Please take some time to **PLAY**! Engage with a question and the materials.

Acknowledgement

Before going any further, it is important that we recognize that we are here today to learn on the unceded, shared territories of the Coast Salish pecople on which our schools are located. We recognize that the Katzie and Semiahmoo First Nations who have signed the Surrey Schools Aboriginal Education Enhancement Agreement.

Playful Mathematical Inquiry in Grades 3 to 5: Multiplication

February 16th, 2017 ~ STA Focus Day
North Surrey Secondary School
Presented by Jen Barker
Twitter: @barkerJBarker

Acknowledgements

- Thanks to Cynthia Walker, Gurpreet Koonar, Diane Brebeck, Hyekyung Lee for letting me try out some lessons in their classes!

- These ideas have been collected and/or inspired from a number of sources. Please see hand out for specifics!

Learning Intentions

- I have an emerging definition of PLAY!

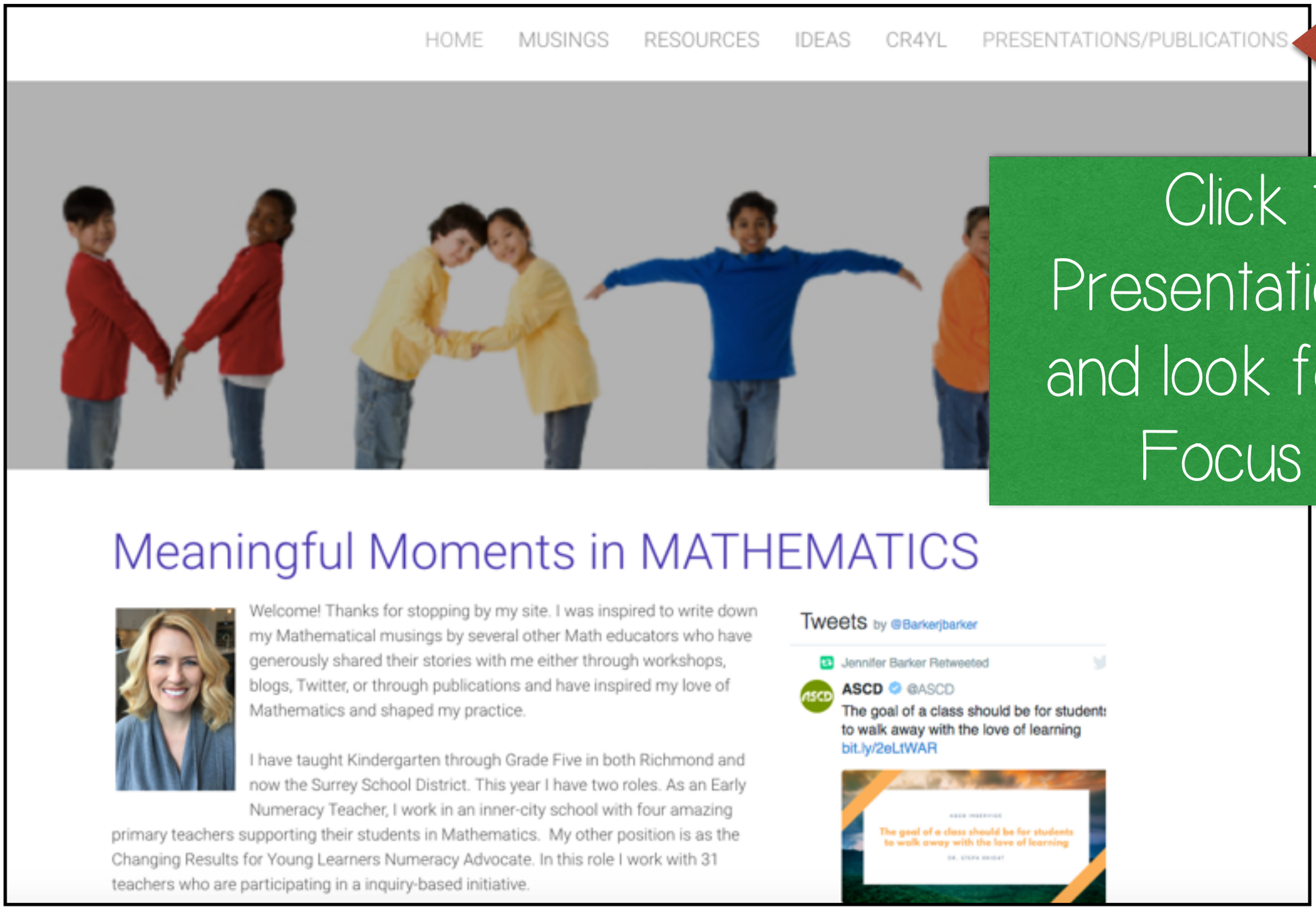
- I understand there are different types of inquiry and what these look like.

- I understand my role as the teacher during playful mathematical inquiry, including designing the learning opportunities, asking nudging questions, and providing formative and summative assessment.

- I have a few ideas about how to design and incorporate playful Mathematical inquiry in my math class with regard to multiplication.

Where can you find PPT, learning intentions, and more ideas?

www.meaningfulmathmoments.com



Click the Presentations tab and look for STA Focus Day

What grade do you teach? Why did you sign up for this session?

PLAY

Diminished consciousness of self

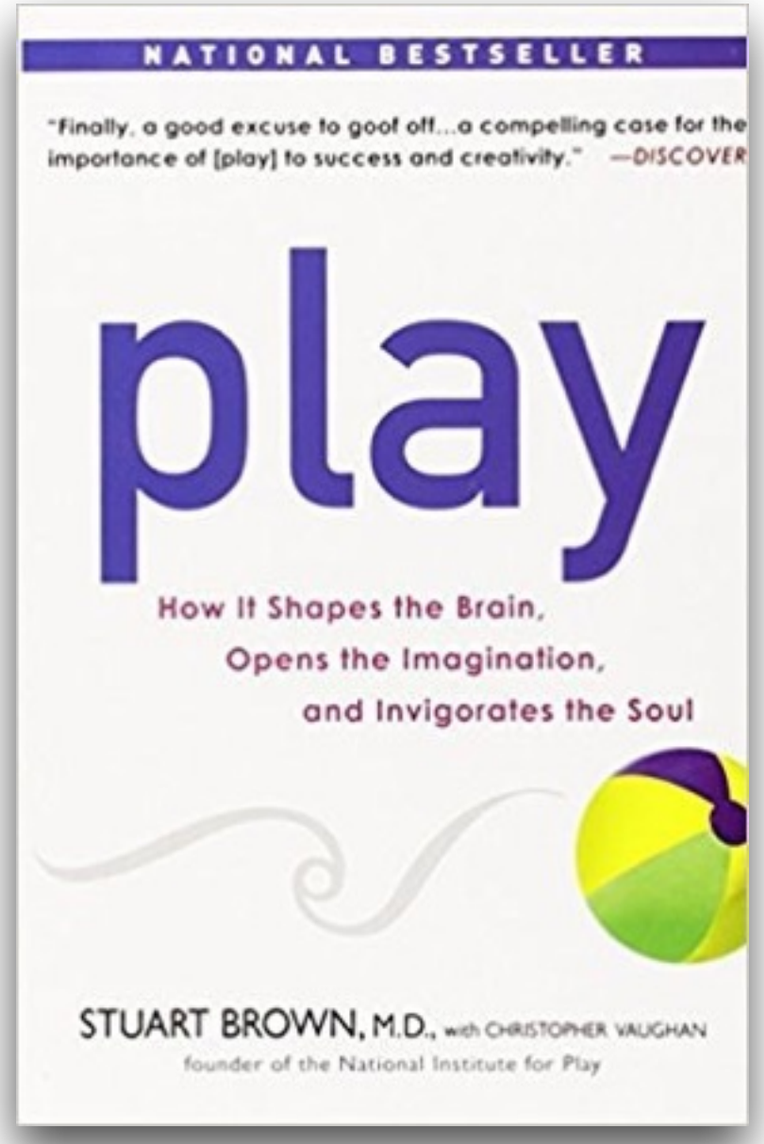
- no good or bad
- willingness to take risks

Improvisational Potential

- its openness
- co-constructing understanding

Continuation Desire

- it hooks! Focused attention
- self motivated



What is Inquiry-based learning?

Inquiry-based Learning is a dynamic and emergent process that builds on students' natural curiosity about the world in which they live.

As its name suggests, Inquiry places students' questions and ideas, rather than solely those of the teacher, at the centre of the learning experience. Students' questions drive the learning process forward.

Teachers using an inquiry-based approach encourage students to ask and genuinely investigate their own questions about the world. Teachers further facilitate students' learning by providing a variety of tools, resources, and experiences that enable learners to investigate, reflect, and rigorously discuss potential solutions to their own questions about a topic the class is studying.

Shifting Pedagogical Paradigms

Traditional learning	Inquiry learning
Have to learn	**Want to learn**
What to know	**How to know**
Tell and memorize	**Ask and inquire**
Only one right answer	**Many conclusions**
Teacher-directed	**Learner-centred**
One-size-fits-all	**Personalized**
Passive learning	**Active learning**
Assess for marks	**Assess for learning**

Thinq 4 - 6: Inquiry based learning in the junior classroom (2016), p 12.

Types of Inquiry

Structured Inquiry:

- The teacher determines the big idea and what the students will come to understand by the end.
- The teacher starts with the guiding question.
- The students help create the plan and guide the inquiry with their questions, interests, ideas, analysis, reflections and understandings.

Guided Inquiry:

- The teacher comes up with the big idea or topic and or the teacher come up with the questions.
- The students are responsible for designing and following their own procedures to test the question and then communicate their results and findings.

Open Inquiry:

- The students determine the purpose and formulate the questions.
- The students design procedures, gather the materials and communicate their findings.
- The teacher facilitates, supports, asks questions and redirects the investigation.

From Michelle Hikida, Richmond Teacher

What might this look like in my classroom?

Whole class structured inquiry

- everyone has the same question & the same materials

Whole class guided inquiry

- everyone has same question and choses from the different materials at each table

Small groups guided inquiry

- Different questions and different materials at each table
- could have 2, 3, or 4 questions around the class

Individual or Partner Open Inquiry

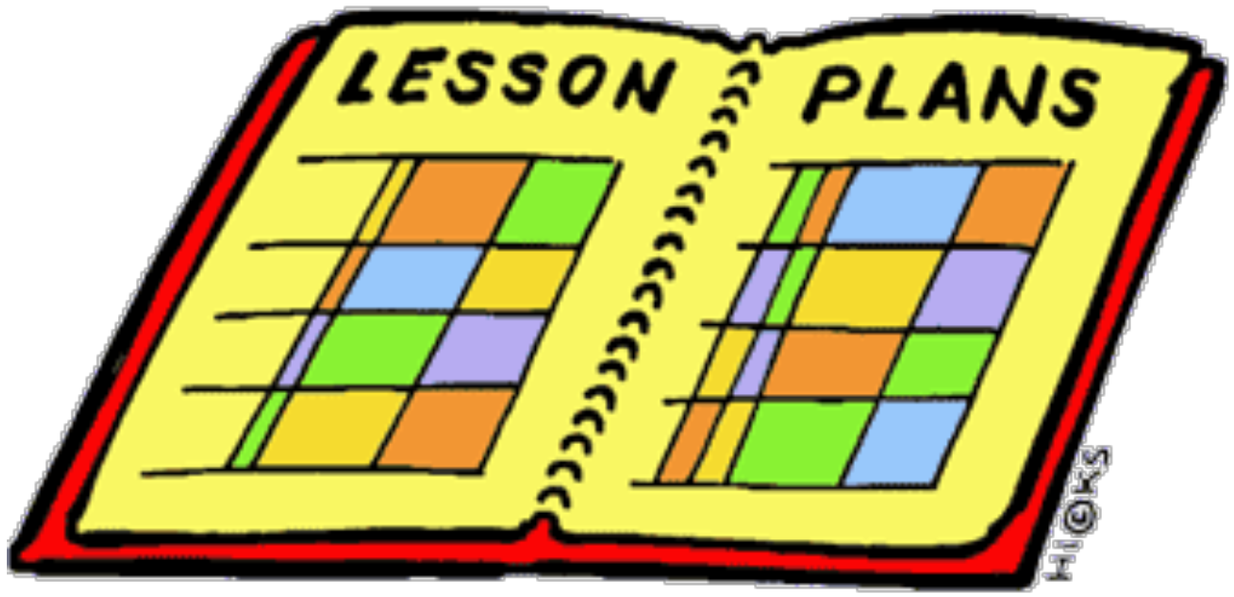
- Lots of different questions
- Many different materials dependent on what students choose

Structure of a Whole Class Lesson

1. Introduce the problem - use a book, image, artifact

2. Exploration Time - what materials will you need?

3. Sharing - what strategies did you try?



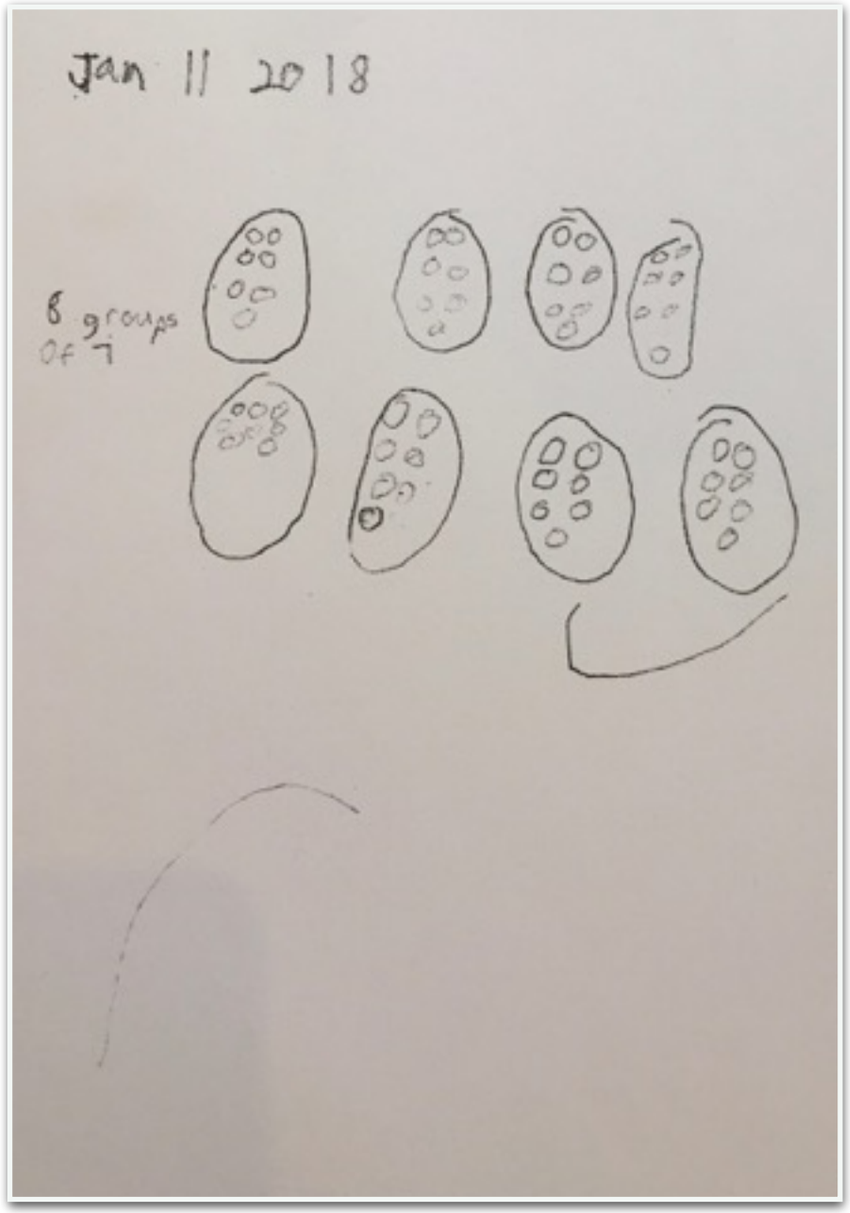
Developmental progression of Multiplication

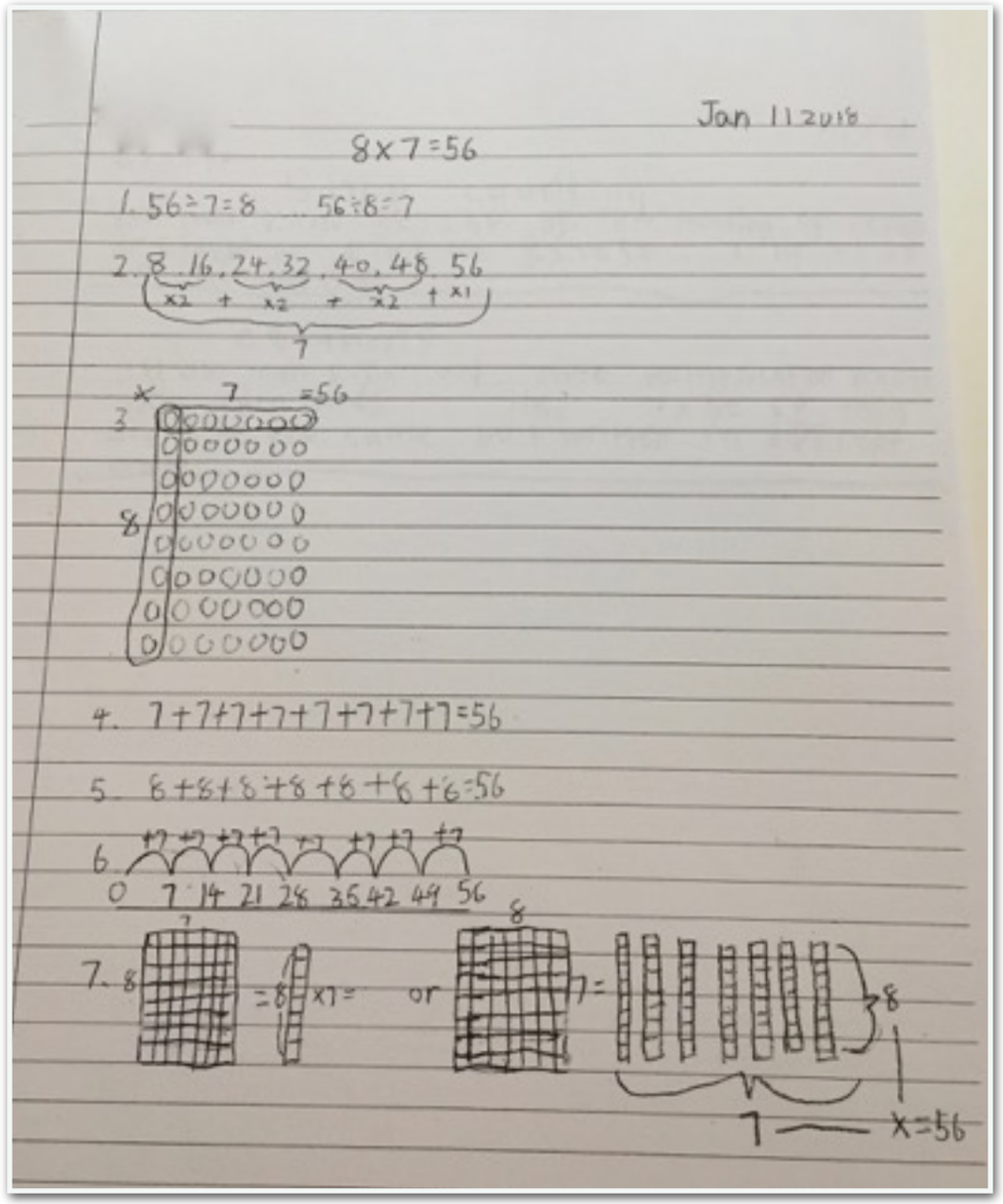
- Recognizing Equal Groups
- Multiplying Equal Groups - skip counting & repeated addition & groups of
- Multiplying Using Rectangular Arrays
- Using Multiplicative Thinking to Solve Single & Multi-digit questions including language such as times, twice as many, etc.
    - Using known facts and compensating
    - Doubling and Halving
    - Using the commutative property
    - Using the distributive property
    - Using the associative property

