

Visual Teaching of Math Concepts

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Power of visualization

Using visuals enhances learning.

Power of visualization

It leads to greater engagement.

Power of visualization

It leads to better memory of learned material.

So ...

Let's use visualization even more for describing mathematical concepts.

Visuals are powerful tools in

algebra, pattern, number, data
and measurement

Make it interesting

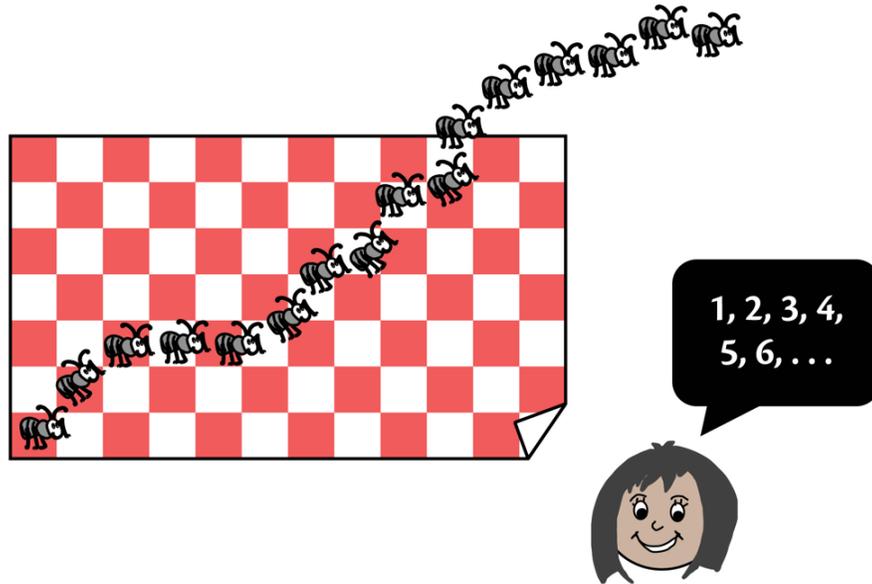
Try to use provocative visuals to initiate conversations.
This leads to richer conversations.

source

Many of the screen shots come from Eyes on Math

Setting up

Which ants did Meghan already count?
How high will she go to count
all of the ants?



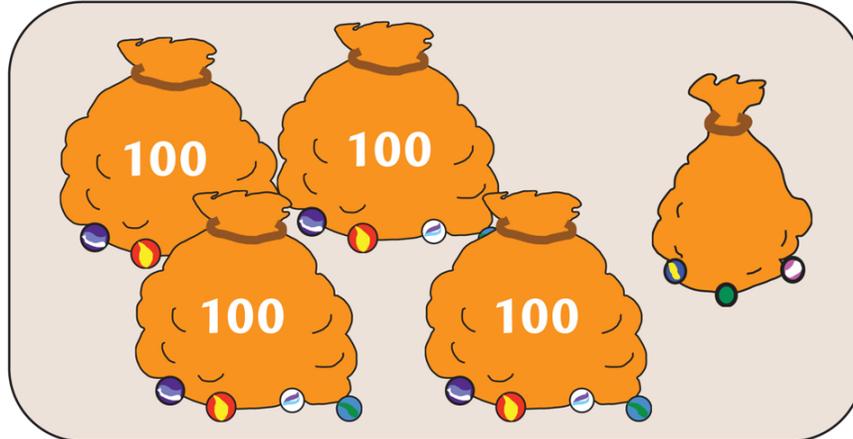
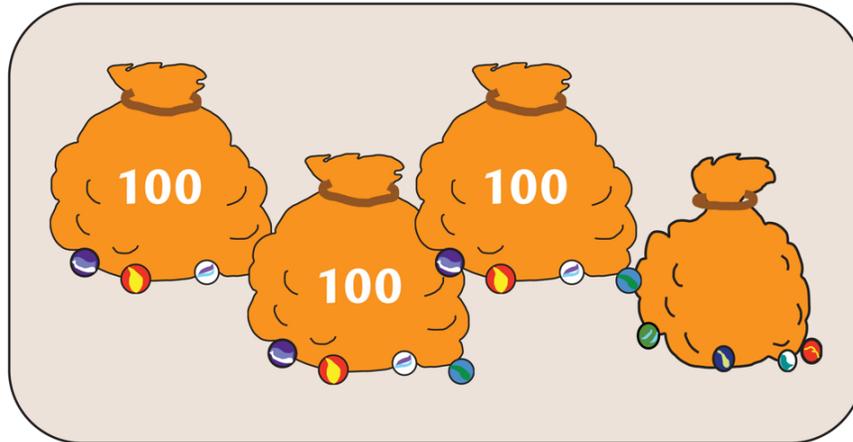
COUNTING UP BY 1s • Grades K–2 • CCSS K.CC

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Does this picture show a single multiplication?

