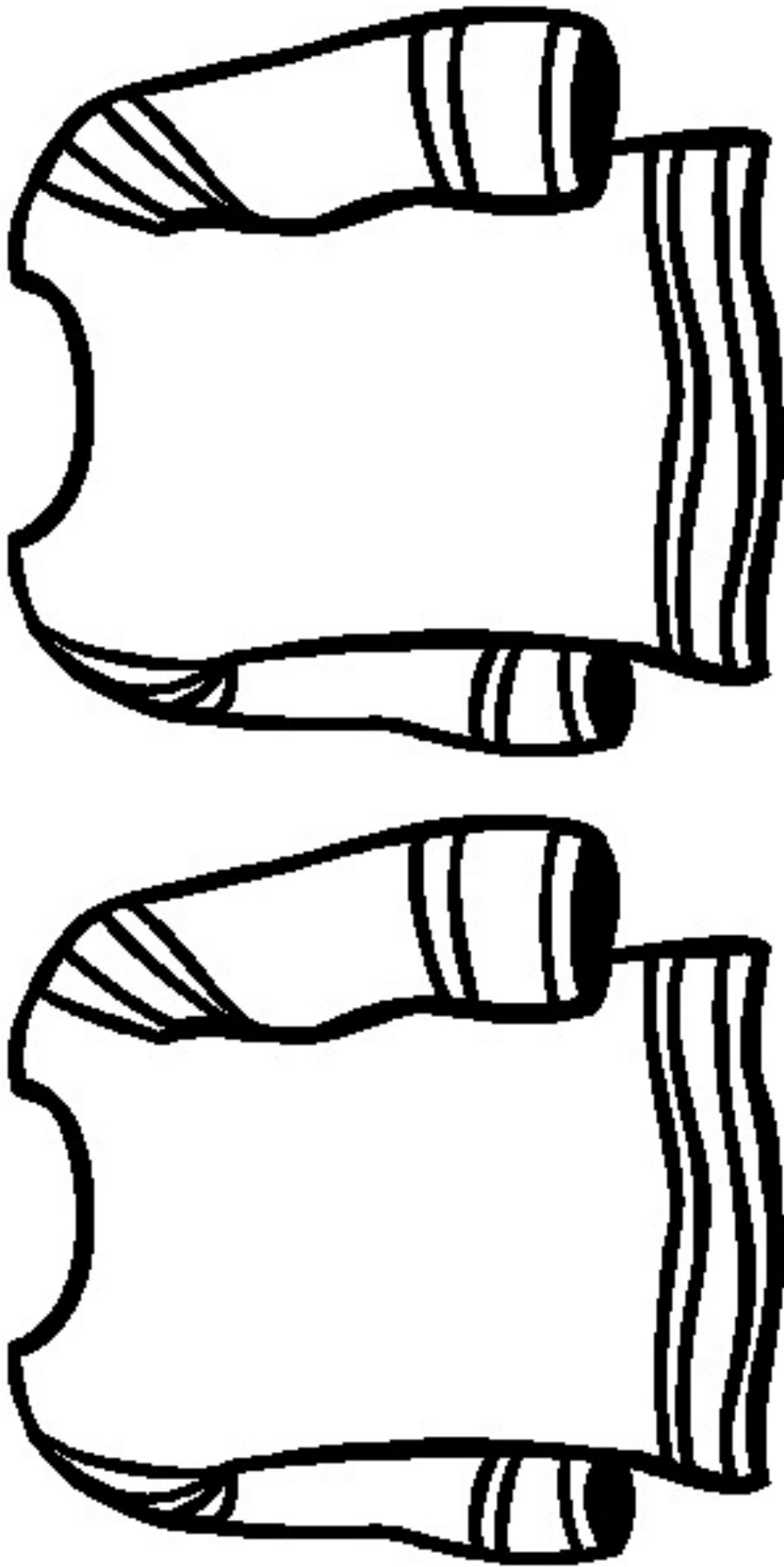
Which other pairs of players can you find that add to give you a round number? What's the sum each time?

How many different combinations can you find?