Finding Out What Students Know

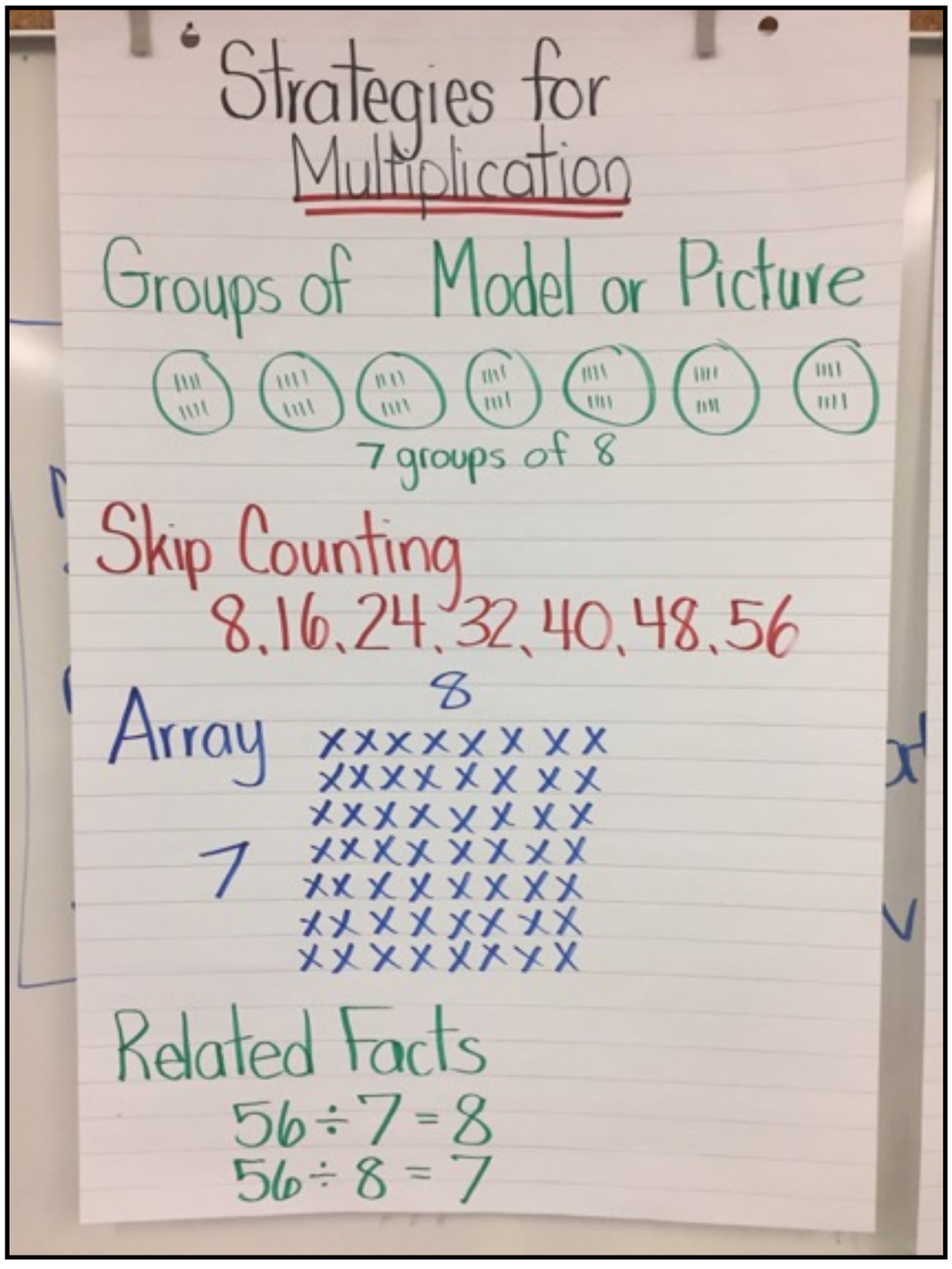
Activating Prior Knowledge

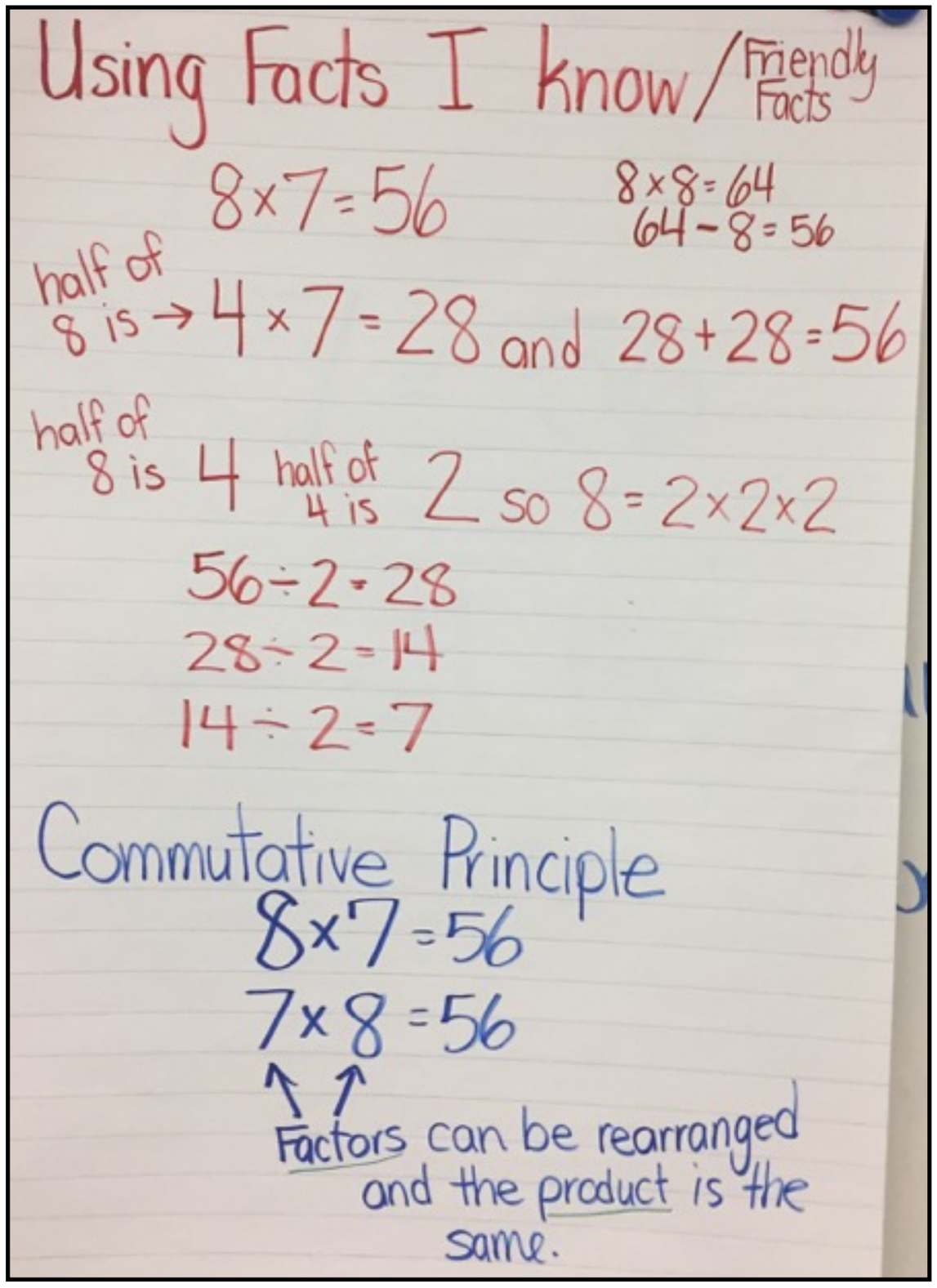
What are all the ways you can show 8 x 7 =

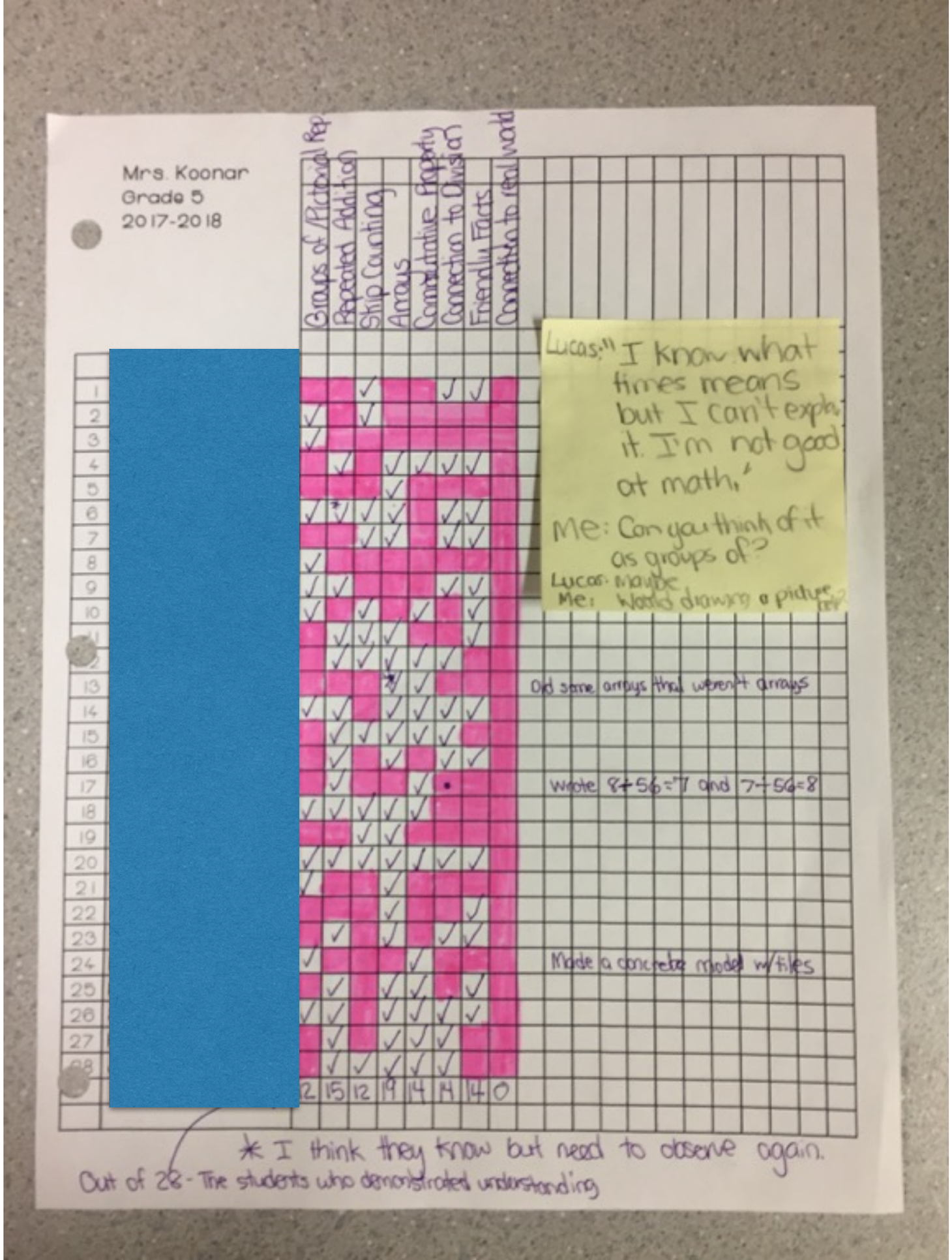




AFTER: Students share aloud the strategies they know!





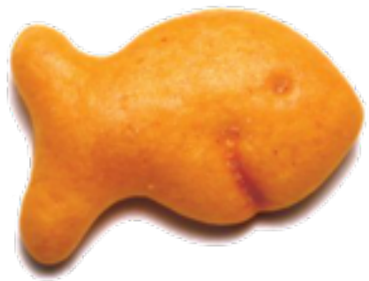


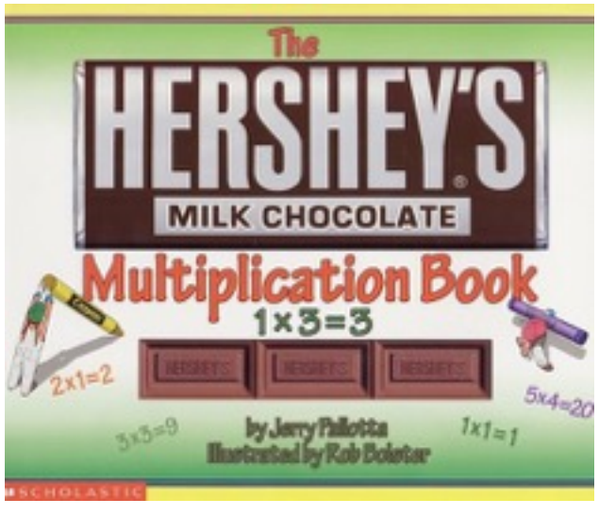
How could teachers use this information to inform their instruction?

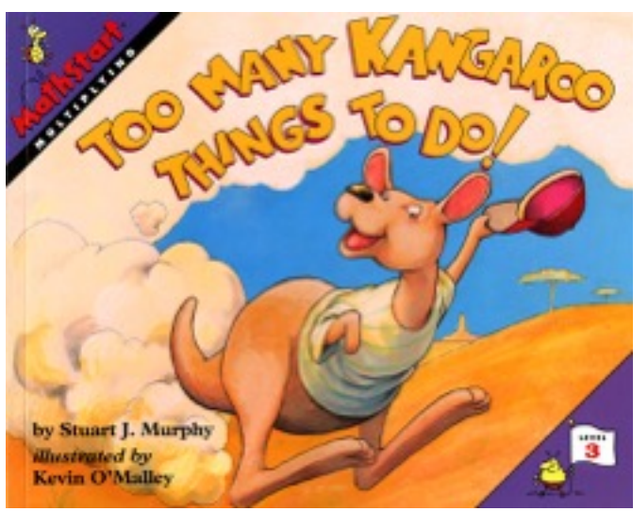
How might you plan your Multiplication unit?

Designing learning opportunities that are PLAYFUL & ENGAGING?

- Exciting literature
- Inviting Materials
- Connected to students' interests
- Multi-modal - hands on, kinesthetic, visual, auditory
- Opportunities for Collaboration
- Organized







Lessons that provided an entry point for all and allow each student to work to their potential

Learning Intentions for:

ALL

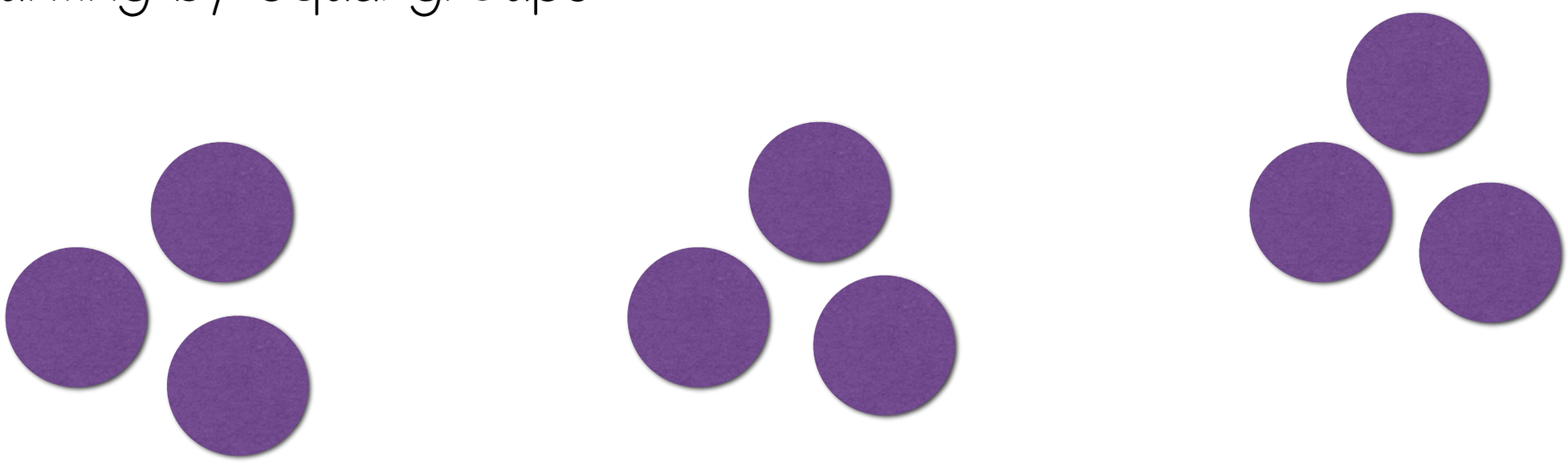
SOME

FEW

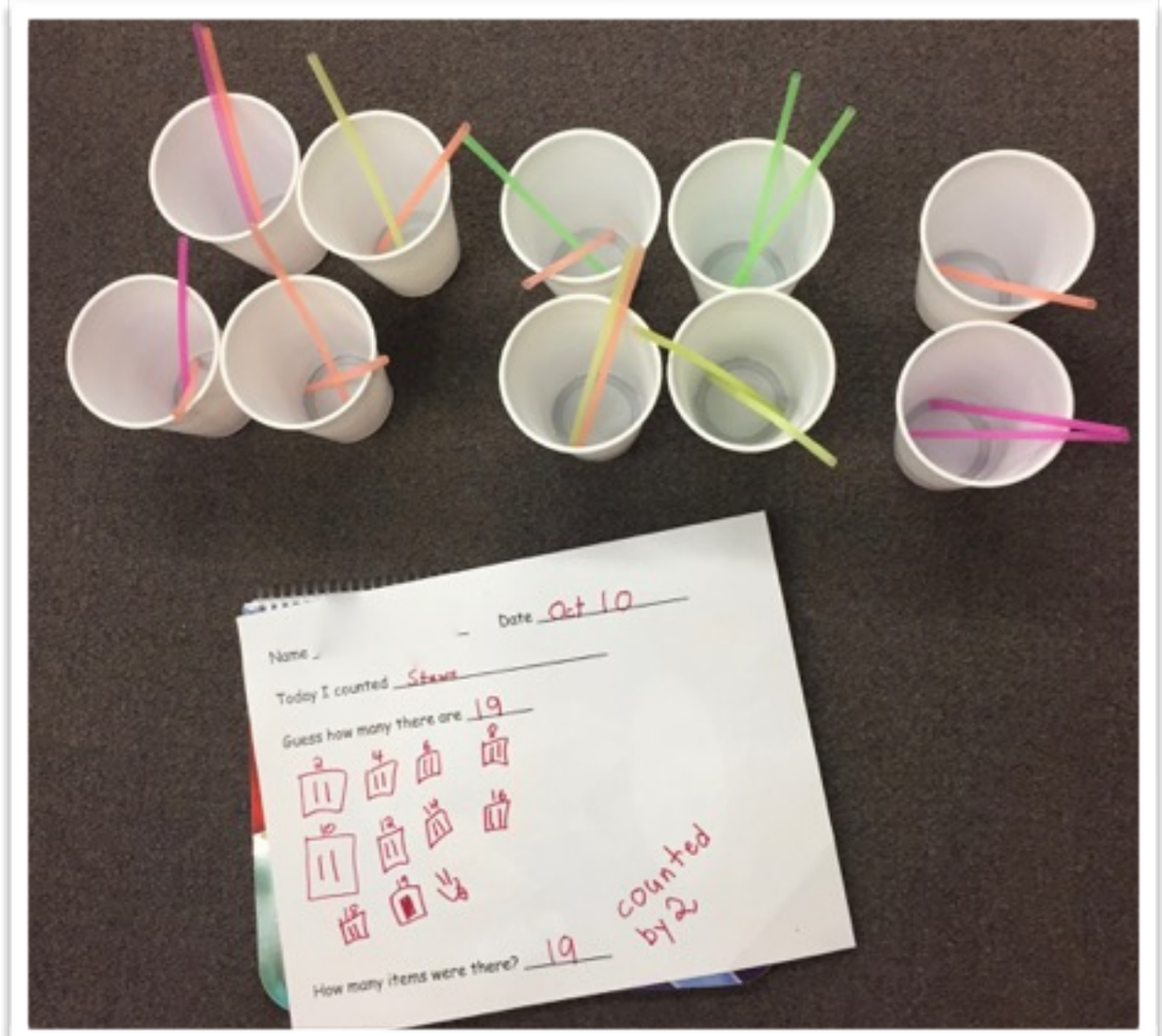
Thanks to Shelley Moore for her work in this area.

How do we assist students in seeing equal groups?

- Counts by equal groups (e.g., 2's, 5's, 10's, and so forth)
- Knows the quantity stays the same when counted by different sized groups (conservation of number)
- Identifies and extends the number pattern that emerge when counting by equal groups



What are the different ways you could count your collection?



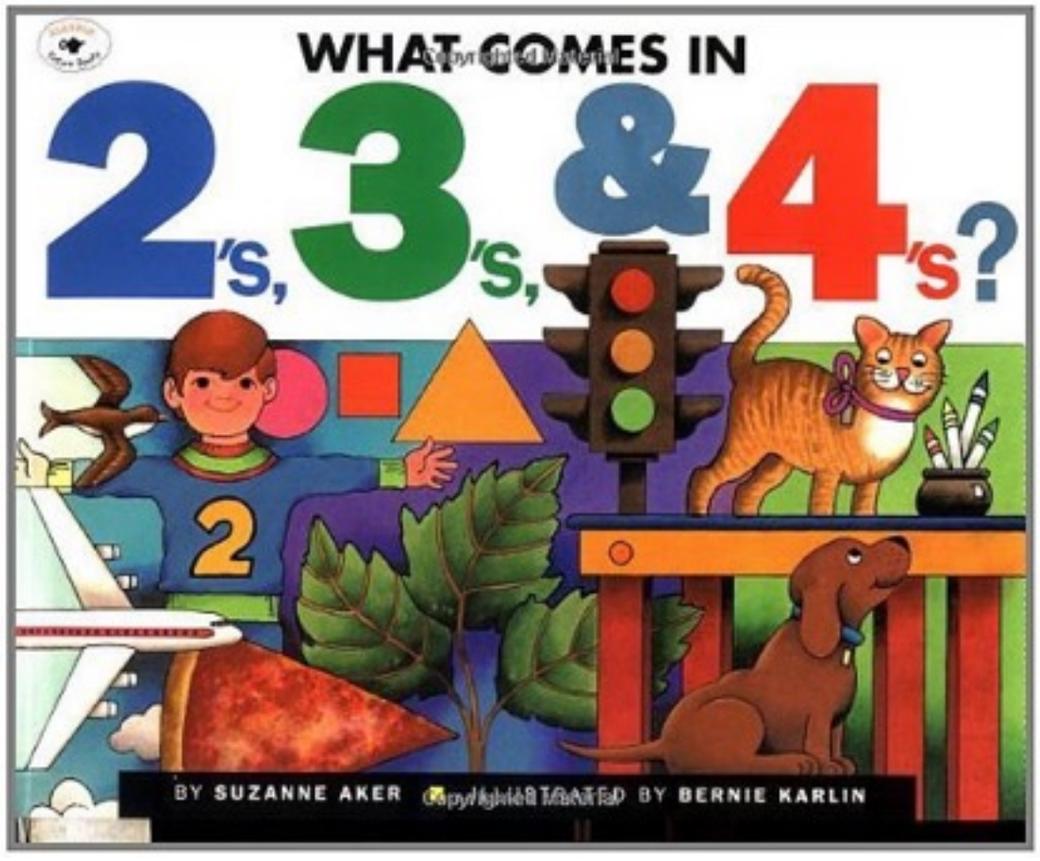
What comes in equal groups?