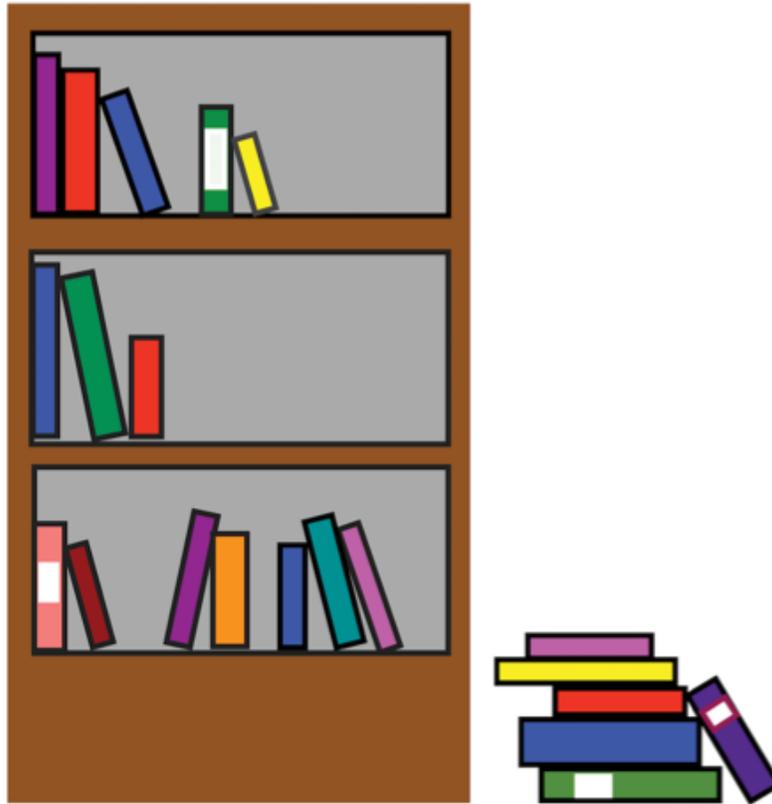
Which section has more marbles?
How can you be sure?



COMPARING SIZES OF NUMBERS • Grades K–2 • CCSS 2.NBT

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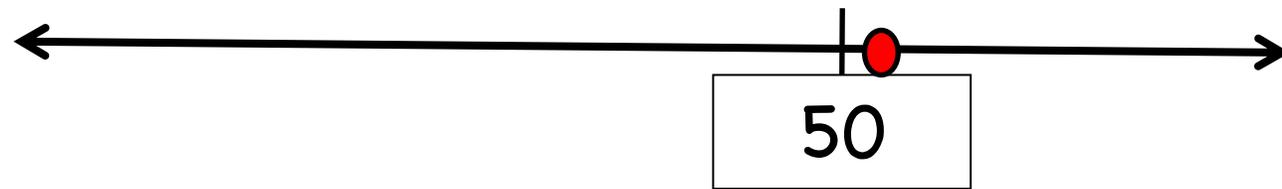
What different addition sentences might tell how many books will be on each shelf after putting away the books on the floor?



What do you know about the number for the yellow dot? How sure are you?



What do you know about the number for the red dot? How sure are you?

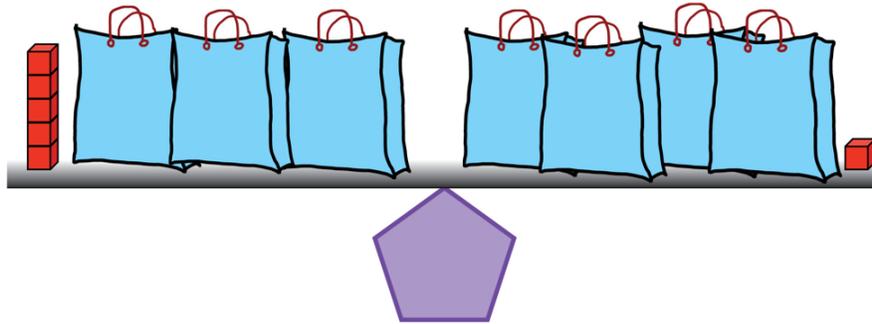




HEADS	TAILS

What will happen next?
How sure are you?