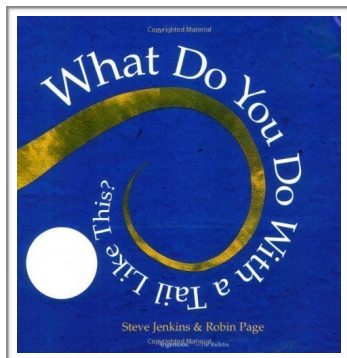
And then:

*Which **three** players can you add to make a round number?*

Hockey Jerseys



What Do You Do With A Tail Like This? by Steve Jenkins



ISBN: 978-0618997138

Book description: A nose for digging? Ears for seeing? Eyes that squirt blood? Explore the many amazing things animals can do with their ears, eyes, mouths, noses, feet, and tails in this interactive guessing book, beautifully illustrated in cut-paper collage, which was awarded a Caldecott Honour. (from www.amazon.ca)

AVAILABLE IN FRENCH as Que faites-vous avec ça?

Grade level(s): 2-3

Math Concepts: Measurement, especially indirect measurement

Instructional ideas:

Read and enjoy the book. Consider sharing only a few pages per sitting. There's lots to digest in this nonfiction book! Not only are animals grouped according to their feet, noses and ears, but then the purpose of each is described.

Steve Jenkins' images are remarkable and his books are of great interest to lovers of science and nature. There are plenty of details in the book that could be used in a comparative study – that is, as aspect to compare.

In order to take advantage of this idea of comparison, consider asking students what classroom tools they would use to measure each of the animal "parts" presented. For example: Would Unifix cubes work? What about pencils? Paper clips?

Of particular interest are the tails that curl.

What objects would be best used to measure that?

Explore measuring large and small objects in the classroom using some of the tools suggested by your students.

Which ones work best for measuring across a desk?

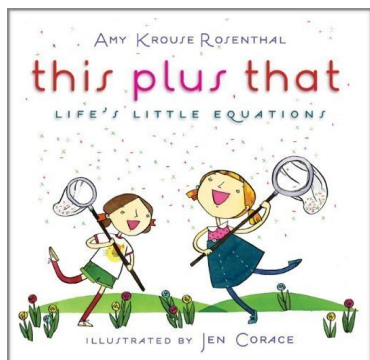
Across the room? Across the school?

What tool would be best to measure around the round carpet?

A hula hoop? The top of the stool?

Have fun exploring non-standard units of measure and indirect comparison with this interesting book as your starting point.

This Plus That – Life’s Little Equations by Amy Krouse Rosenthal



ISBN: 978-0061726552

Book description: In this fanciful collection, Amy Krouse Rosenthal puts together unexpected combinations that always add up to something special. Whether it's "wishes + frosting = birthday" or "birds + buds = spring," each equation is a small delight. This Plus That shows that life's total experience is always greater than the sum of its parts. (from www.amazon.ca)

Grade level(s): 2-3

Math Concepts: Exploring Equality and Inequality, Representing Number

Instructional ideas:

Read and enjoy the book. Have fun with the equations and the surprising ways the author puts ideas together.

Exploring Equality and Inequality

Explain to your students that, just like the author of this book, you are going to show numbers in surprising ways. Use the place value tents to show how a large number like 365 can be broken up:

365 is the same as $300 + 60 + 5$.

$365 = 100 + 100 + 100 + 10 + 10 + 10 + 10 + 10 + 10 + 1 + 1 + 1 + 1 + 1$

$365 = (3 \times 100) + (3 \times 20) + (5 \times 1)$

$365 = (150 + 150) + (30 + 30) + (10 - 5)$

$365 = 400 - 30 - 5$

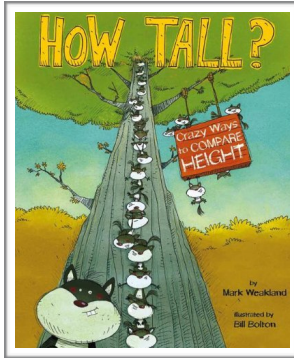
$365 = 250 + 250 - 150 + 15$

etc

Have students choose a number within their comfort zone and show it in as many ways as they can. Encourage them to use equations, to build with ten frames or base 10 blocks, to use tallies or other representations to show their number.