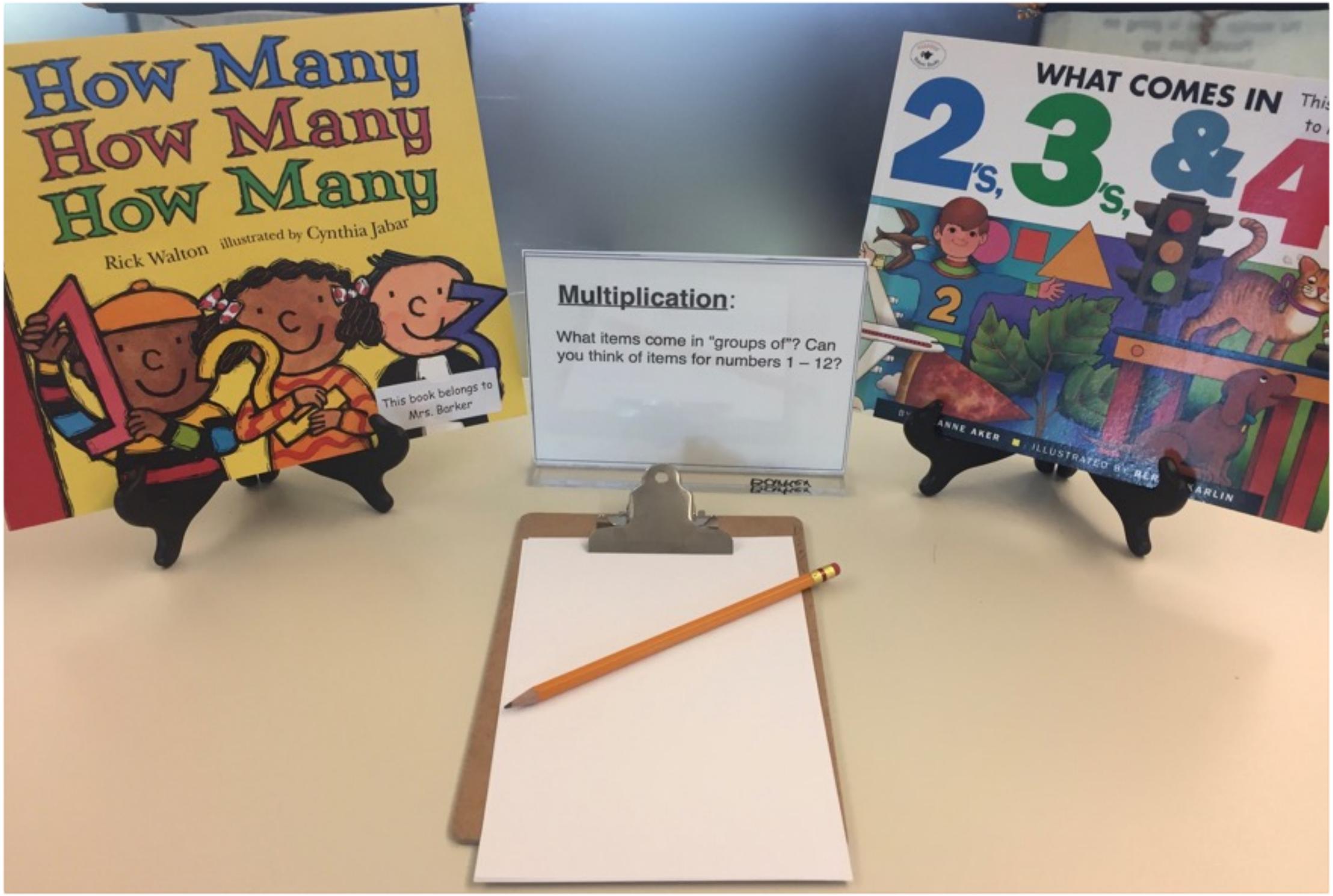
2

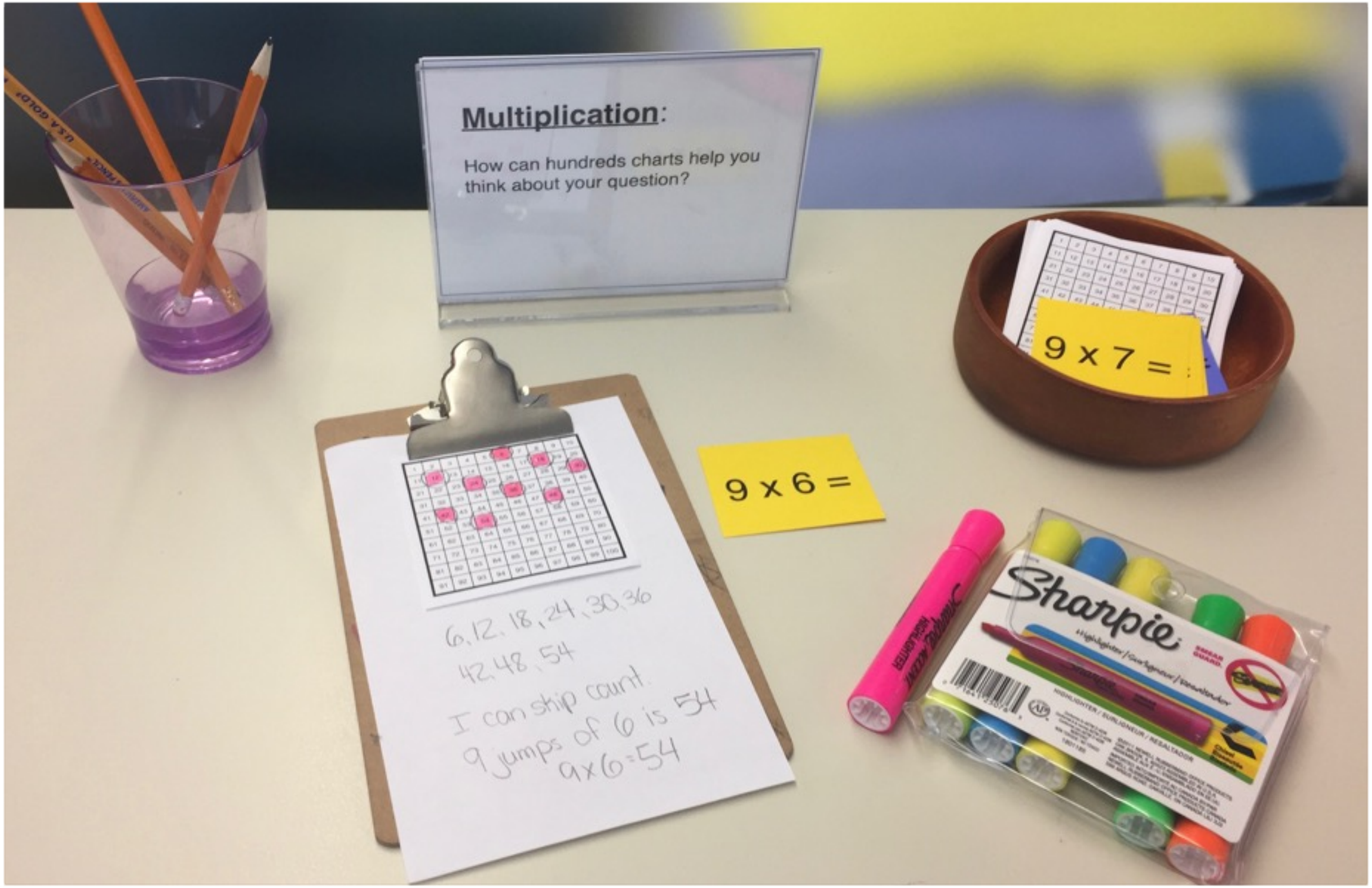
eyes
ears
hands
feet
shoes

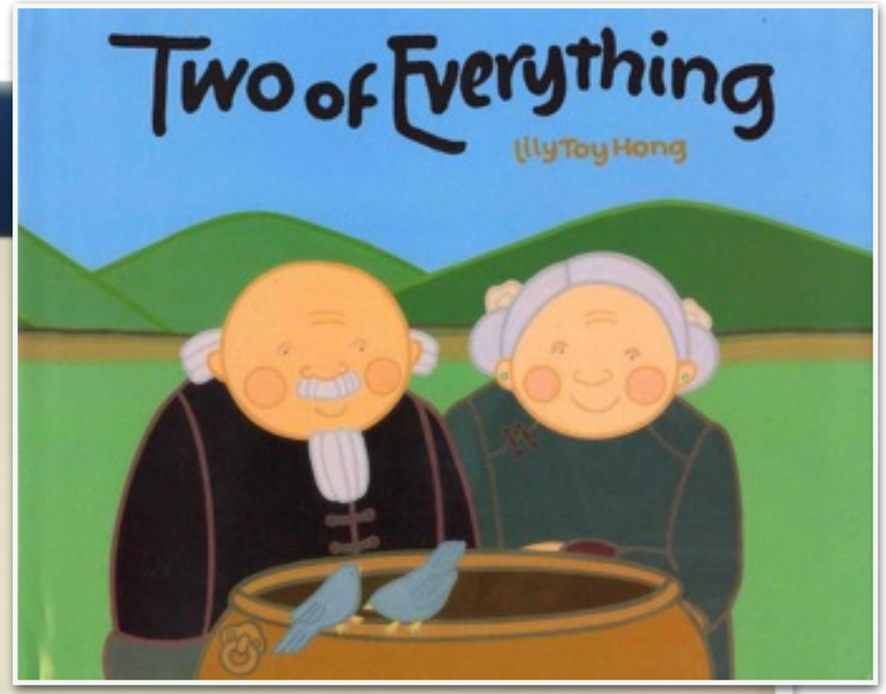
4

Dog legs




How Many
How Many
How Many
Rick Walton
illustrated by Cynthia Jabar
This book belongs to
Mrs. Barker
Multiplication:
What items come in "groups of"? Can you think of items for numbers 1 – 12?
WHAT COMES IN
2's, 3's, & 4
2
ANNE AKER


Multiplication:
How can hundreds charts help you think about your question?
9 x 6 =
9 x 7 =
6, 12, 18, 24, 30, 36
42, 48, 54
I can skip count.
9 jumps of 6 is 54
9x6=54
Sharpie

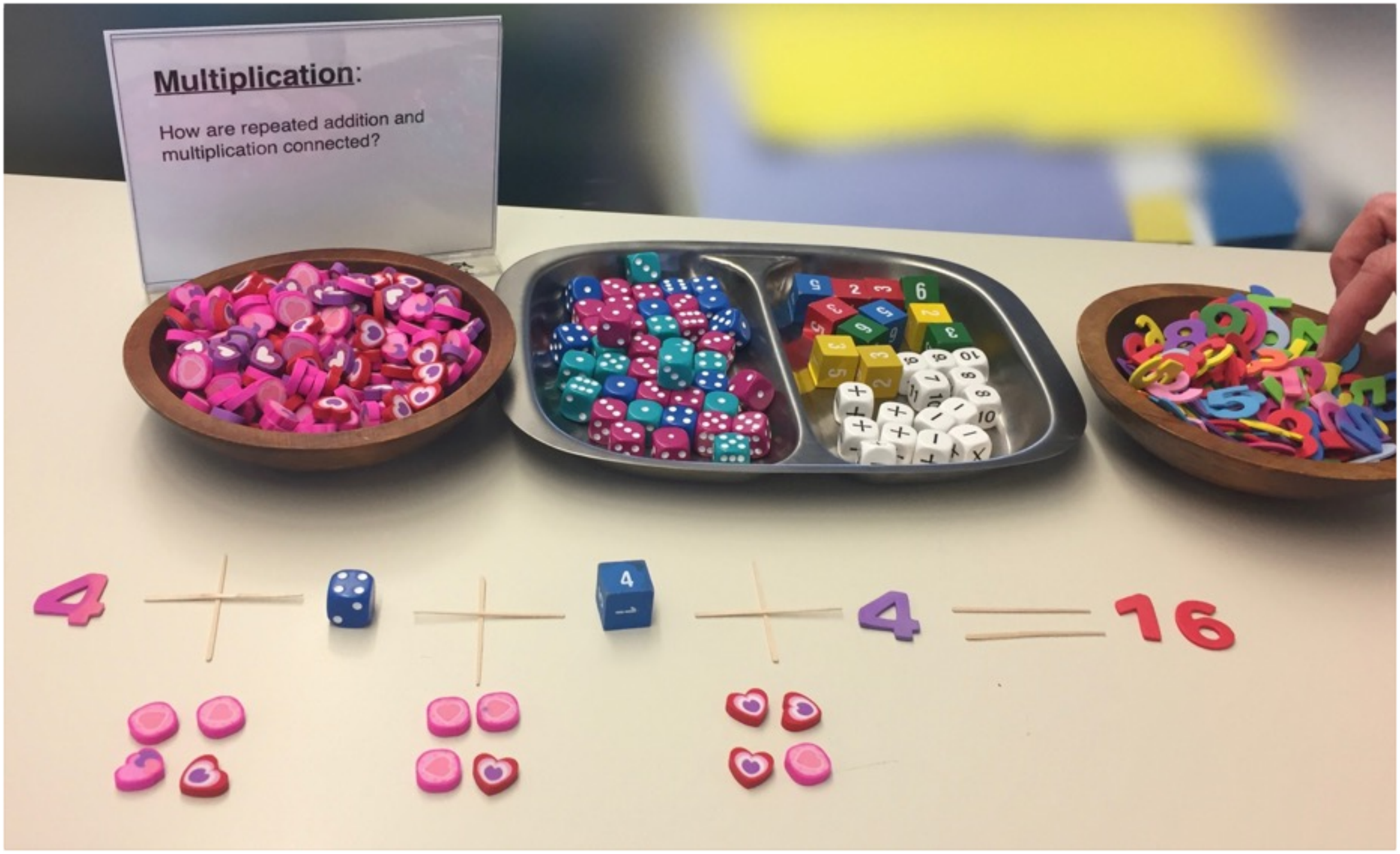


Multiplication:

How do T charts help us to count groups of items?

4 x 9 =

n	9
1	9
2	18
3	27
4	36


Multiplication:
How are repeated addition and multiplication connected?
4 + + 4 = 16

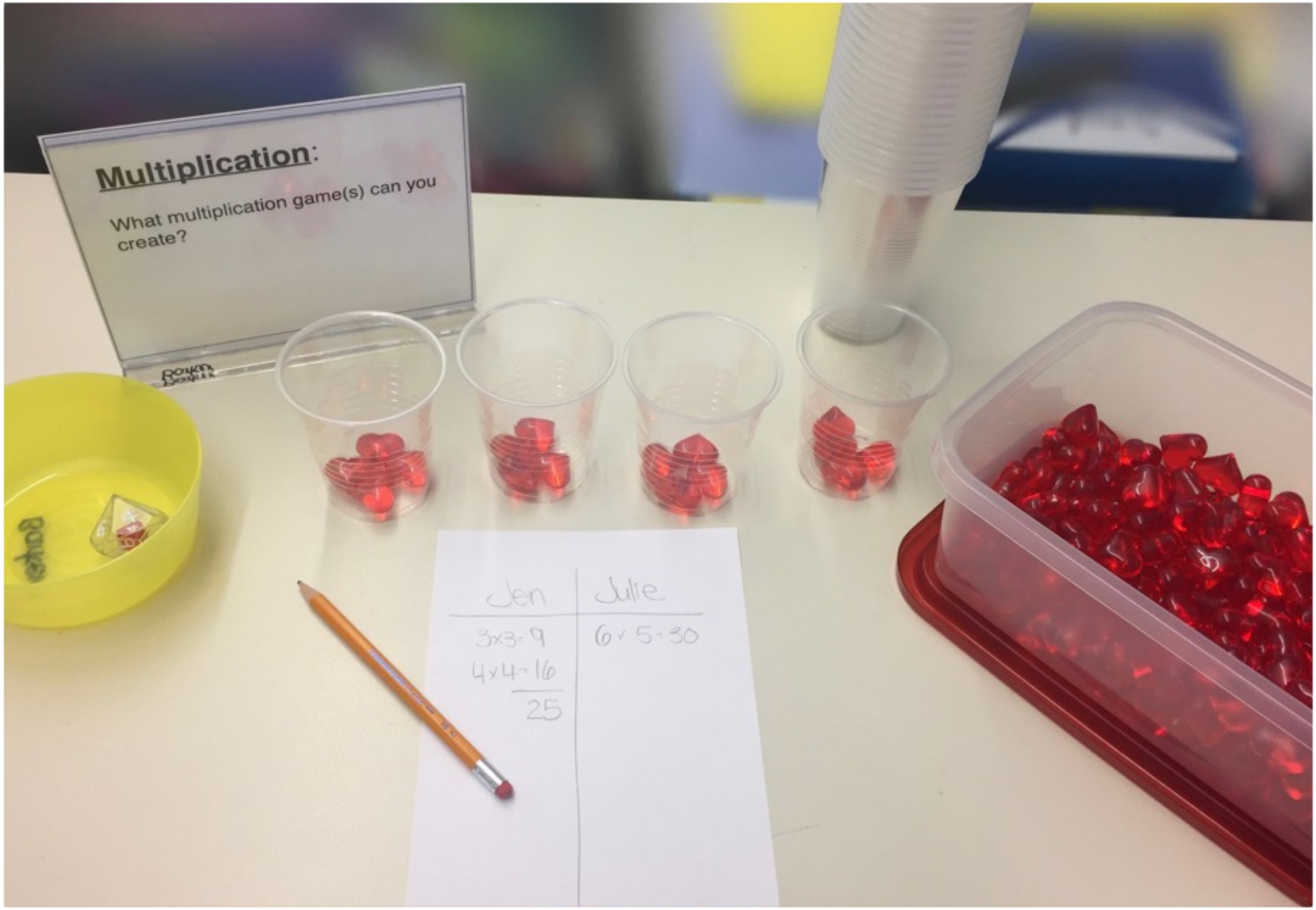
How do we help our students develop understanding of multiplying equal groups?

- Counts groups as single entities (unitizes)
- Distinguishes between number of groups and number of objects in a group
- Show with models "a number of groups of a certain size" when the language of "groups of" is presented with various terms (e.g., "piles of," "stacks of," "rows of," "cups of,")
- Interprets word problems using models and drawings showing the number of groups and the number in each group
- Records number of groups in each step of a skip counting pattern, relating it to multiplication (Repeated addition and skip counting)

How many? How many in each? How many altogether

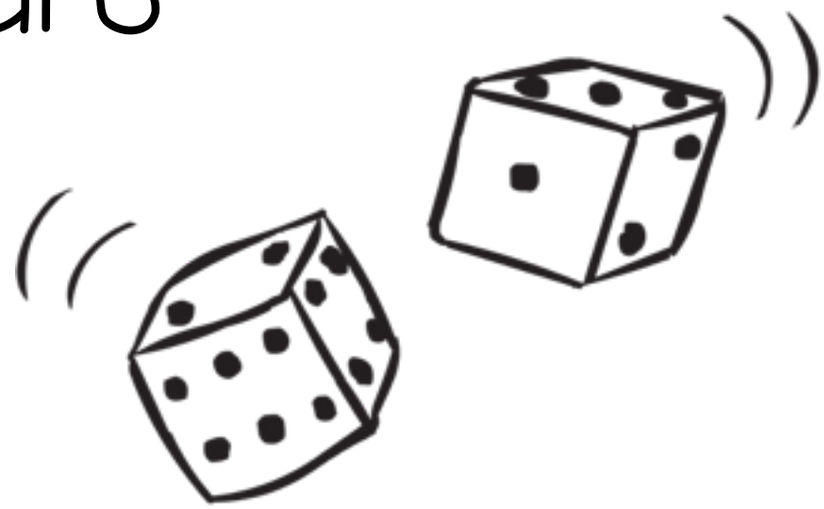
4 groups of 2 = 8

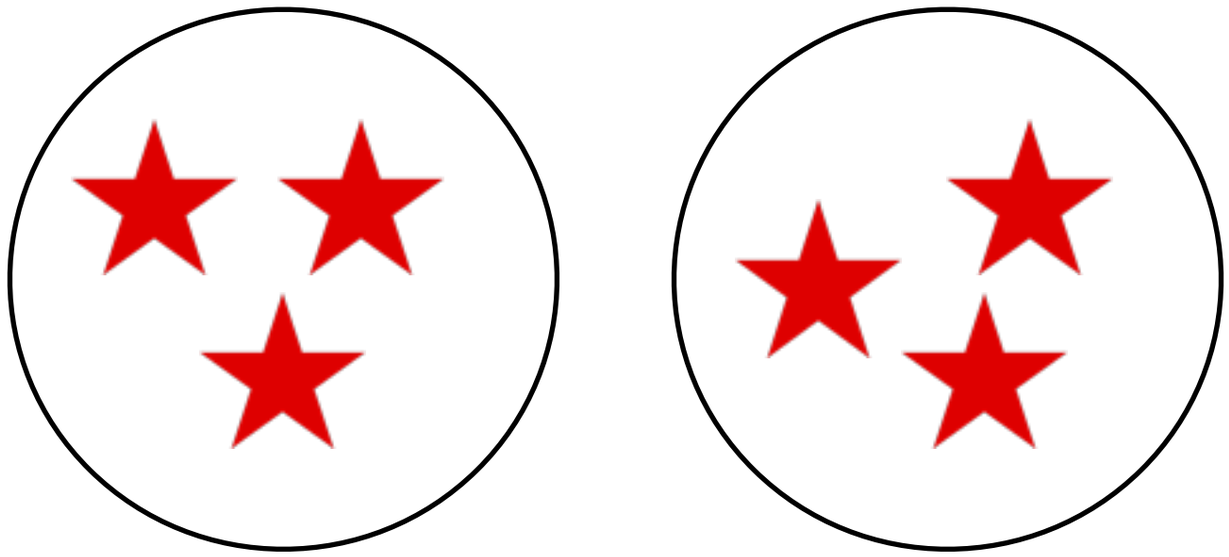
4 x 2 = 8


Multiplication:
What multiplication game(s) can you create?
Jen
Julie
3x3=9
4x4=16
25
6x5=30

Circle and Stars

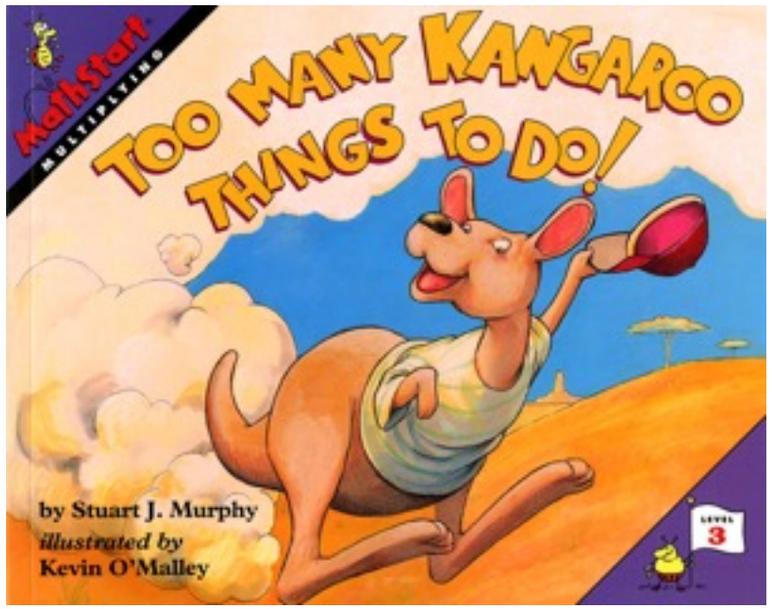
A Marilyn Burns classic! Play with a partner.
Each game has eight rounds.