How can thinking about this balance
help you solve
the equation $3x + 5 = 4x + 1$?



Now

- What kind of photo or picture could you use to start a conversation about ratio or rate?

Interesting problems

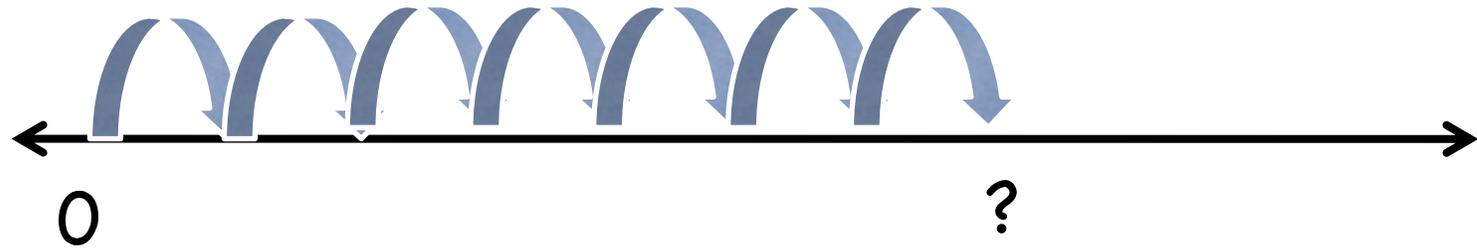
On which numbers might the bunnies be?

1

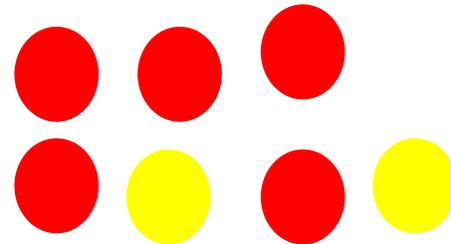
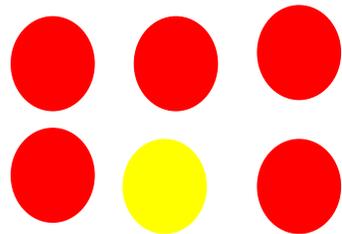
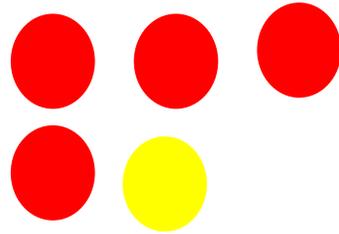
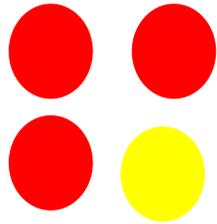


1000

What number could the ? be? What could it not be?



Which group of dots is the “reddest”?



How might you solve this with a picture?

You add two numbers.

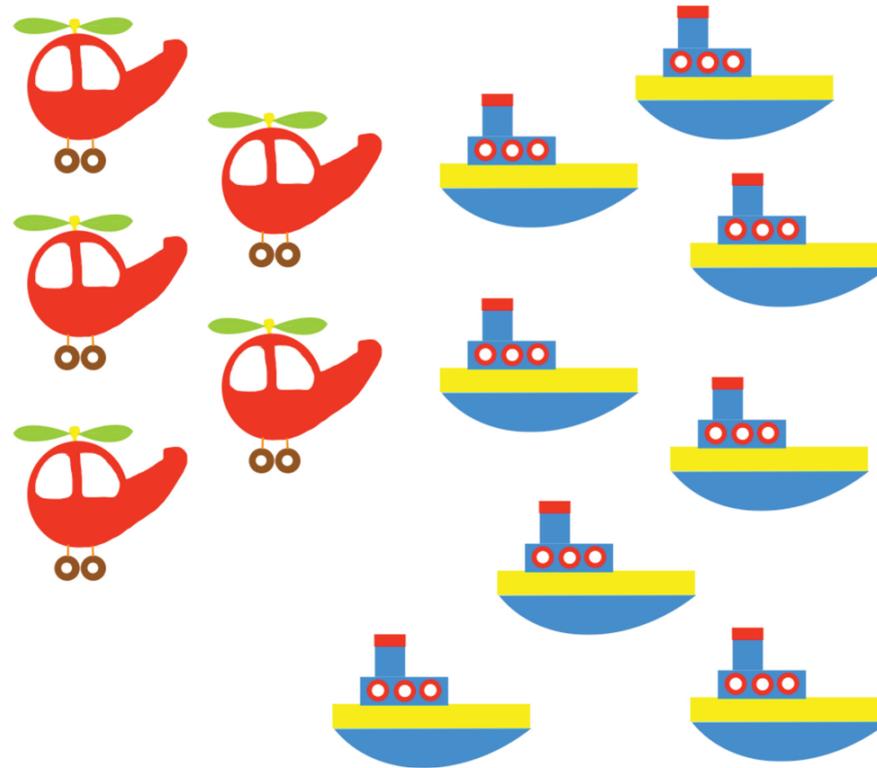
You subtract the same two
numbers.