Post their representations for all to see under the heading "This Plus That!"

How Tall? Wacky Ways to Compare Height by Mark Weakland



ISBN: 978-1404883239

Book description: This book presents some interesting comparisons between objects. Written with a sense of fun, some of these illustrations and comparisons may be confusing for younger learners but will certainly inspire conversations about the act of comparison!

Grade level(s): 2-3

Math Concepts: Measurement, Repeated Addition

Instructional ideas:

Read and enjoy the book. The illustrations and comparisons are indeed wacky - have fun with the wildness of them!

Exploring Measurement and Repeated Addition

Show the children the illustration of the elephant and fire hydrants on pages 18 and 19. In it, the elephant is being compared to 4 fire hydrants. Ask students if they can show you approximately how high a fire hydrant is, compared to their own bodies. Then have them extrapolate to estimate the height of an elephant.



Next, use the information included at the bottom of the page.

The author says that a fire hydrant is 81 cm. Have students check their estimates with the actual measure. They should use this information to calculate the actual height of an elephant in centimetres. Accept students' strategies for finding the total.

If necessary, scaffold the task by asking:

What is 80×4 (or $80 + 80$, added to another $80 + 80$)? $(160 + 160 = 320 \text{ cm})$

What is 1×4 (or $1 + 1 + 1 + 1$)? (4 cm)

What is the sum of those 2? (324 cm)

What in our classroom is 324 cm tall? $(\text{the ceiling, 2 teachers})$

Extend the task by finding an actual fire hydrant nearby. Measure the height and see if it is indeed 81 cm tall. If not, use the strategy suggested above to find the height of 4 of your local fire hydrants.

Experiment with other classroom objects. Ask:

How many garbage cans tall is an elephant?

How many desks tall is an elephant?

How many pencils tall is an elephant?

How many small rulers tall is an elephant?

How many Grade 2-3 kids would it take to be the same height as an elephant?

Compare the number of objects and the size of them and see what students notice (that the smaller the object, the larger the number it takes to make an elephant).

Lifetime: The Amazing Numbers in Animal Lives by Lola M. Schaefer



ISBN: 978-1452107141

Book description: In one lifetime, a caribou will shed 10 sets of antlers, a woodpecker will drill 30 roosting holes, a giraffe will wear 200 spots, a seahorse will birth 1,000 babies. A book about picturing numbers and considering the endlessly fascinating lives all around us, Lifetime is sure to delight young nature lovers.
(from www.amazon.ca)

Grade level(s): 2-3-4

Math Concepts: Number sense, Numbers in the world, Scientific Inquiry

Instructional ideas:

Read and enjoy the book. As you do so, record any questions students have about the creatures, especially with regards to the numbers listed.

You might hear ideas like...

- *What do 1000 seahorses LOOK like? How much space do they take up?*
- *How much is 1000 anyway?*
- *About how many eggs are in a single alligator nest?*
- *How many eggs can 2 alligators produce in their lifetimes?*
- *If there were 50 deer in a herd, how many antlers would be shed?*
- *How long does a rattlesnake get? How many mice can it eat in a year?*

Encourage students to pursue answers to their questions, and to model solutions with materials whenever possible. Although in many cases the numbers will be well above the conceptual understanding of grade 2 students, either have them work with an older peer or scale down the questions to ensure they remain meaningful.

Note that in order to answer their questions, students may need to use a calculator. Make them available and take the opportunity to teach how a calculator works.

Have students publish their questions and answers in a poster format and post their work in a place others can see.

Attributes of Number:

On the front and back flyleaf pages of this book are 2 collections of numbers. Begin with either the front or back set. Show the collections of numbers to the students, then record each one on a sticky note or a recipe card sized piece of construction paper with magnetic tape attached to the back. Post them on the whiteboard and ask:

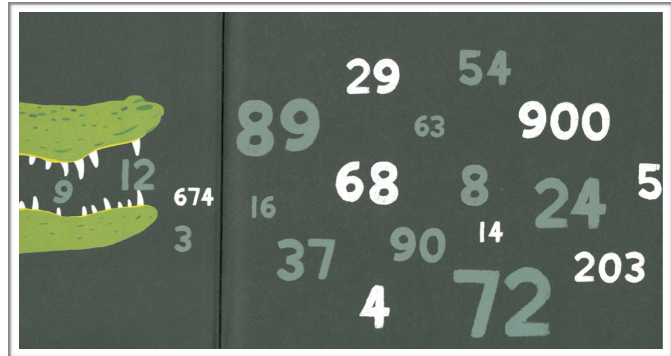
How can you sort these numbers? Which ones are alike? How are they alike?