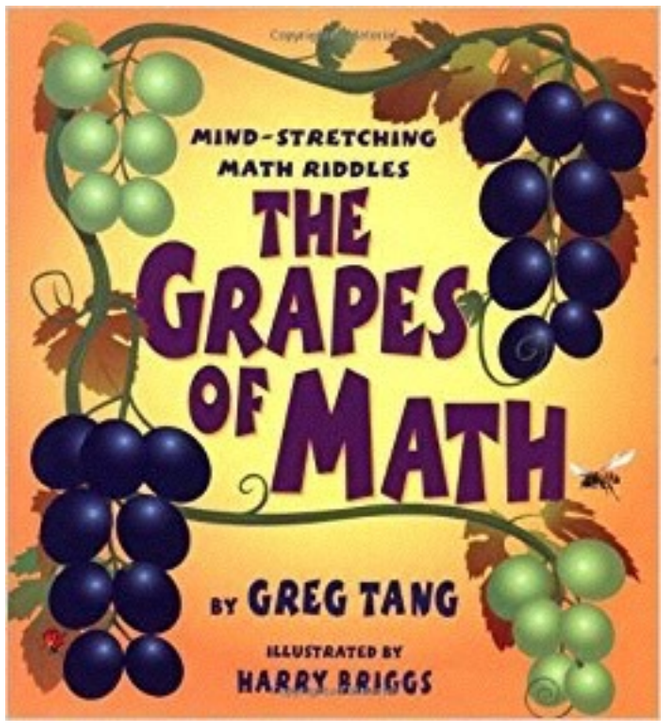


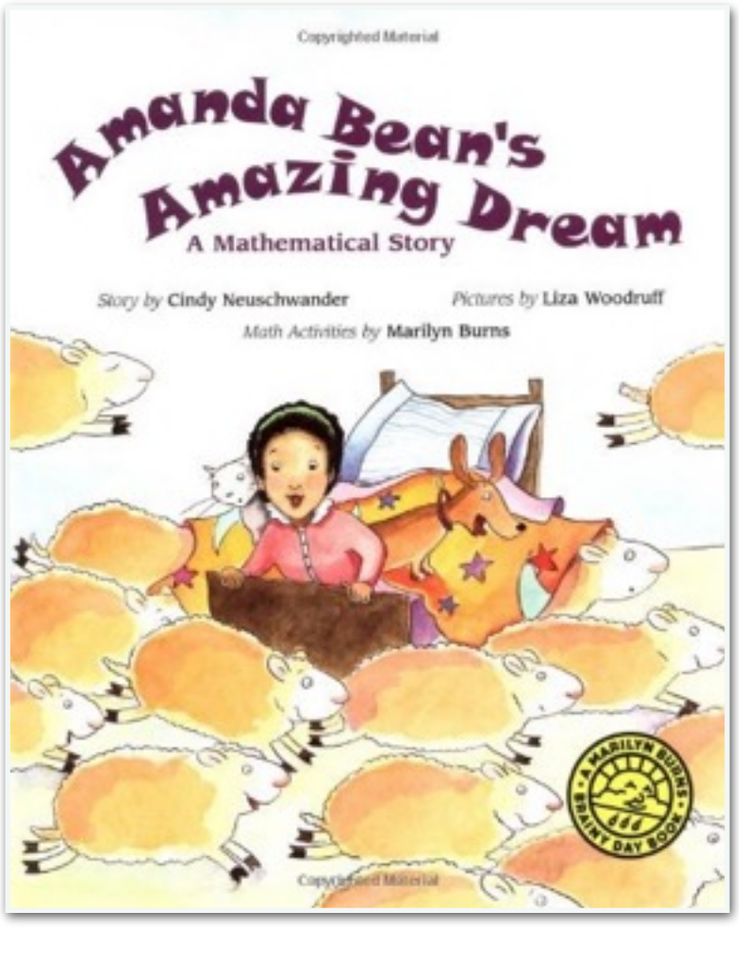


2 x 3 = 6

https://www.kyrene.org/cms/lib/AZ01001083/Centricity/Domain/1309/Circles%20and%20Stars%20Directions.pdf







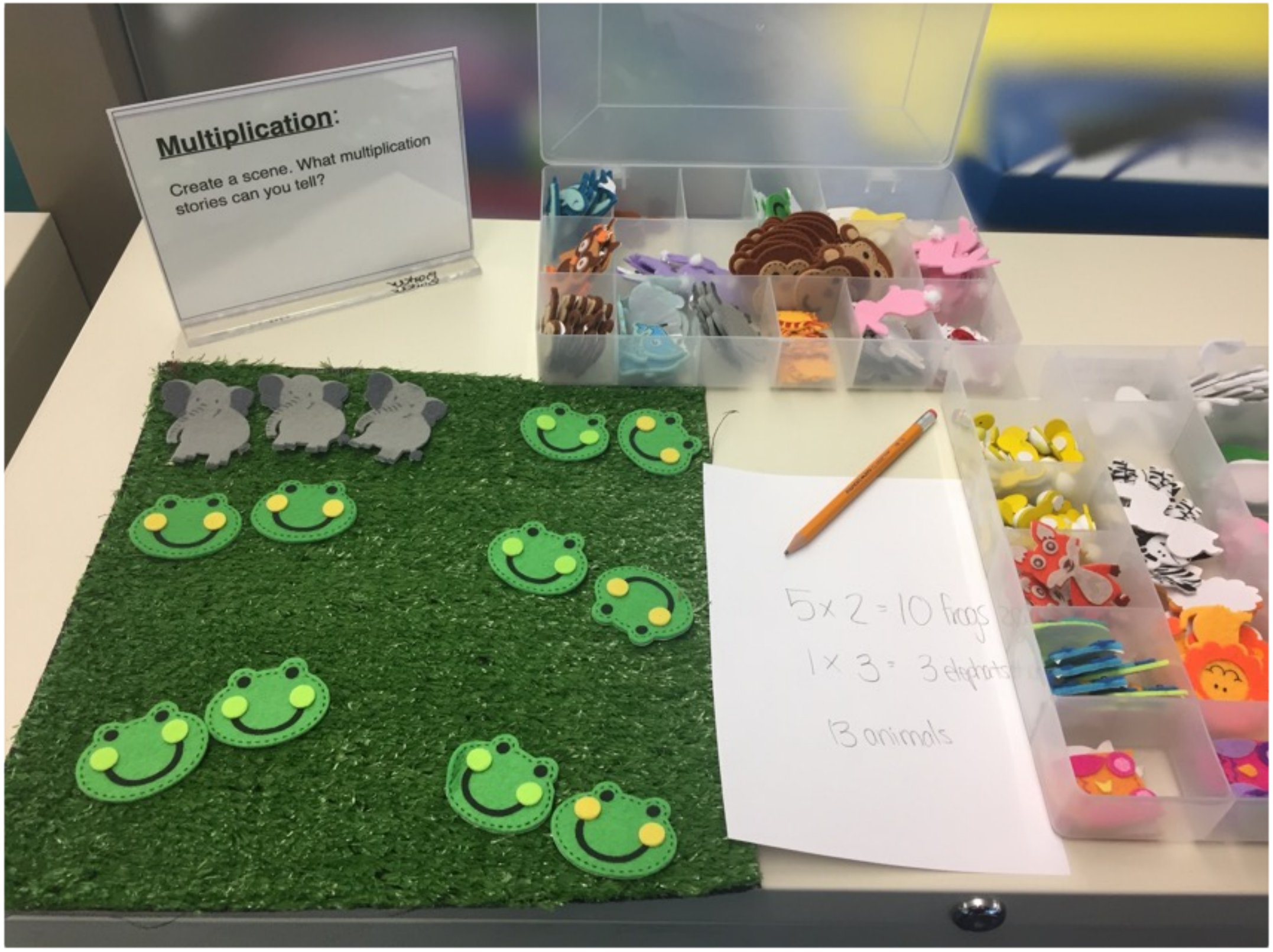
Look at a page from the story.
What question could you ask the
multiplication could help you solve?
Try it out!

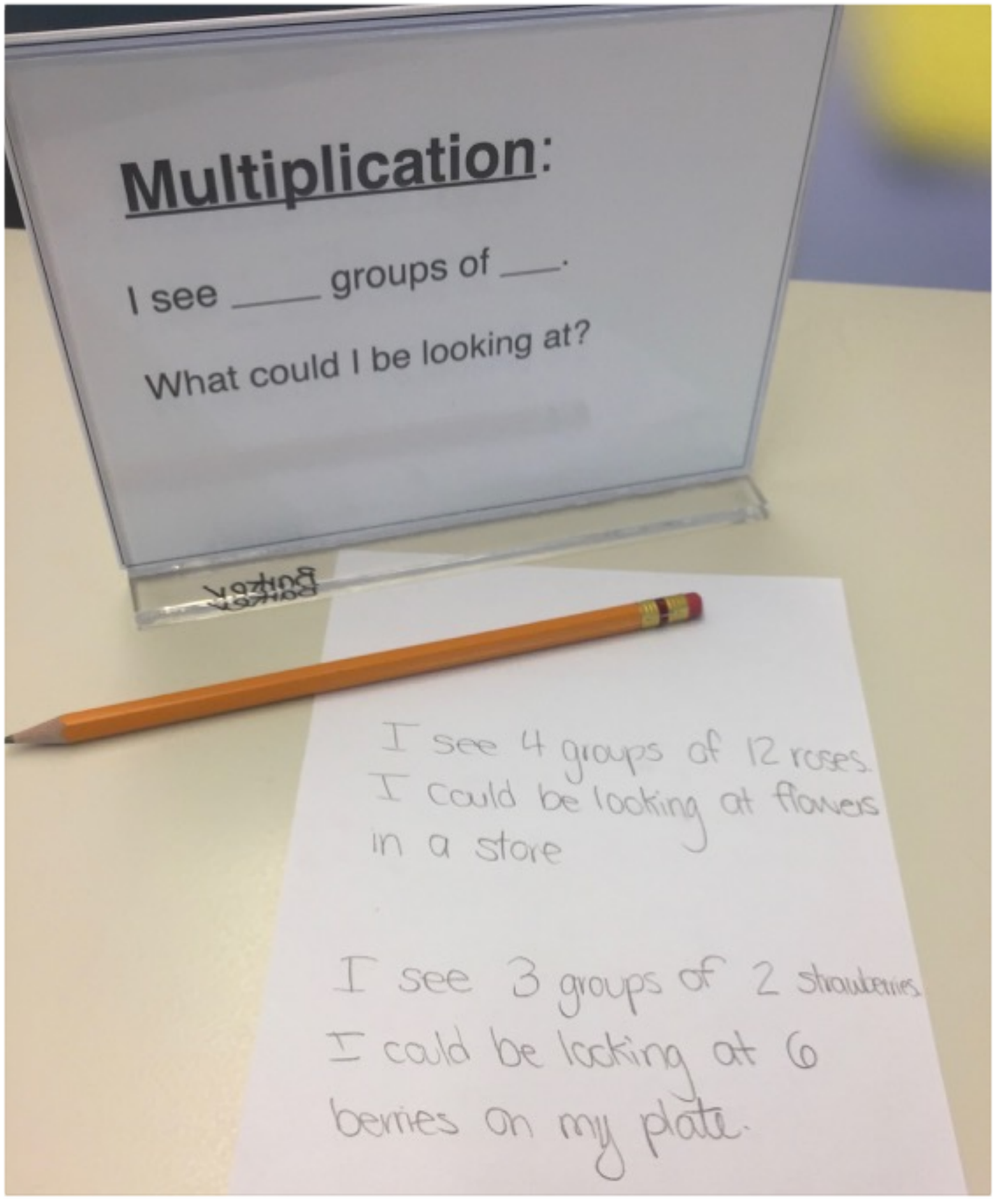
Then I notice something. It looks like eight bicycles with sheep on them.

"How many wheels is that?" I wonder. I start counting, but the sheep whiz by so fast, I cannot count all the bicycle wheels.

"Wait!" I yell. "I am Amanda Bean and I count anything and everything!"

What question might your students ask?


Multiplication:
Create a scene. What multiplication stories can you tell?
5 x 2 = 10 frogs
1 x 3 = 3 elephants
13 animals


Multiplication:
I see ____ groups of ___.
What could I be looking at?
I see 4 groups of 12 roses.
I could be looking at flowers
in a store
I see 3 groups of 2 strawberries
I could be looking at 6
berries on my plate.

Dim Sum for Everyone!

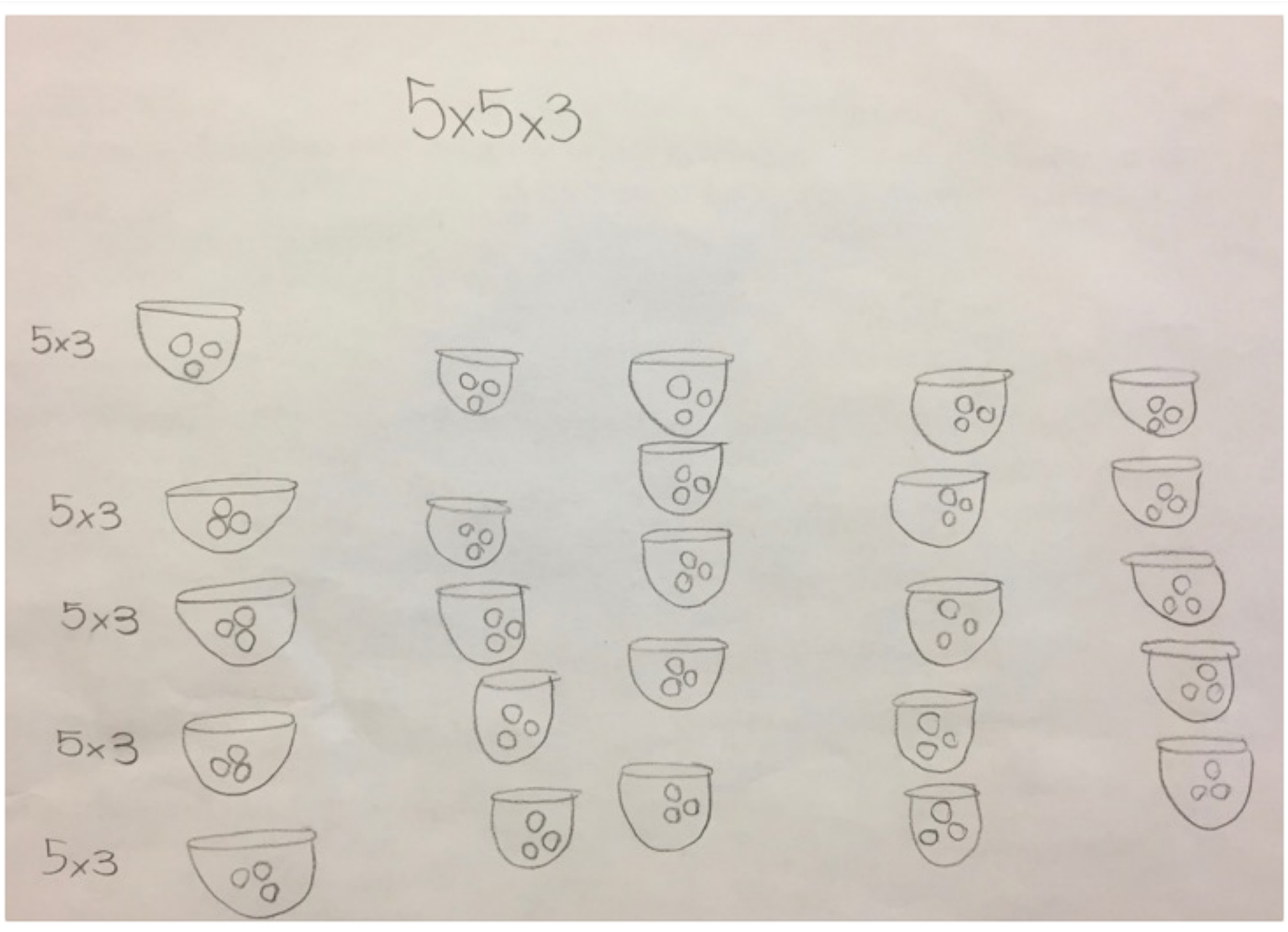
Your family decides to order Dim Sum for dinner. The dishes of dim sum are served on plates with 3 treats each. How many treats would come to your table?

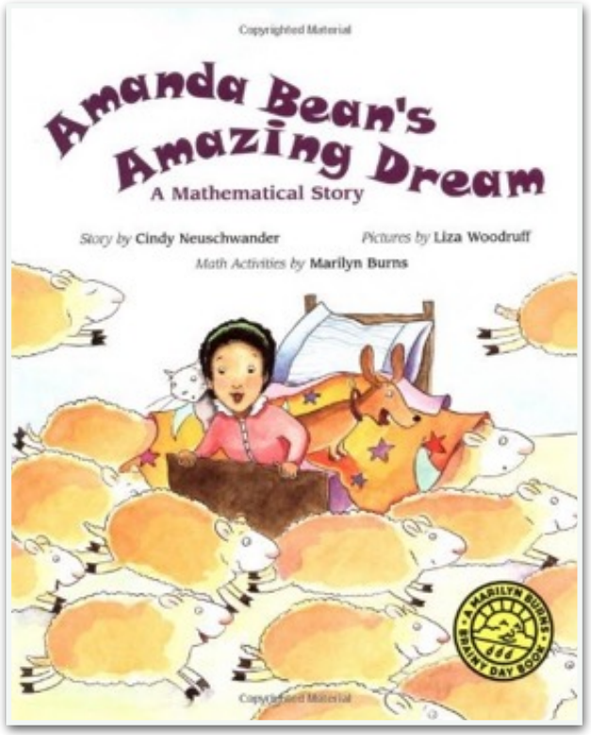
15 treats would come to our table.

5 groups of 3=15

3 + 3 + 3 + 3 + 3

What if your family received five different servings of Dim Sum?





Name: _____

Amanda Bean's Amazing Dream

Which Has More?

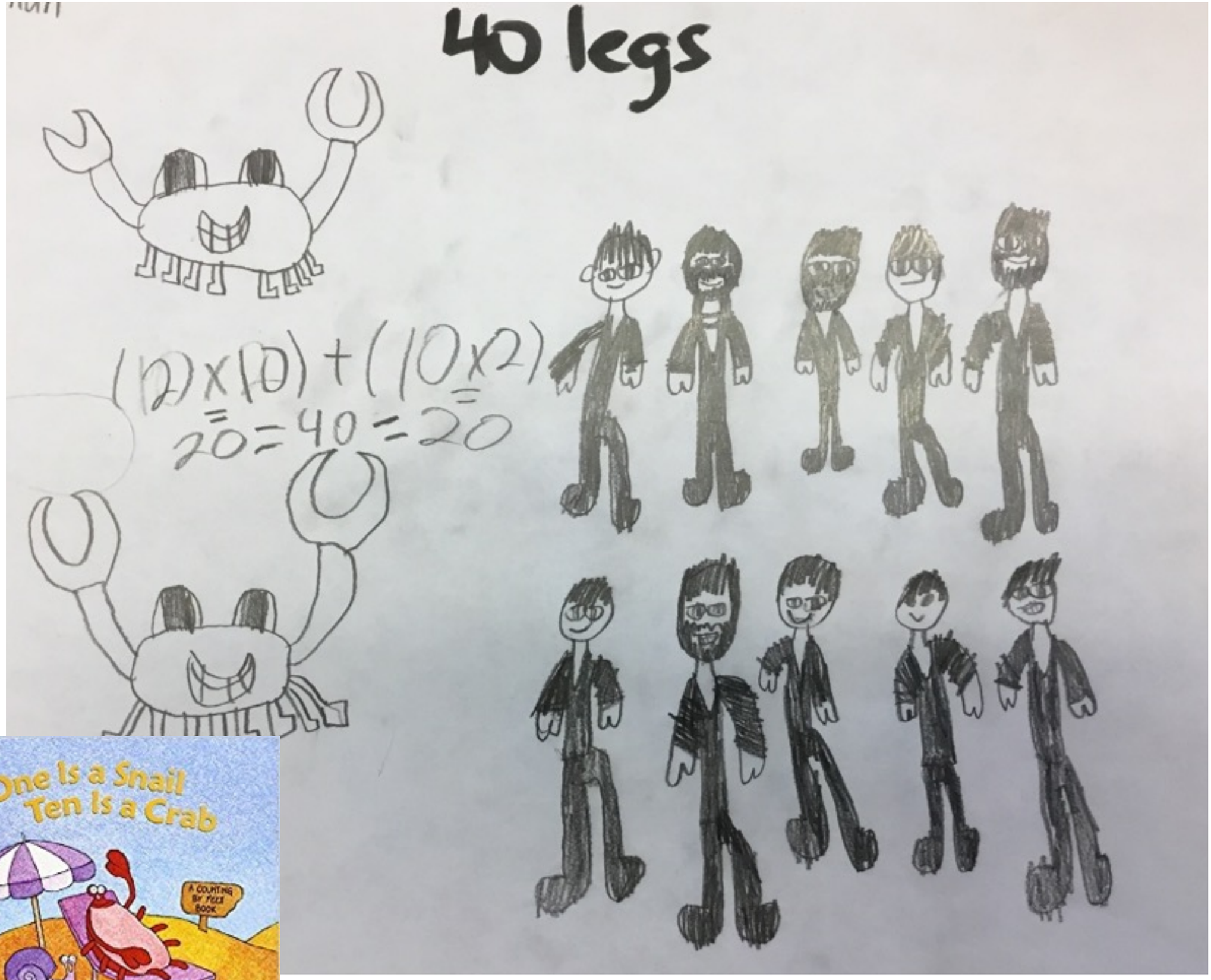
For each question, explain your thinking using numbers, pictures, and/or words.