The first answer is 10 more.

What are they?

Building connections

Does this picture show
addition or subtraction or both?



RELATING ADDITION AND SUBTRACTION • Grades K–2 • CCSS 1.OA

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People can have many names.

What different names
could you give this shape?

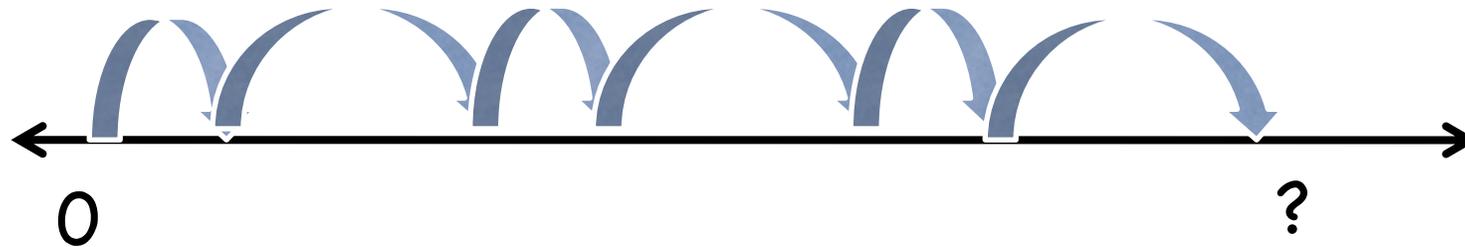


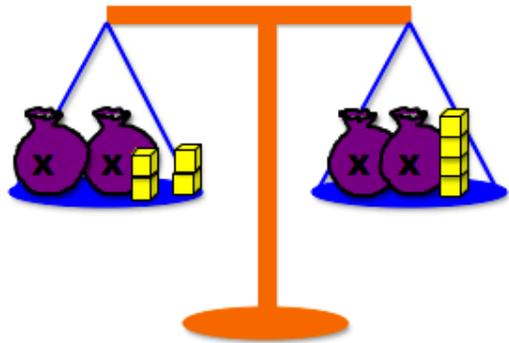
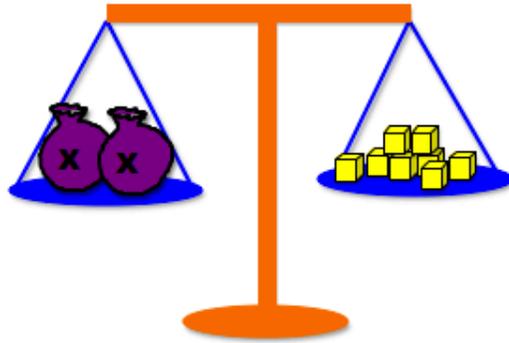
CLASSIFICATION OF SHAPES • Grades 3–5 • CCSS 5.G

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The jumps are whole number amounts. What number could the ? be? What could it not be?





How are the equations for the two balances different?

Proving ideas

What idea(s) do you see?



What idea(s) do you see?