Students may suggest a wide range of groupings, including:

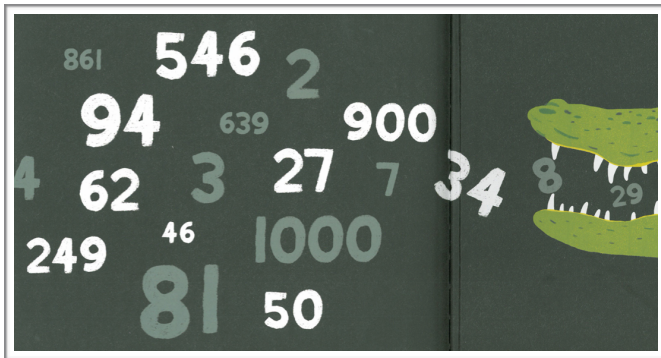
- double versus triple digits
- square numbers
- odd and even numbers
- multiples of 7

etc

Prepare to be surprised!

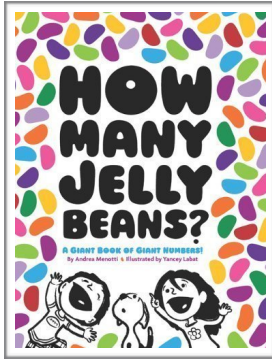


Repeat with a second set of numbers on the back flyleaf.



Have students create sets themselves and share them with a partner, inviting that other student to guess their sorting rule.

How Many Jelly Beans? by Andrea Menotti



ISBN: 978-1452102061

Book description: How many jelly beans are enough? How many are too many? Aiden and Emma can't decide. Is 10 enough? How about 1,000? That's a lot of jelly beans... But eaten over a whole year, it's only two or three a day! This giant picture book offers kids a fun and easy way to understand large numbers! (from www.amazon.ca)

Grade level(s): 2-3-4

Math Concepts: Skip Counting, Multiples, Multiplication, Division, Estimation

Instructional ideas:

Read and enjoy the book.

Skip Counting & Multiplies

As you progress through the pages, count in many ways. On the page with 100 jelly beans, have students count with you to 100 by 25's as pictured, then count by 10's. Mark the numbers on a hundreds chart.

Ask:

What numbers can we count by and land exactly on 100?

Hand out hundreds charts and have students repeat the same activity, colouring the numbers as they count. Make a list of all the numbers you can count by and land on 100. Call these the factors of 100.

Beginning multiplication

Refer to the page with the calendars.

Have students look at September and ask:

- *If the children ate 2 jelly beans a day, how many would they eat in September?*
- *What if they ate 3 a day for the month of September?*
- *How many would be eaten in October if you ate 3 a day? What connections can you make?*

- *If the pattern of jellybeans eaten in September is “3 a day, 3 a day, then 2 a day:”, how many would be eaten in September in all? How did you figure it out?*
- *If you ate 2 jellybeans a day from January 1st until Valentines Day, how many jellybeans would you need?*

Beginning division

Refer to the page with 5000 jellybeans.

Have students recall what they know already about 1000 jellybeans and ask:

- *About how many jellybeans would they have to eat each day to eat 5000 jellybeans in a year?*

Estimation

Buy a large bag of jellybeans and put 10 in a small dish. Put a quantity (about 130 to start) in another jar with a lid. It's not important that the jar be full. Ask students to use the referent of 10 to estimate the number in the jar.

Repeat with a bowl of 50 and a jar of 600-700 for older children. Have them justify their estimates.

Take time to count the jellybeans in 10's and 25's and 100's to confirm the total number.

Consider sorting, graphing and then sharing the jellybeans so that everyone gets the same amount. Talk about how to handle the remainders...