Which has more cookies,

- a tray with ____ rows and ____ cookies in each row, or
- a tray with ____ rows and ____ cookies in each row?

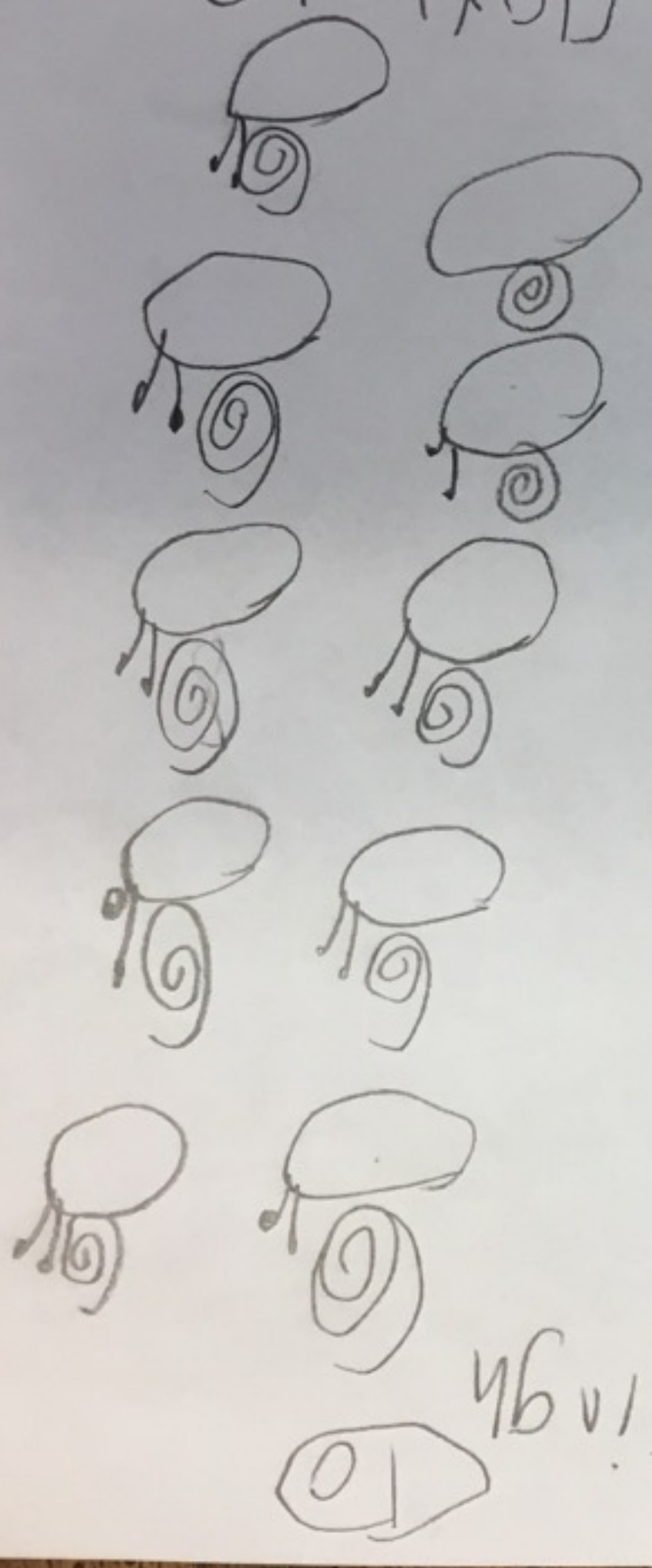
Which has more wheels, _____ tricycles or _____ bicycles?

Thanks to Marc Garneau for sharing these!

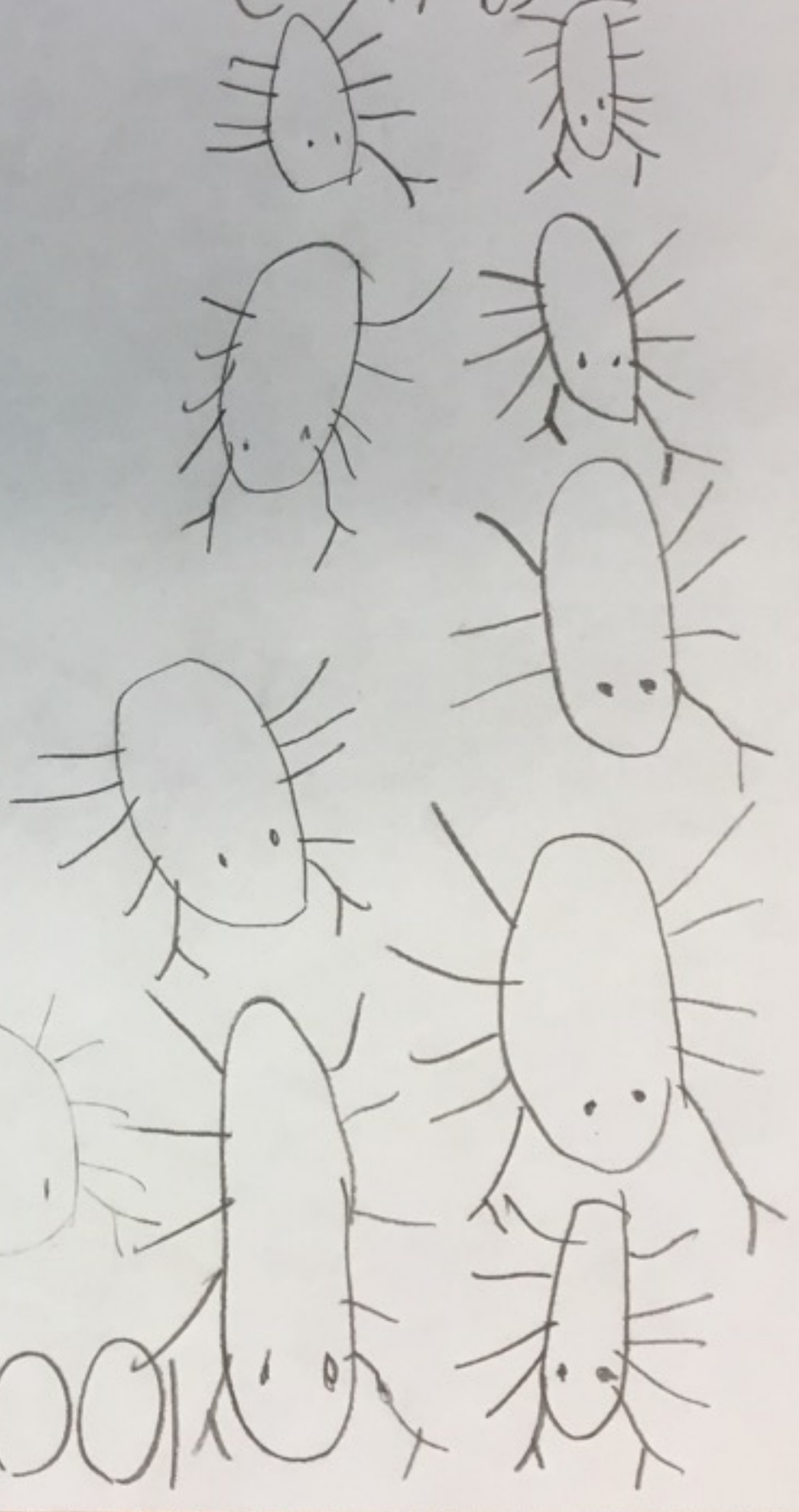

40 legs
(10x10)+(10x2)
=
20=40=20

One Is a Snail Ten Is a Crab
A COUNTING BY FEET BOOK
April Pulley Sayre and Jeff Sayre
Illustrated by Randy Cecil

$(0 \mid = \mid X 0 \mid)$

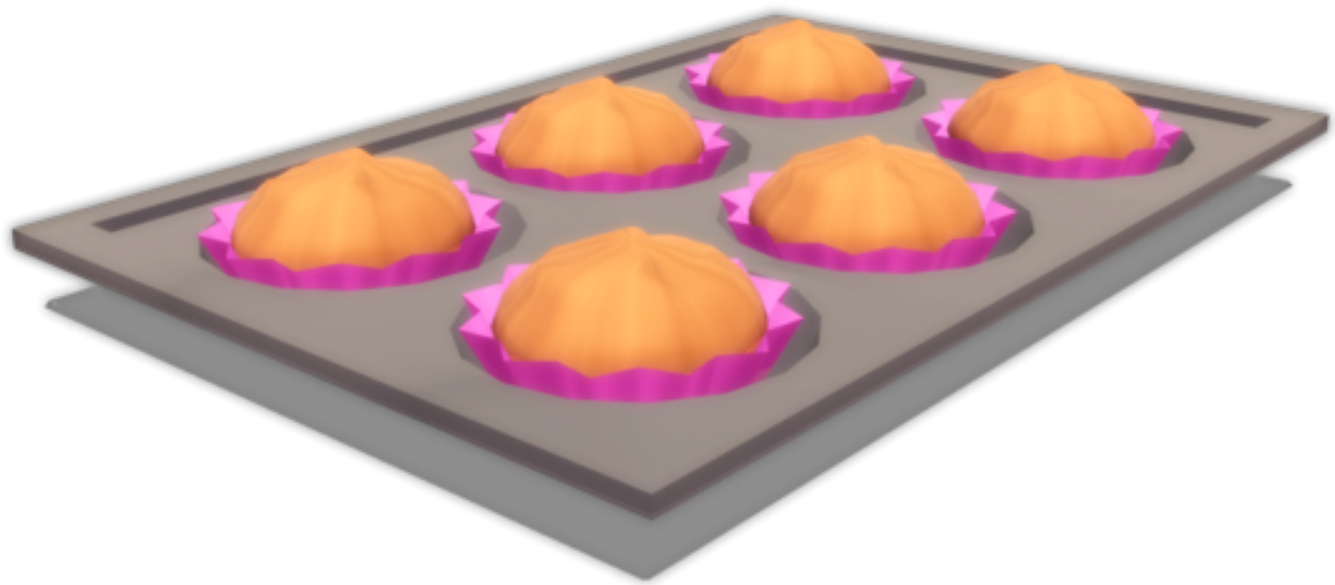


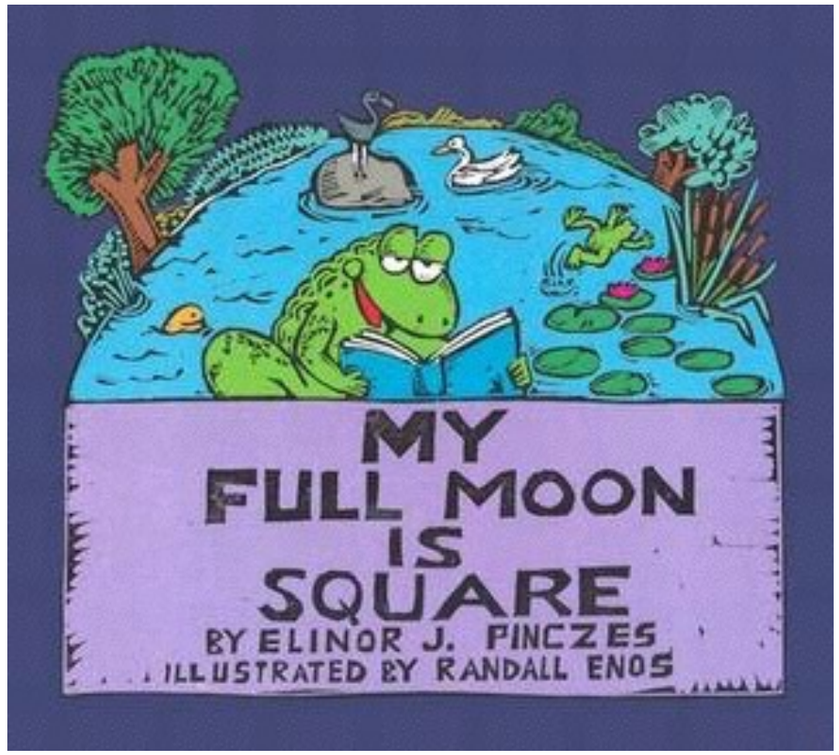
$[ab \in 0 \mid X \mid b]$



How do we assist students in multiplying using rectangular arrays?

- Builds rectangular arrays using "rows of"
- Describes arrays in terms of equal groups (usually by rows)
- Partitions arrays into smaller arrays
- Describes arrays in terms of equal groups when the array is only partially visible





Can you represent the arrangement of ___ flies?
How might you describe it?


Multiplication:
Using square tiles represent a multiplication question that has the same factors (e.g., 7 x 7) in an array.
What do you notice? What do you wonder?

How many different ways can you arrange the chocolates?

Name of Elementary
6505 123A Street
Surrey, BC
Canada, V3W 5Y5

HERSHEY
THE HERSHEY COMPANY

February 17th, 2017

Hershey's Canada
5750 Explorer Drive
Mississauga, Ontario
Canada, L4W 0B1

Dear students,

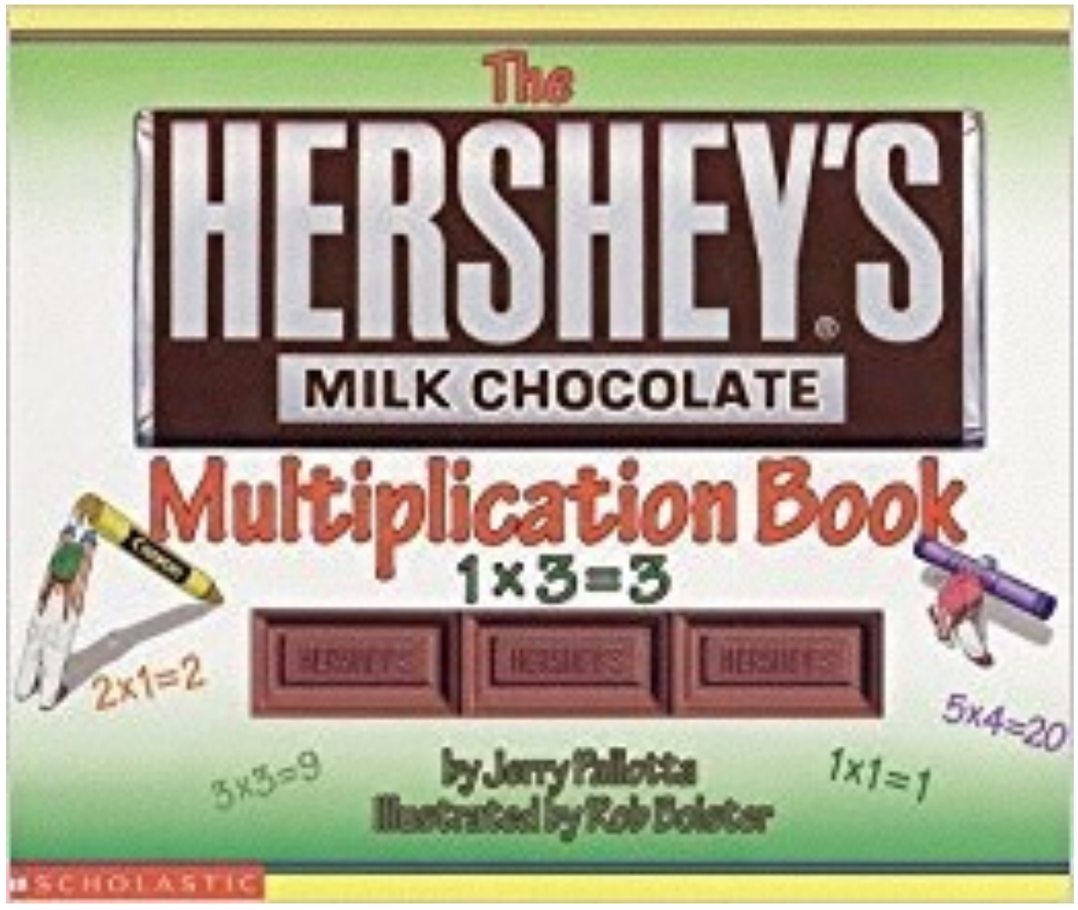
My name is John Bilbrey. I am the President of Hershey's Canada. This spring Hershey's will be making some new chocolate bars. We have 5 different bars coming out. Below is the amount of chocolate squares in each bar.

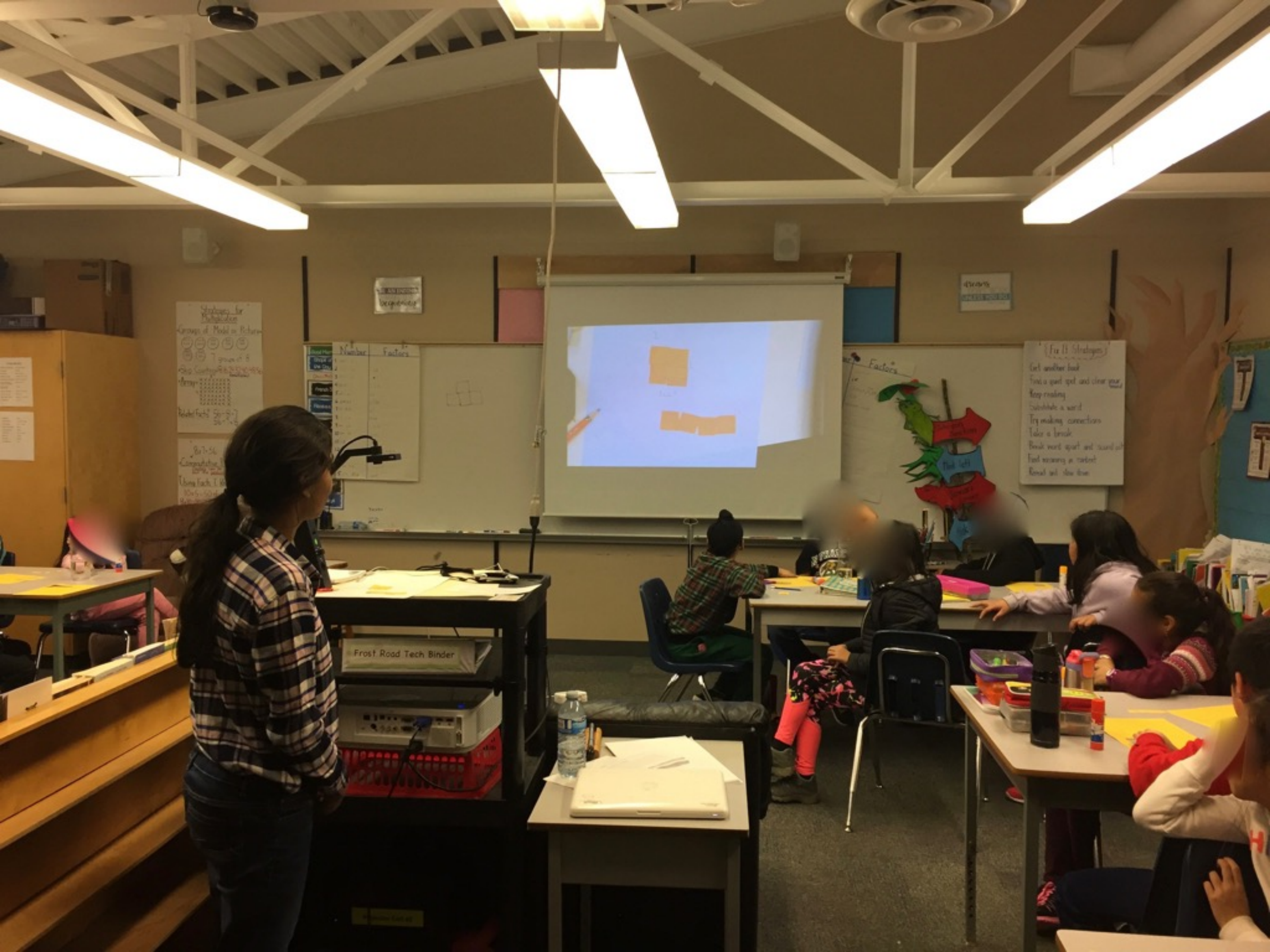
6 squares
12 squares
18 squares
24 squares
36 squares

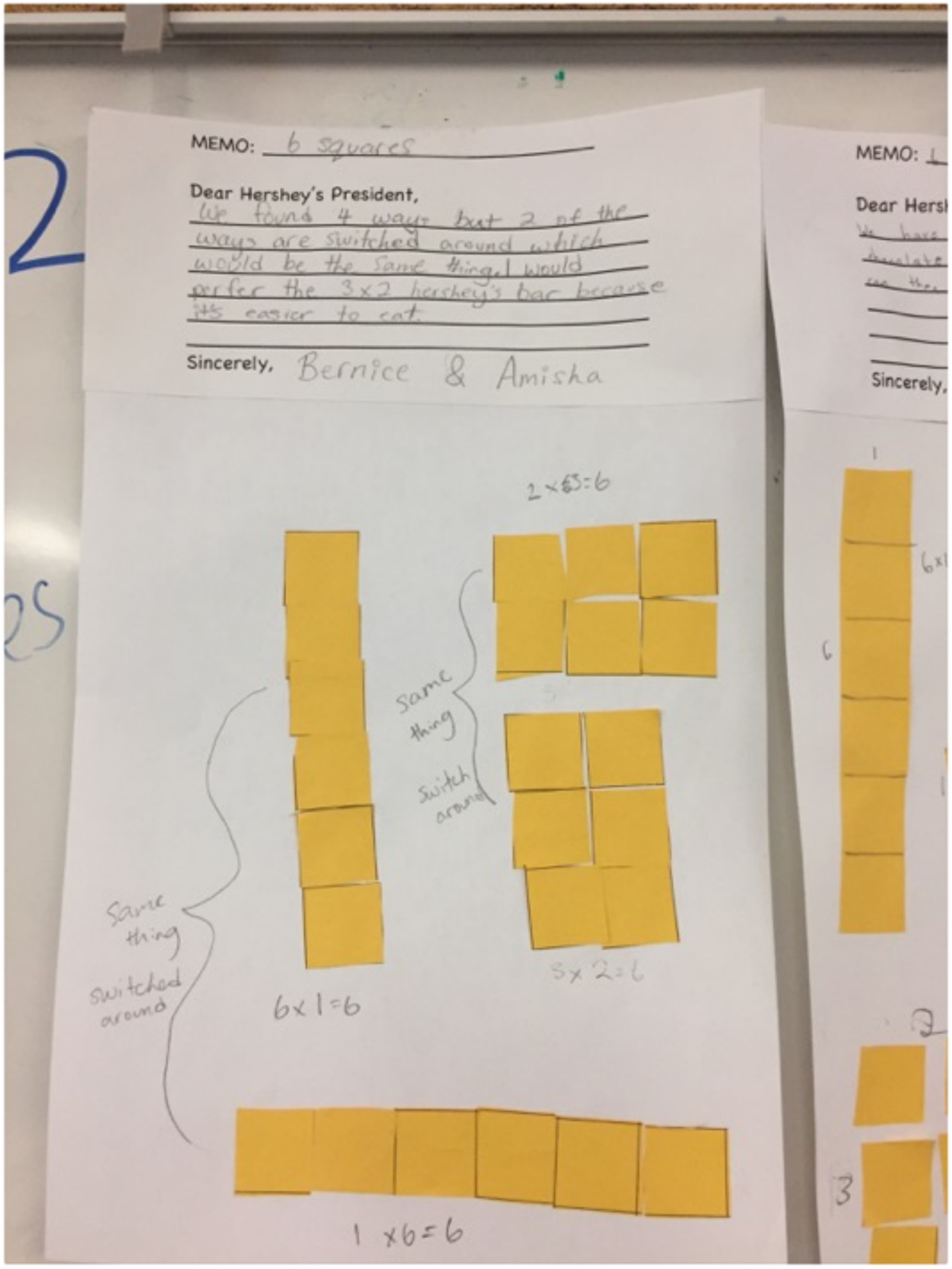
Since we know that children love chocolate bars, can you help us to determine how we should package these new bars?