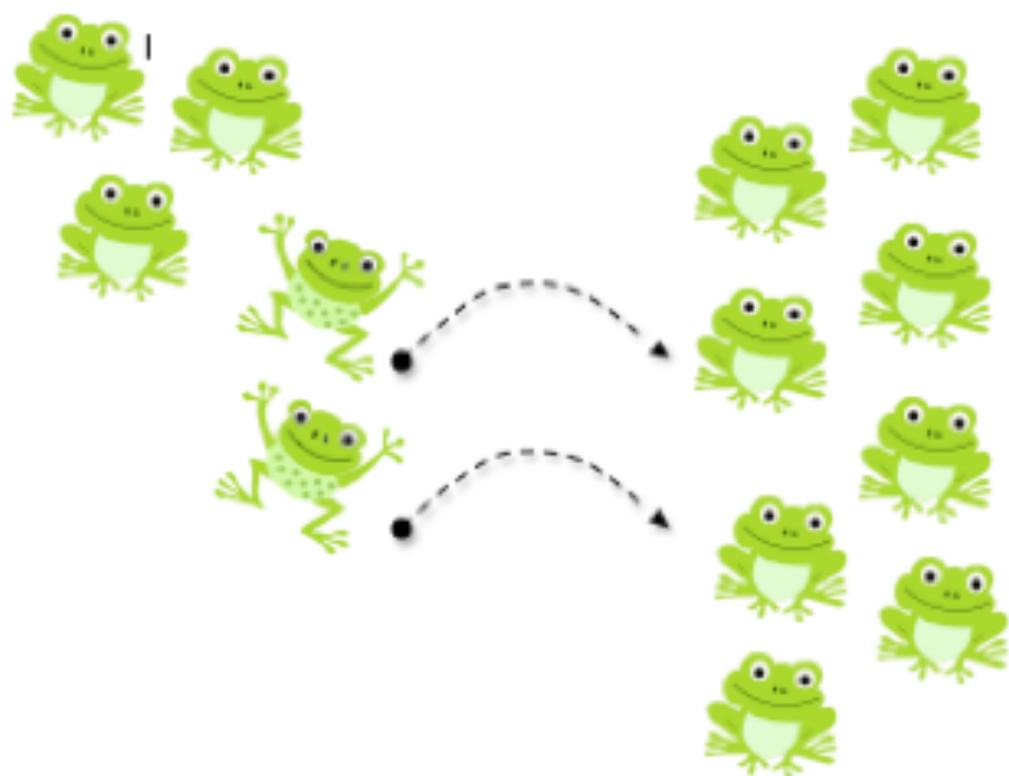


What idea(s) do you see?



What idea(s) do you see?





How are the number sentences you write to tell about all the frogs the same and different after the two frogs move over?

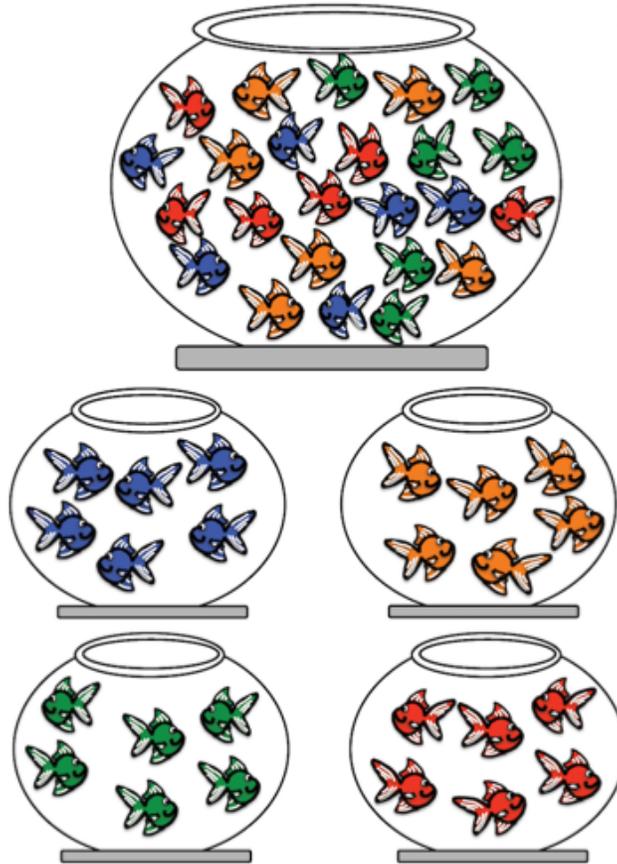
Who is right?



This puddle is
10 steps wide.

This puddle is
12 steps wide.

What division story does the picture show?
Suppose there were 4 more fish.
Would it still show a division story? How?