I look forward to see your pictures and hearing your thinking.
Regards,

John Bilbrey
CEO Hershey's Canada




Number
Factors
Factors
Frost Road Tech Binder

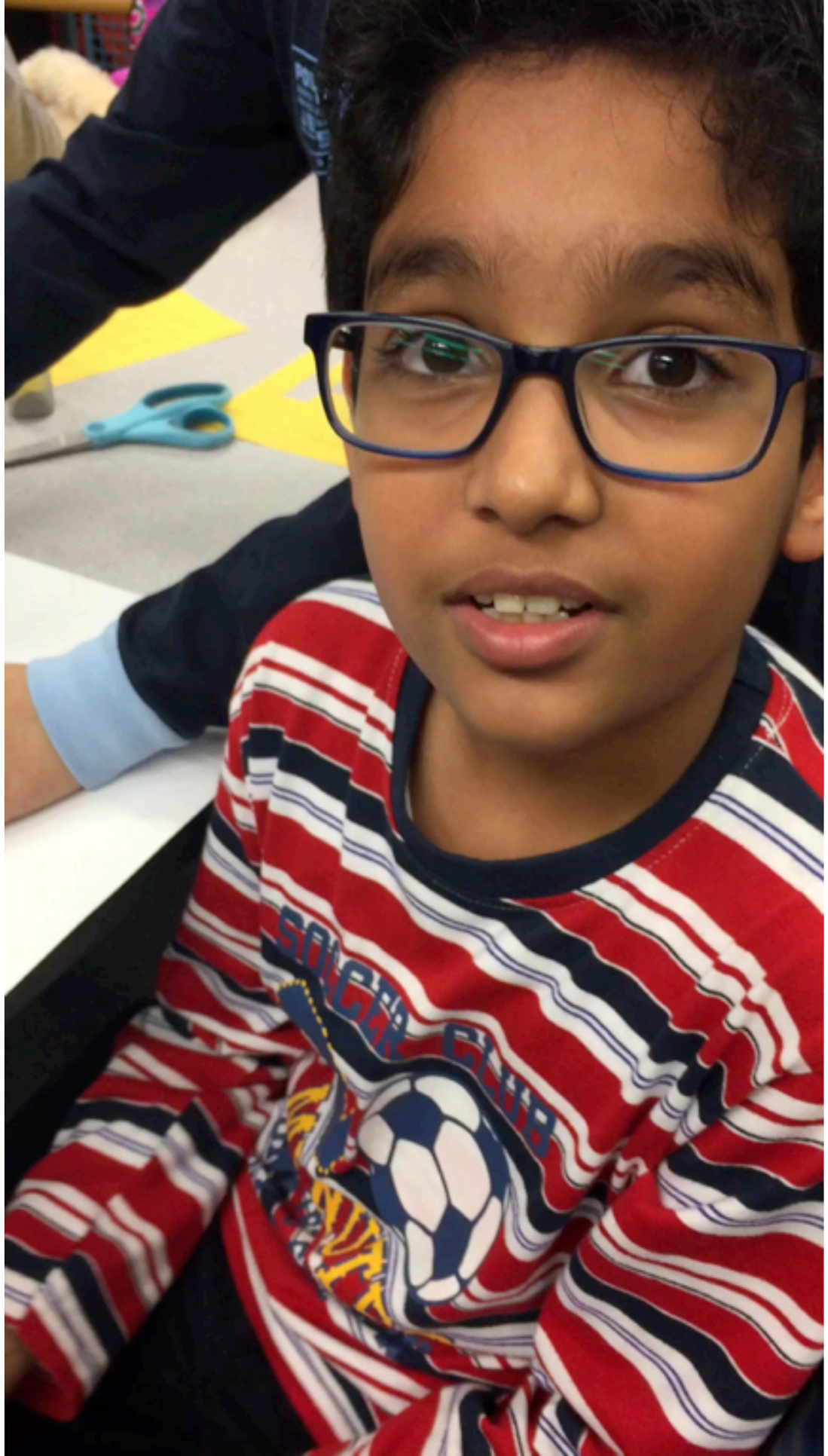

MEMO: 6 squares
Dear Hershey's President,
We found 4 ways but 2 of the ways are switched around which would be the same thing. I would prefer the 3x2 hershey's bar because it's easier to eat.
Sincerely, Bernice & Amisha
2x3=6
Same thing
Switch around
Same thing
Switched around
6x1=6
3x2=6
1x6=6
MEMO:
Dear Hers
Sincerely,
6x1
6
3

COMMUTATIVE PROPERTY

The order of the factors does not matter - the product is still the same!

$$6 \times 4 = 4 \times 6$$

$$24 = 24$$



Diminish consciousness of self

Improvisational potential

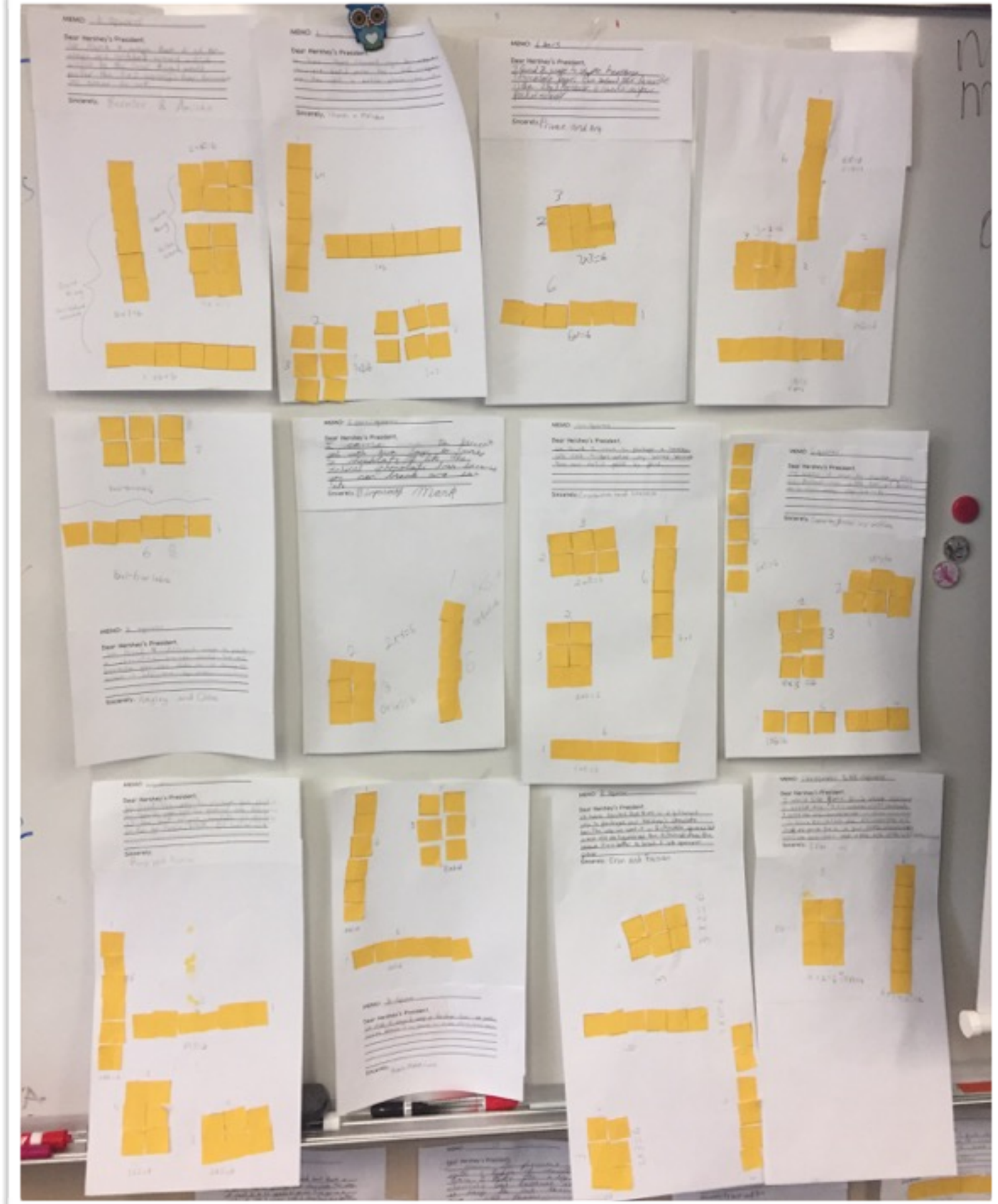
Continuation Desire

MEMO: 17 squares

Dear Hershey's President,

We found 1 way to wrap a 17 square chocolate bar. We prefer the only way which is 17 by 1.

Sincerely,




Multiplication:
How do squares and rectangles help you to think about your question?
5 x 7 =
7
5

Can you create some of the arrays you might see at night in the city?


Multiplication:
Fish like to swim in schools (groups) Pick a number of fish. How many different equal groups can be made from your fish?
10 X 2
5 X 4
10 X 2
20
10x2
2x10
4x5
5x4

How many different ways can you represent your question?

Using a fact they know and compensating

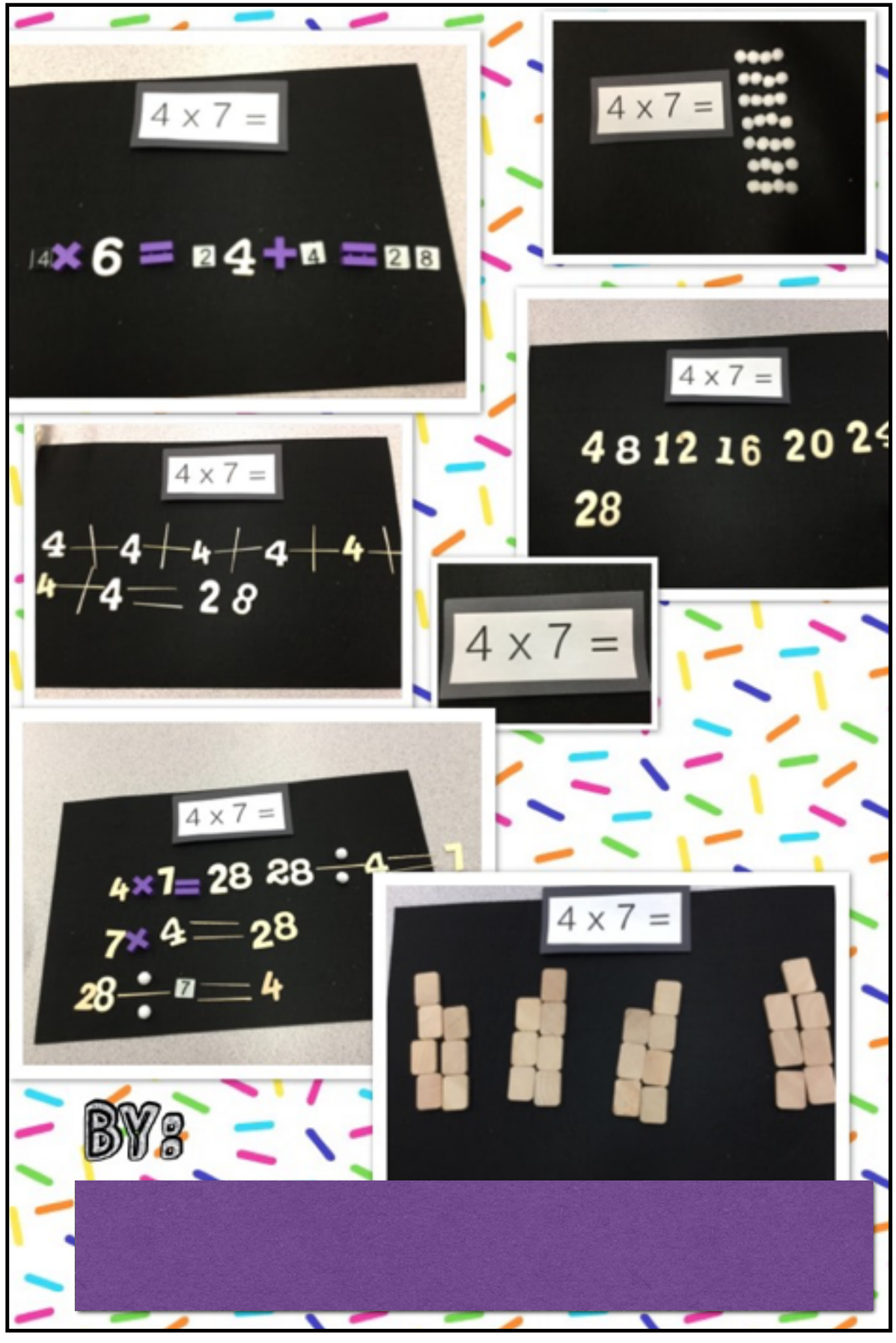
Representing with arrays

Connection to repeated addition

Applying skip counting

Representing groups of

Connection to division and related facts



Take a close look at their work. Are they representing their question or showing different ways to make 12? What questions might you ask these students?

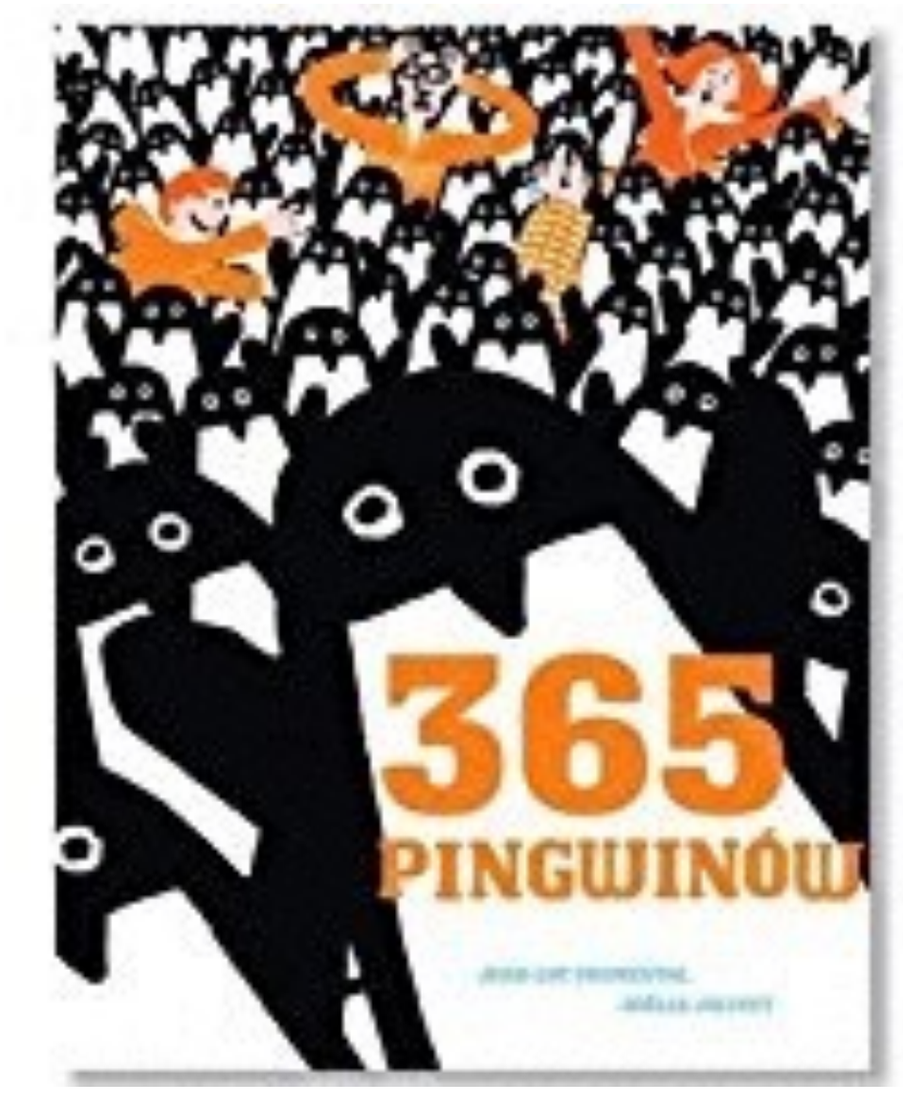
What happens when you multiply
an even # x even #
or and odd # x odd #
or an even # x odd #?

Ex

1. 4 x 4 = 16

2. 4 + 4 + 4 + 4

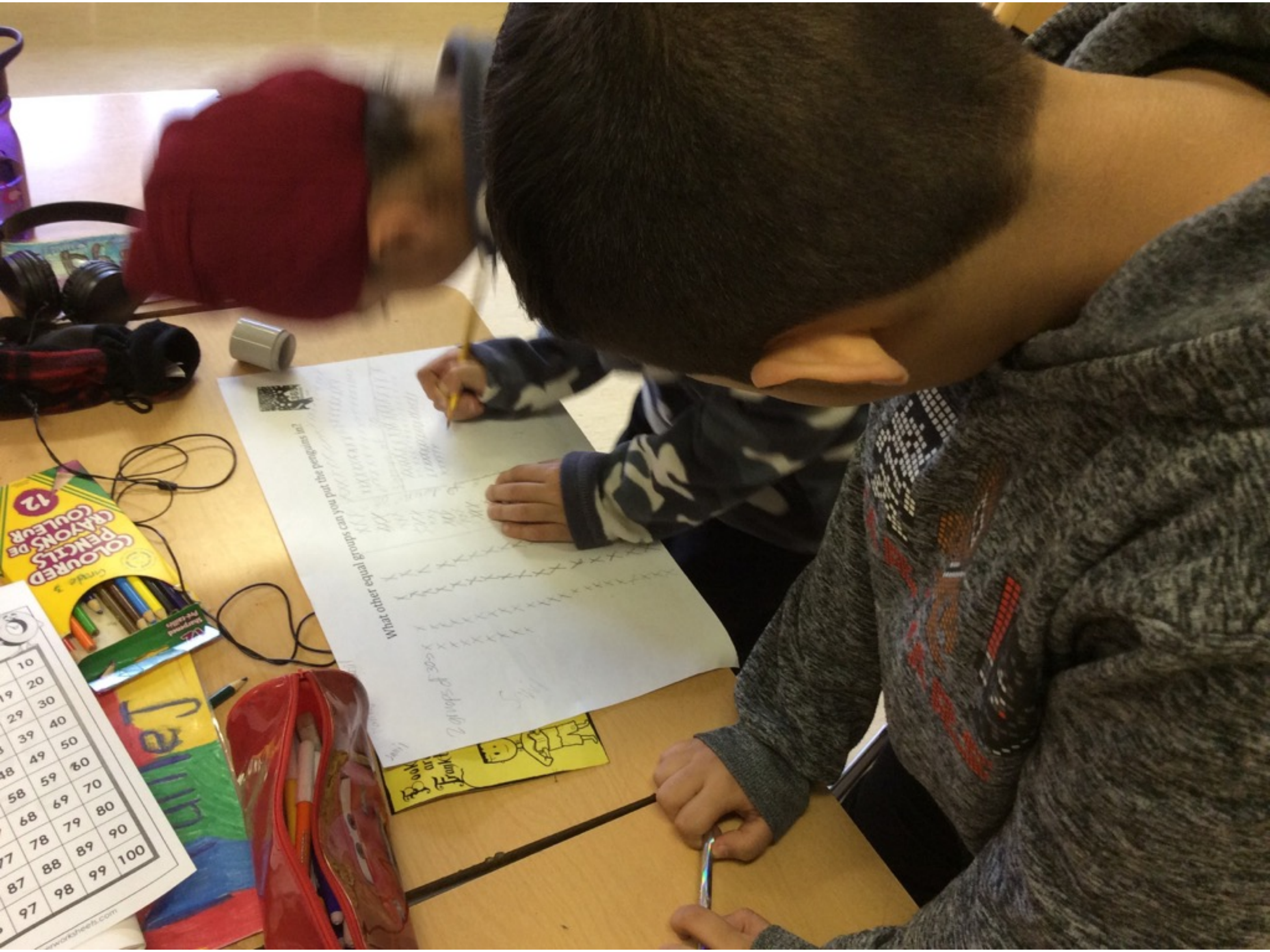
Can you arrange ____penguins into equal groups?
Can you describe the ways using multiplication?
How is this related to division?



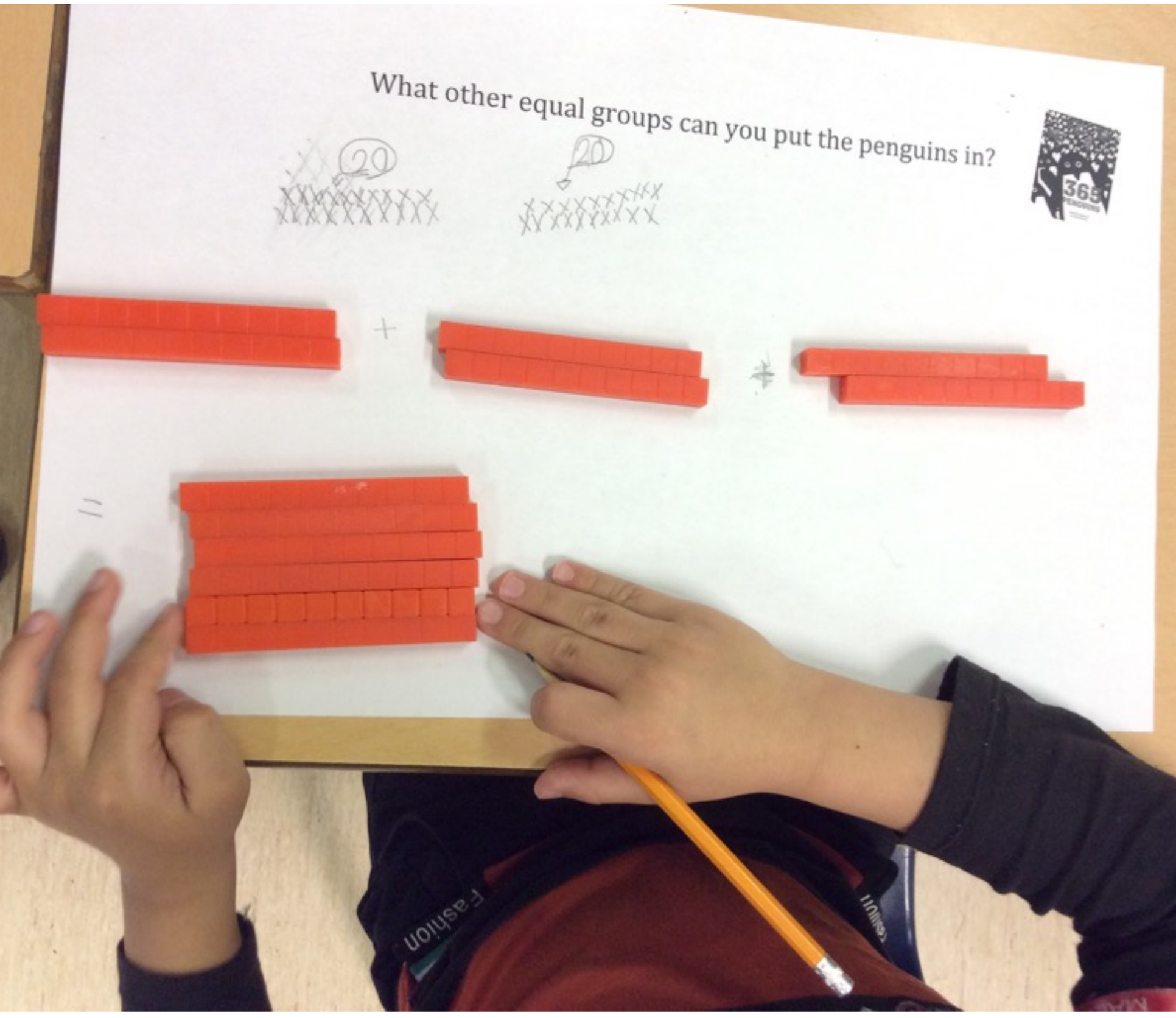
What materials might you provide?

What other equal groups can you put the penguins in?

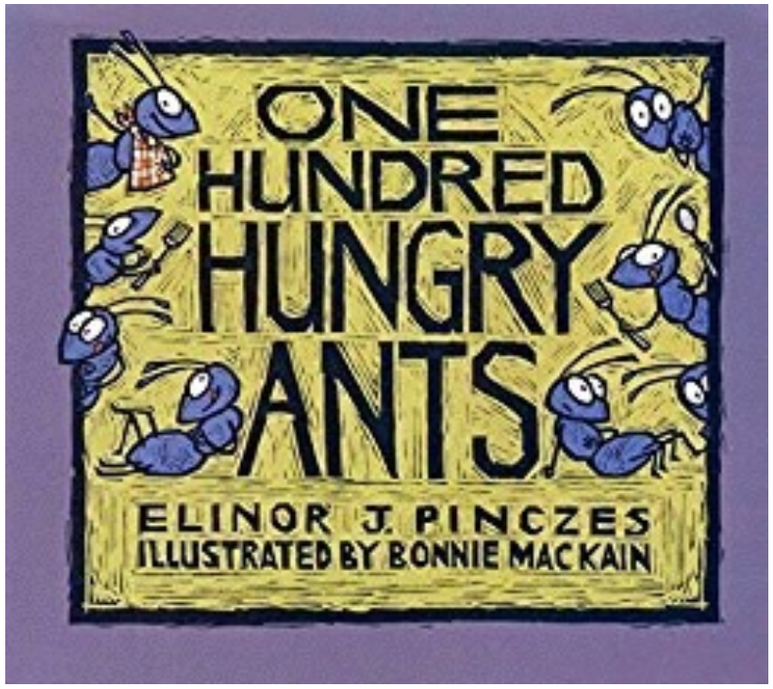
6 of ten.

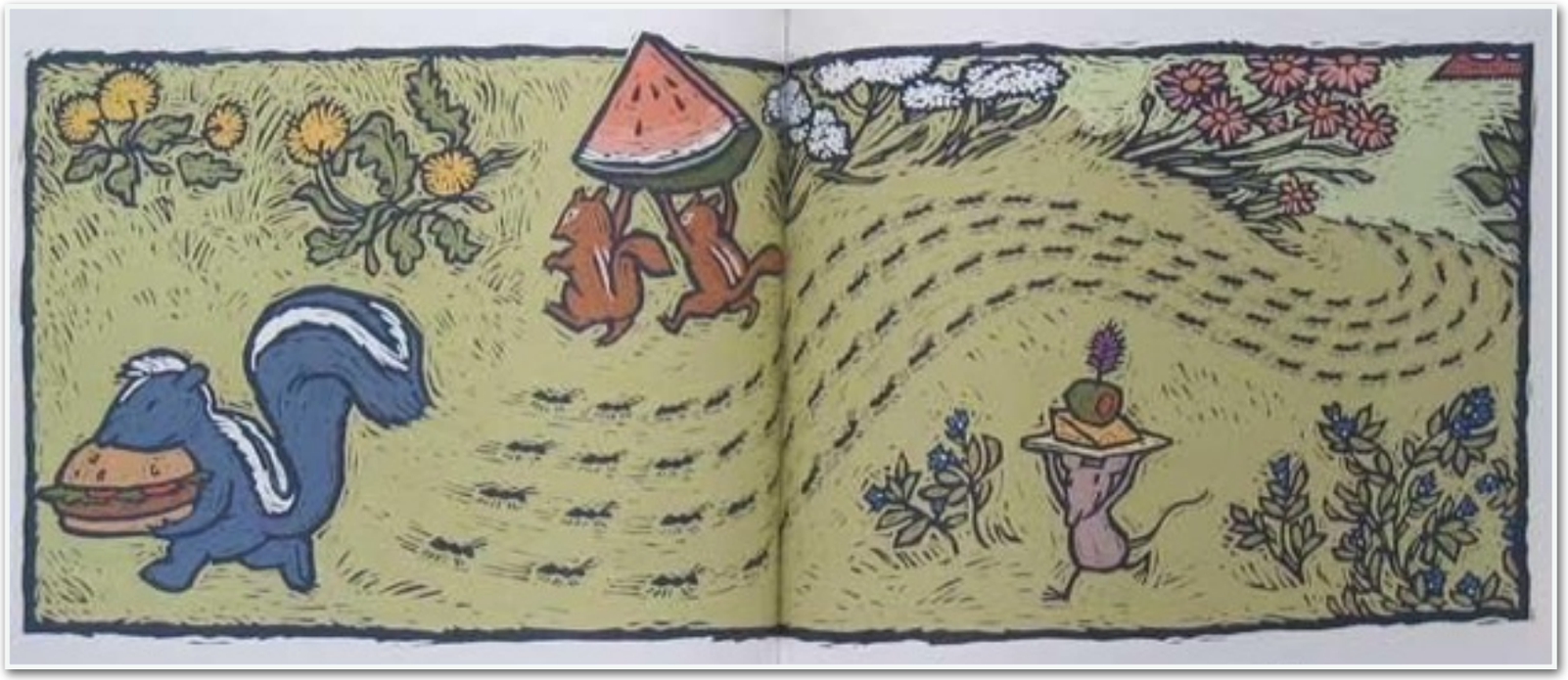

What other equal groups can you put the penguins in?
COLOURED PENCILS
CRAYONS DE COULEUR
12
10
20
30
40
50
60
70
80
90
100

What other equal groups can you put the penguins in?



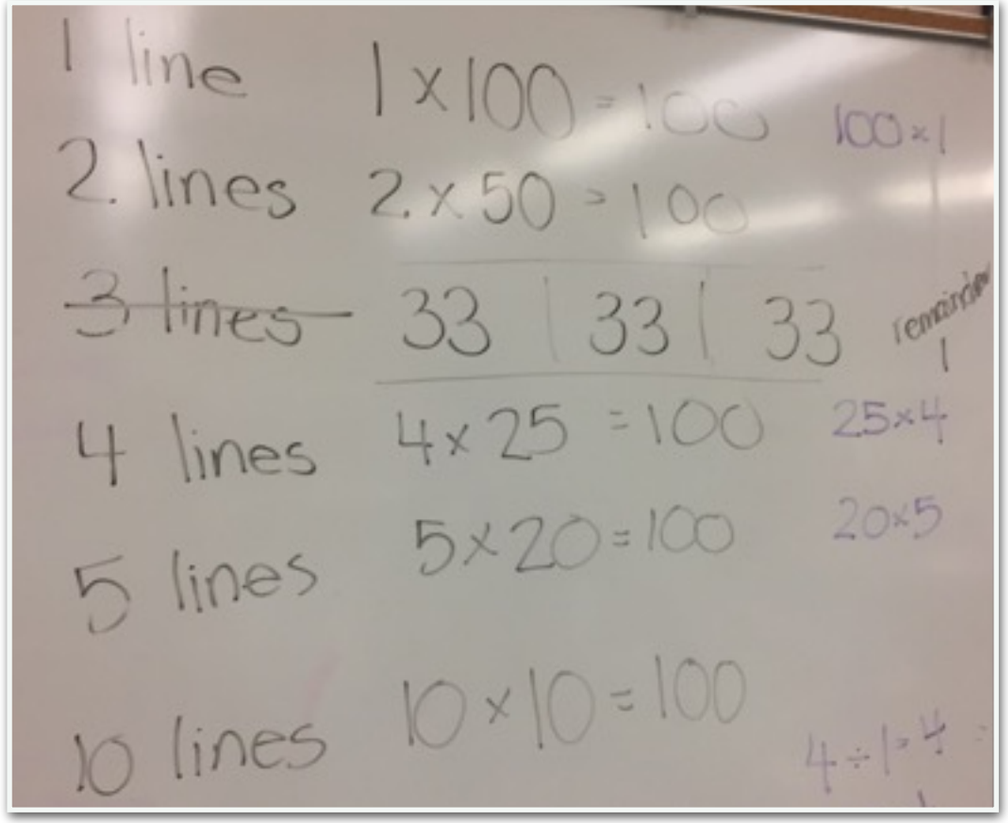

PRIMARY PROGRAM
Hundreds Chart
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50
51 52 53 54 55 56
61 62 63

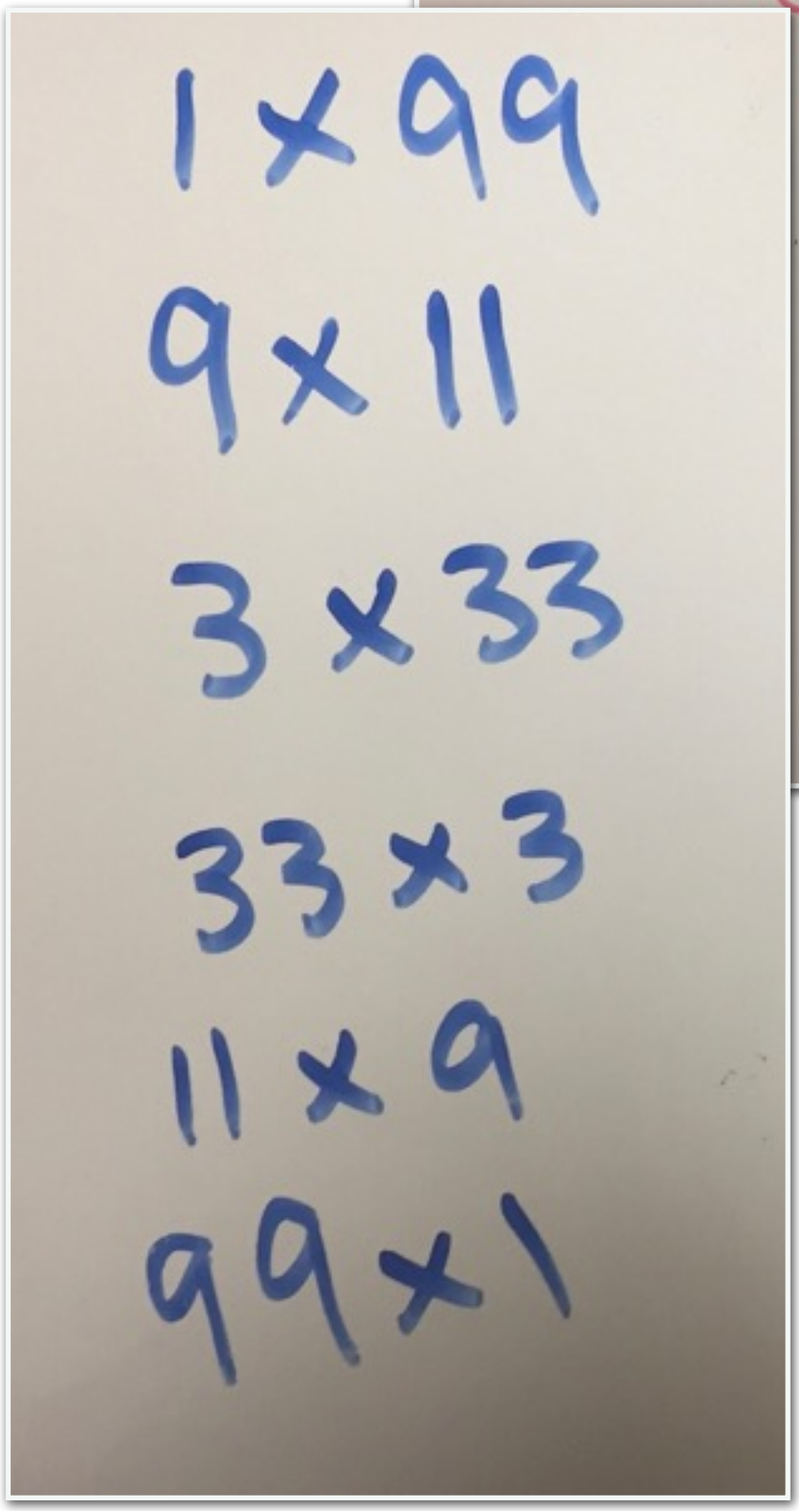


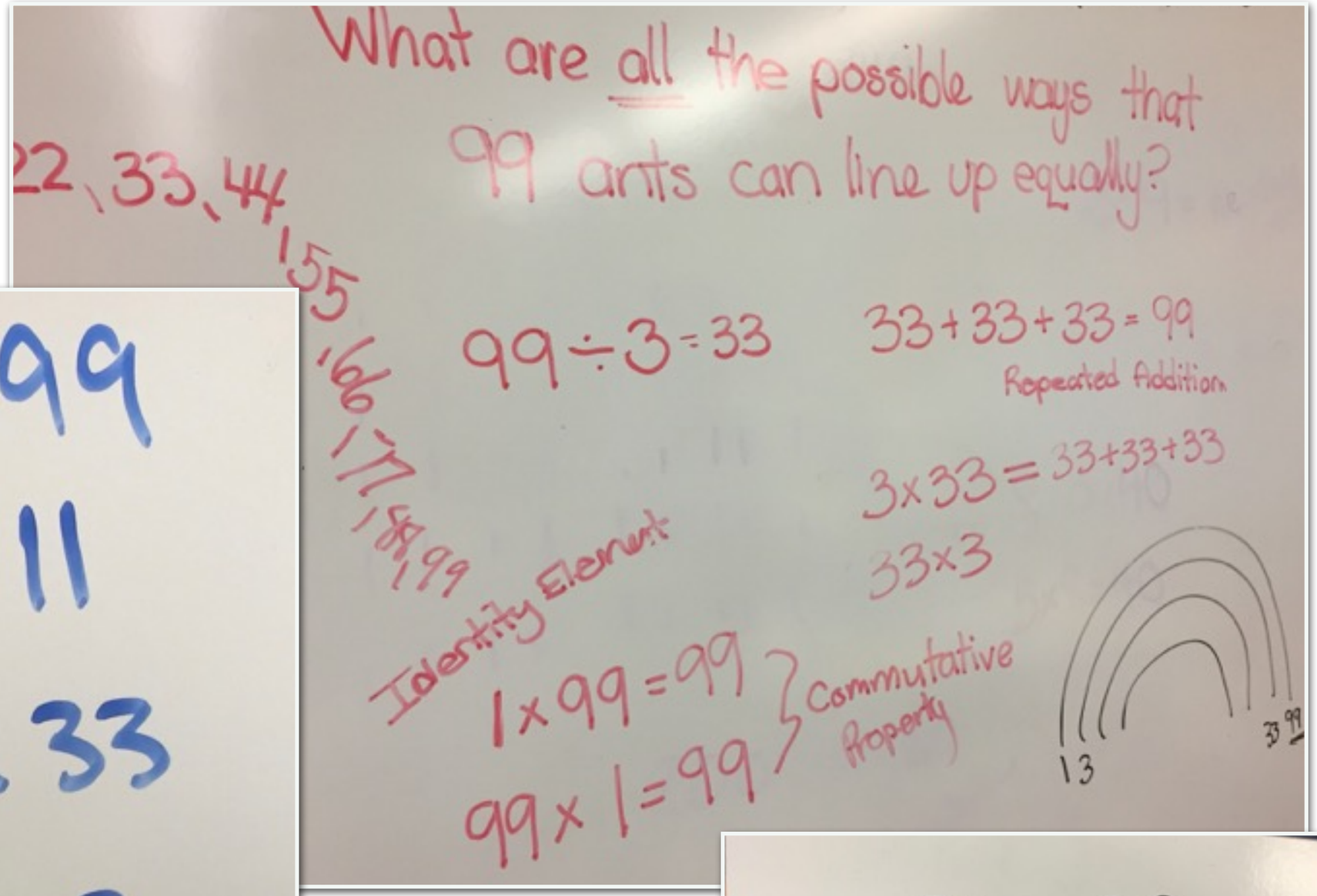


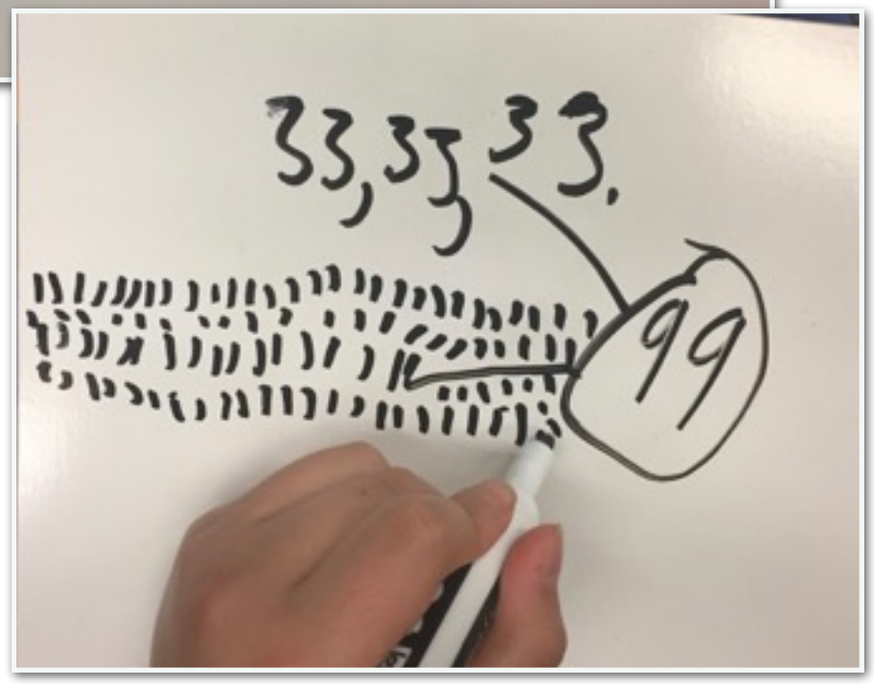
"Mathematizing a read-aloud provides students with opportunities to learn mathematical concepts in meaningful contexts. Using literature to connect concepts with students' experiences helps foster understanding and motivates students to learn."