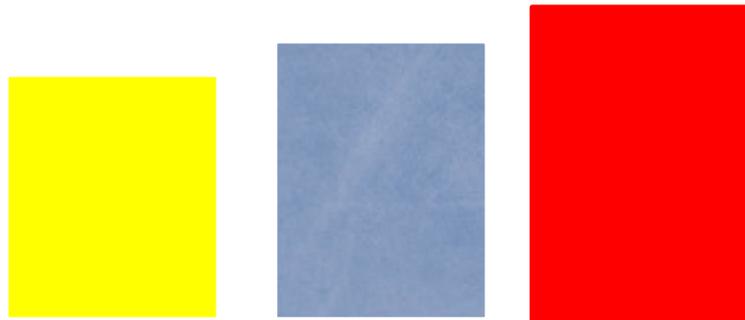


What idea do you see?

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60

Now...

- What kind of picture might “prove” something about the sum of any three consecutive whole numbers?





Encouraging communication

You might ask students to represent virtually every problem they meet with a “math” picture (not just a picture).

The essence of a math picture is showing the relationships, not necessarily the objects.

For example...

Kyra had 3 times as many books as Zayden.

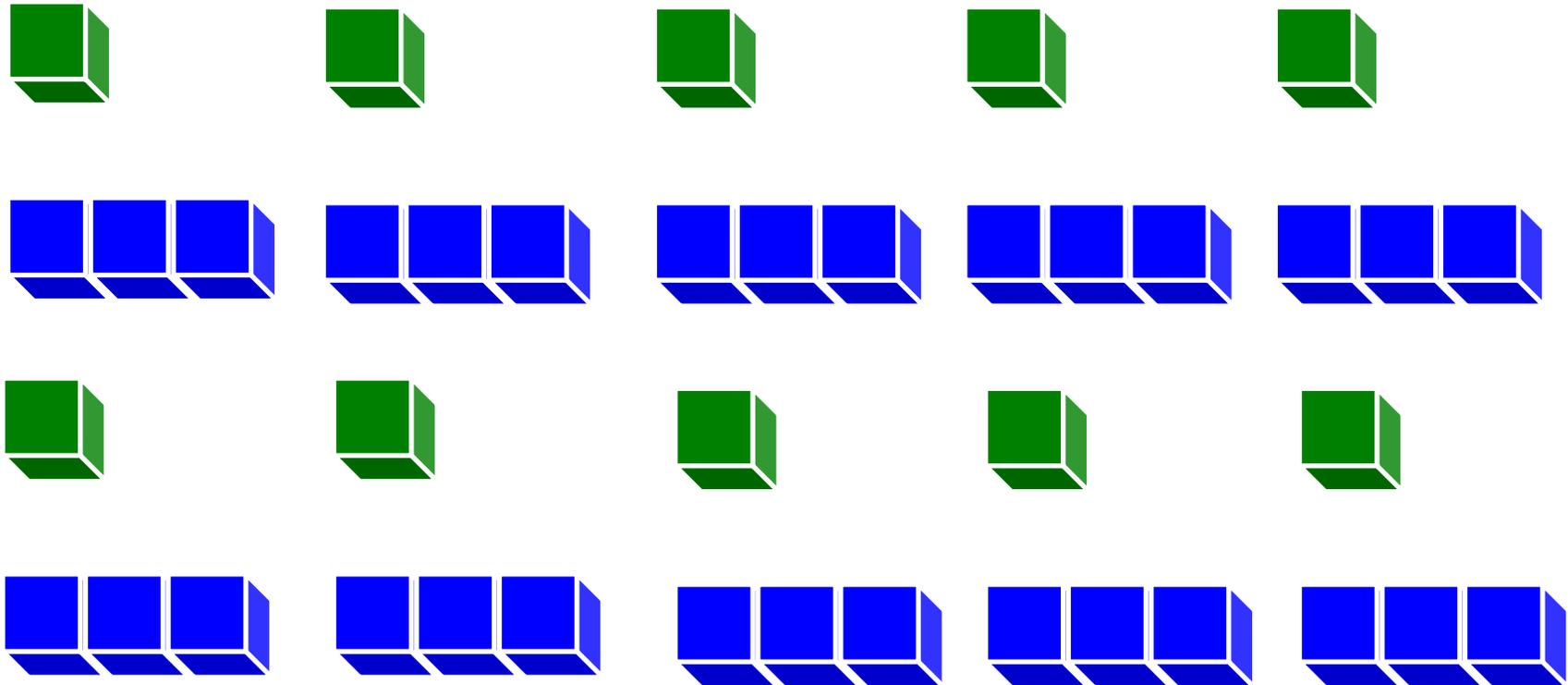
Together they had 40 books.

How many did each have?

For example...



For example...



Or..

- The mean of 5 numbers is 4 more than the median.
- What could the numbers be?



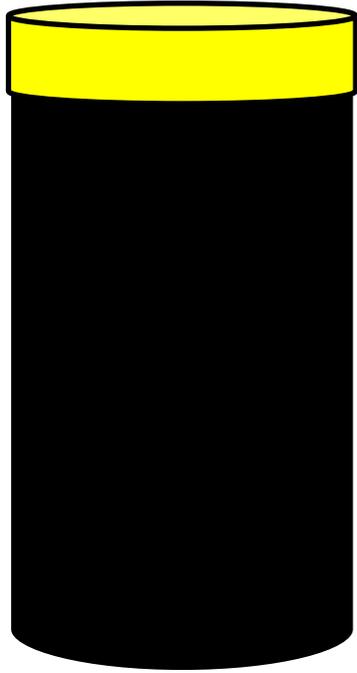
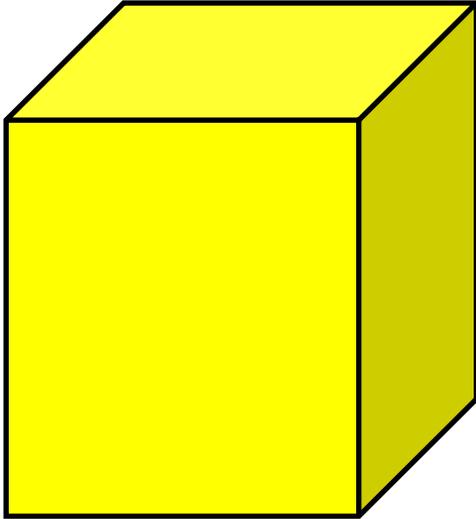
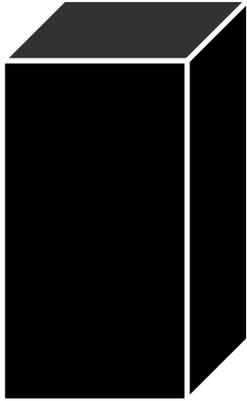




Visualizing fractions and percents

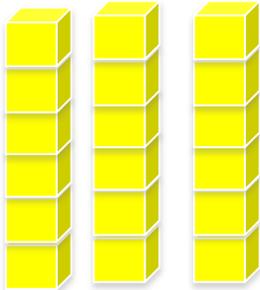
- What does 25% look like?
- What does 90% look like?

- Draw your own picture before you see mine.



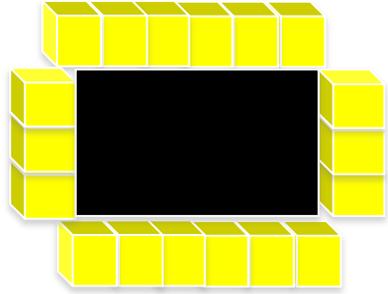
Perimeter problem

- A rectangle's perimeter is three times its length.
- What could the length and width be?









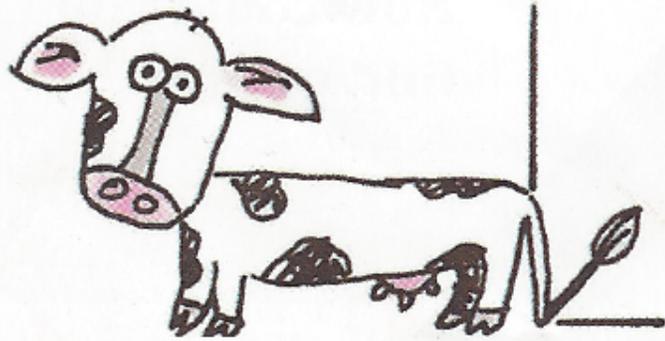
Encouraging communication

One interesting idea is to ask students to create a “visual” glossary.

Here are a couple of entries I got.

Angle bisector

a line dividing an angle into two equal halves



Quadrilateral

a figure with four straight sides



So what do you think?

- Do you see the power of visuals more for
- Introducing conversation
- Setting up problems
- Building connections
- Proving
- Communicating?

Download

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