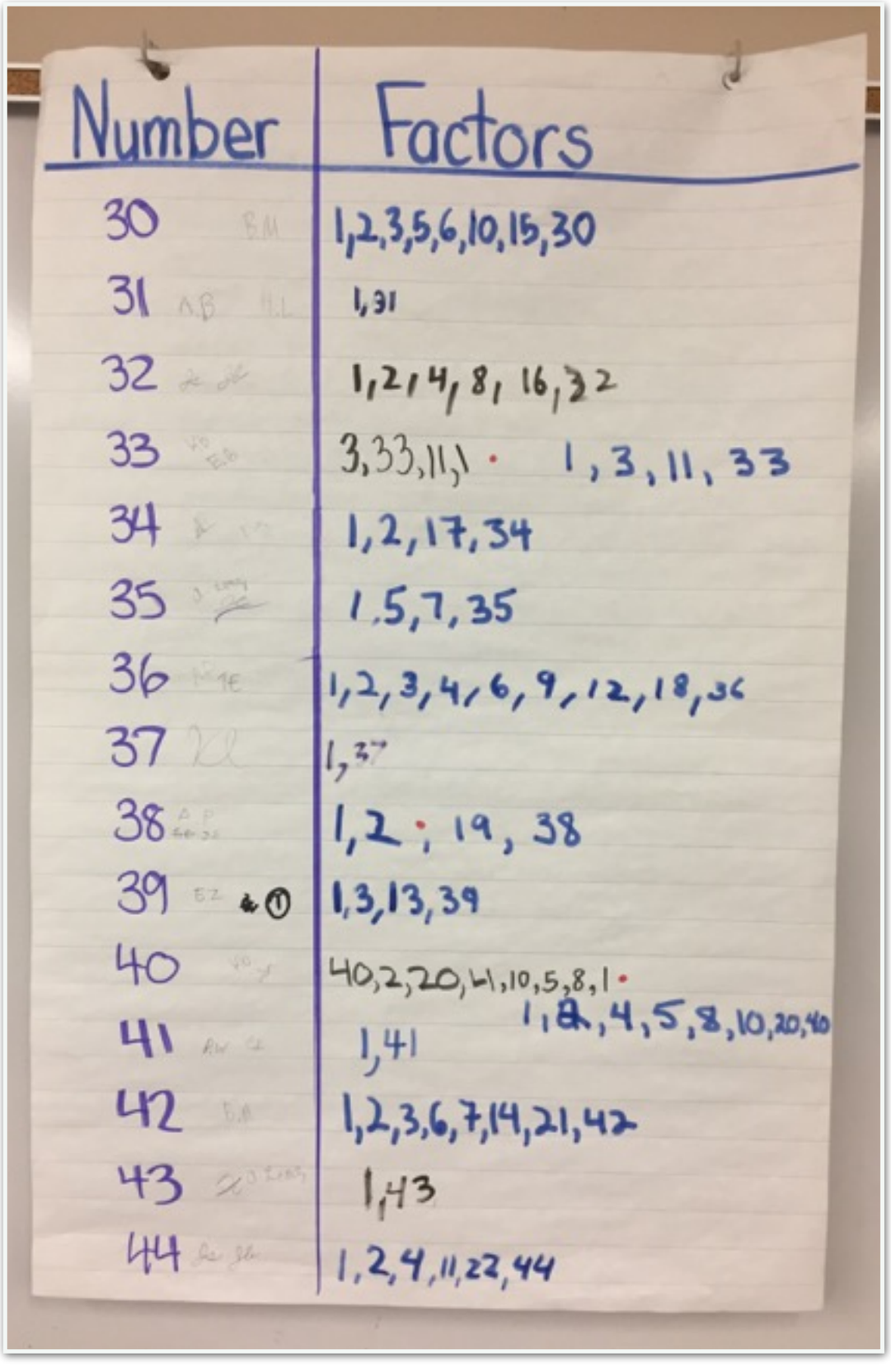
~ Hintz and Smith (2013) Mathematizing Read-Alouds




1 x 99
9 x 11
3 x 33
33 x 3
11 x 9
99 x 1


What are all the possible ways that 99 ants can line up equally?
22, 33, 44, 55, 66, 77, 88, 99
99 ÷ 3 = 33
33 + 33 + 33 = 99
Repeated Addition
3 x 33 = 33 + 33 + 33
33 x 3
Identity Element
1 x 99 = 99
99 x 1 = 99
Commutative Property
1 3
33 99


33, 33, 33.
99



Number	Factors
30	1,2,3,5,6,10,15,30
31	1,31
32	1,2,4,8,16,32
33	3,33,11,1 · 1,3,11,33
34	1,2,17,34
35	1,5,7,35
36	1,2,3,4,6,9,12,18,36
37	1,37
38	1,2;19,38
39	1,3,13,39
40	40,2,20,4,10,5,8,1· 1,2,4,5,8,10,20,40
41	1,41
42	1,2,3,6,7,14,21,42
43	1,43
44	1,2,4,11,22,44

What do you notice about the information?

What do you notice about the even numbers? The odd numbers?

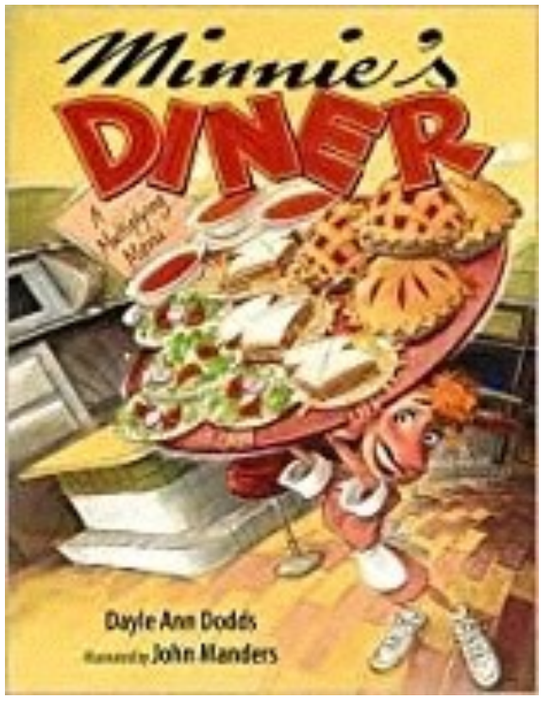
Why do numbers have different factors?

What about the numbers that only have 2 factors. Why might that be?

How do we assist students in using multiplicative thinking to solve single and multi-digit multiplication questions.

- Using known facts and compensating
- Doubling and Halving
- Making landmark or friendly numbers
- Using the commutative property
- Using the distributive property
- Using the associative property

How does halving and doubling help you solve a question you don't know?



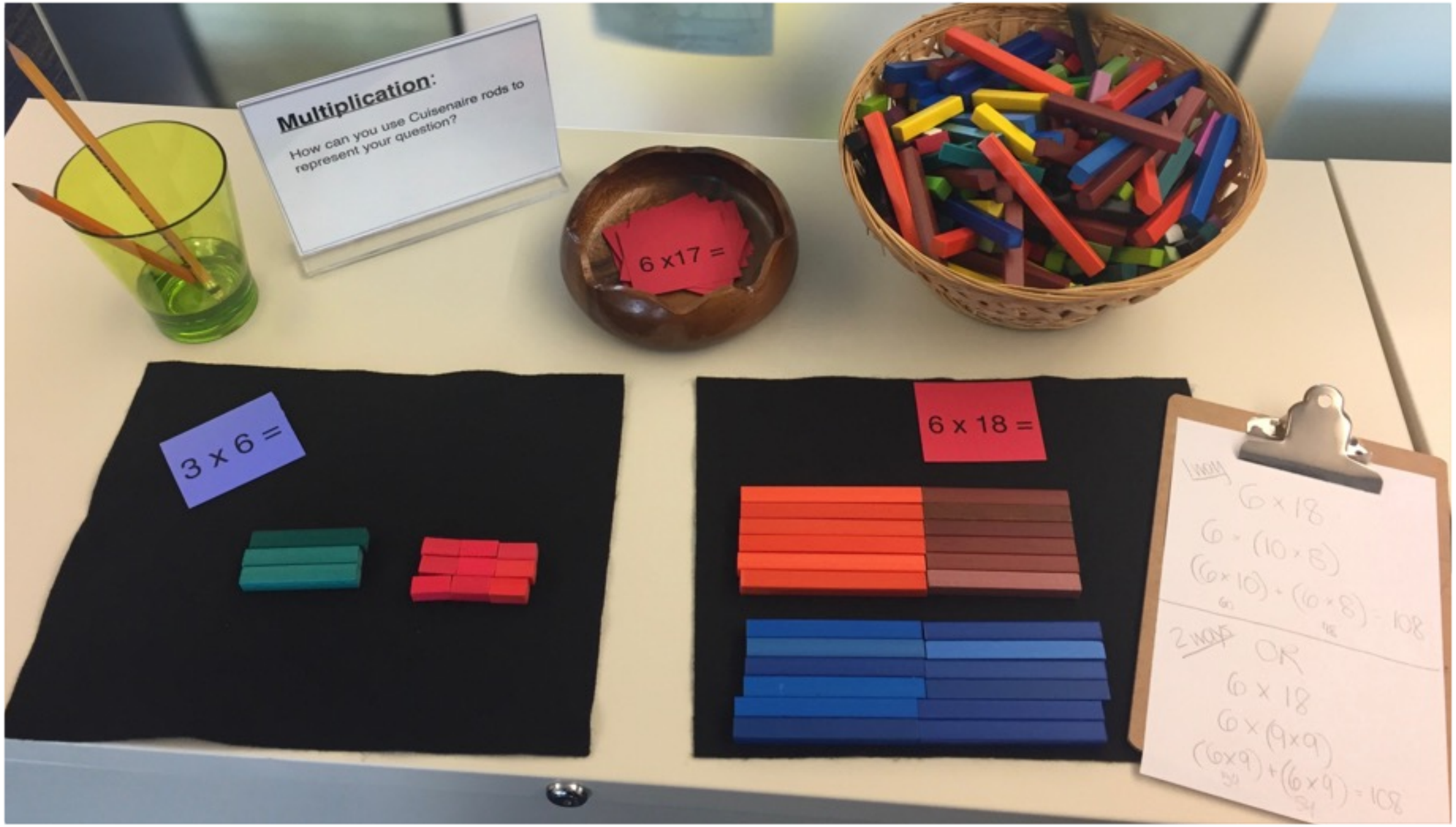
What do you notice is happening?

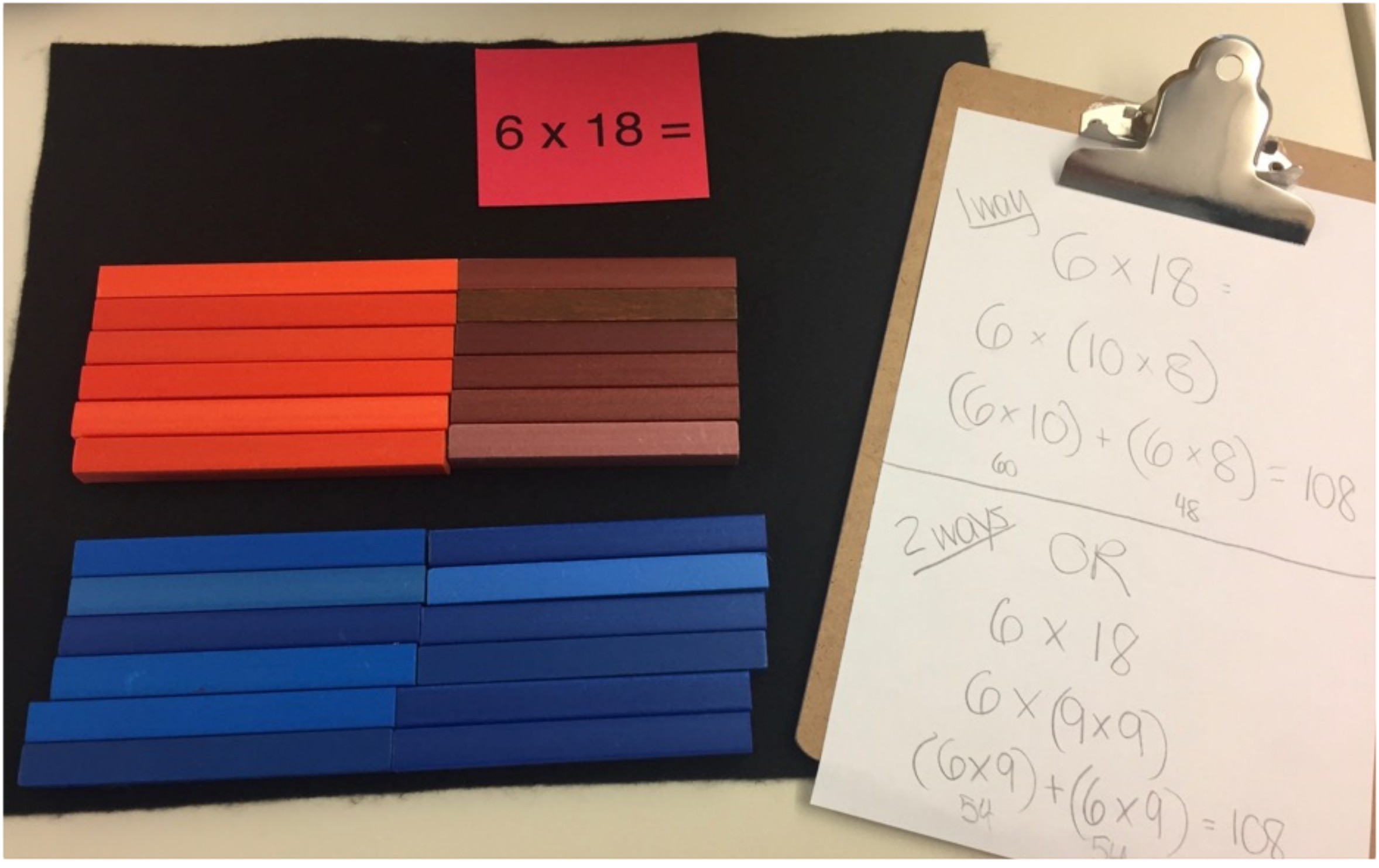
Let's record what each brother ordered?

How could we describe this using multiplication?

How many dishes did Minnie use for _____'s meal?

How many dishes did Minnie use to feed all the brothers?


Multiplication:
How can you use Cuisenaire rods to represent your question?
6 x17 =
3 x 6 =
6 x 18 =
6 x 18
6 - (10 x 8)
(6 x 10) + (6 x 8) = 108
OR
6 x 18
6 x (9 x 9)
(6 x 9) + (6 x 9) = 108


6 x 18 =
1 way
6 x 18 =
6 x (10 x 8)
(6 x 10) + (6 x 8) = 108
60
48
2 ways
OR
6 x 18
6 x (9 x 9)
(6 x 9) + (6 x 9) = 108
54
54

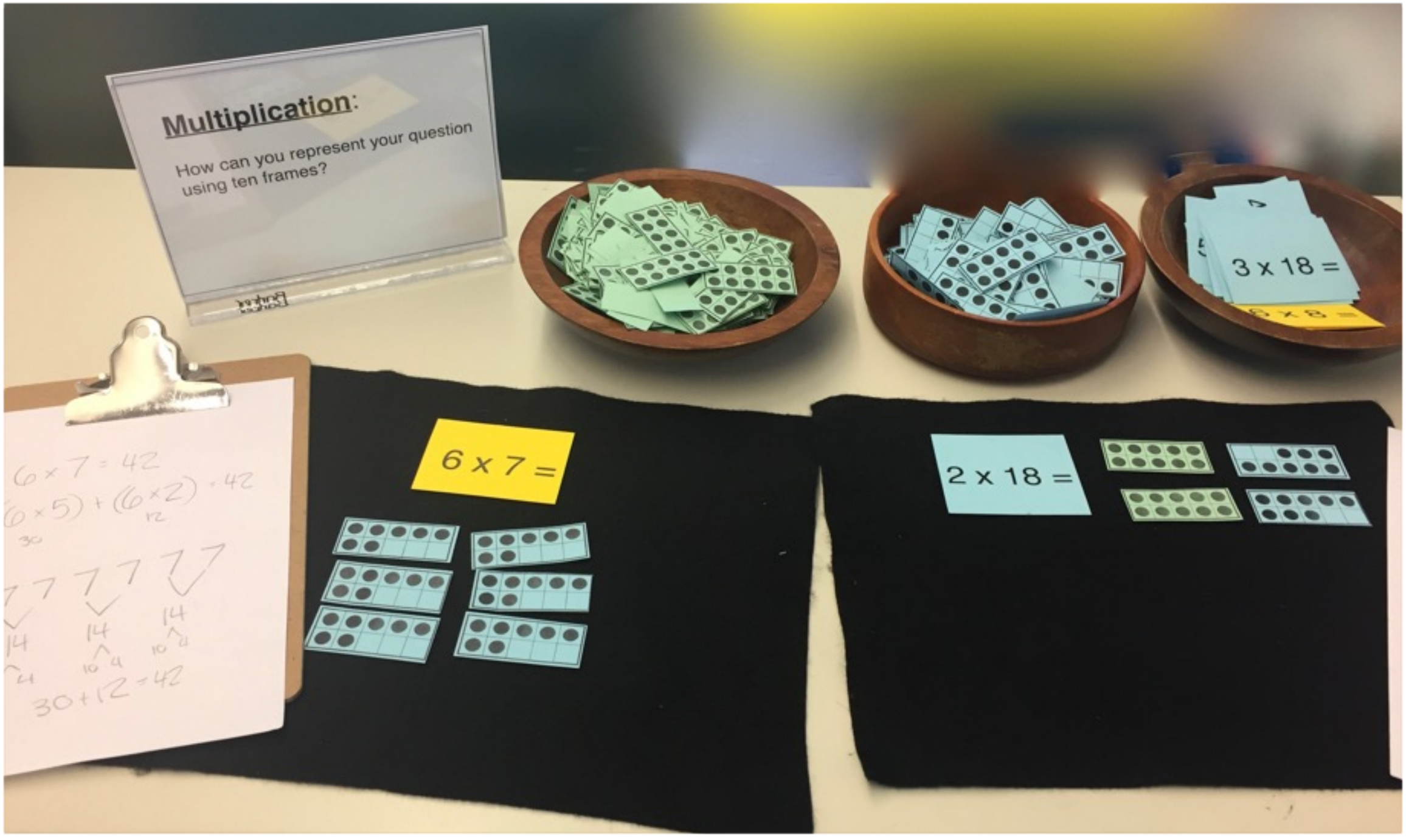
DISTRIBUTIVE PROPERTY

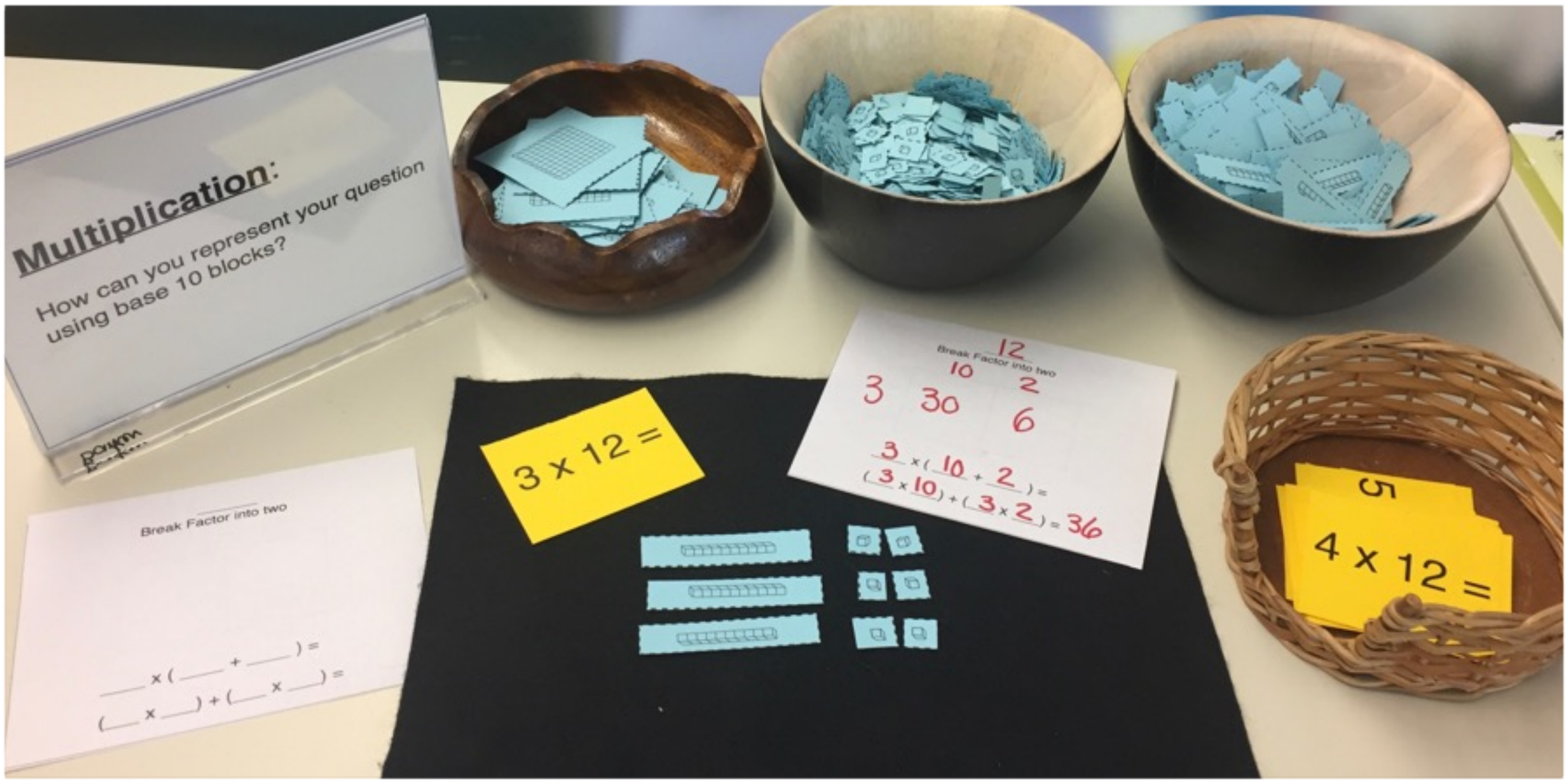
You can break a factor up and distribute the multiplication across both factors!

$$2 \times 33 = 2 \times (30 + 3)$$

$$(2 \times 30) + (2 \times 3)$$

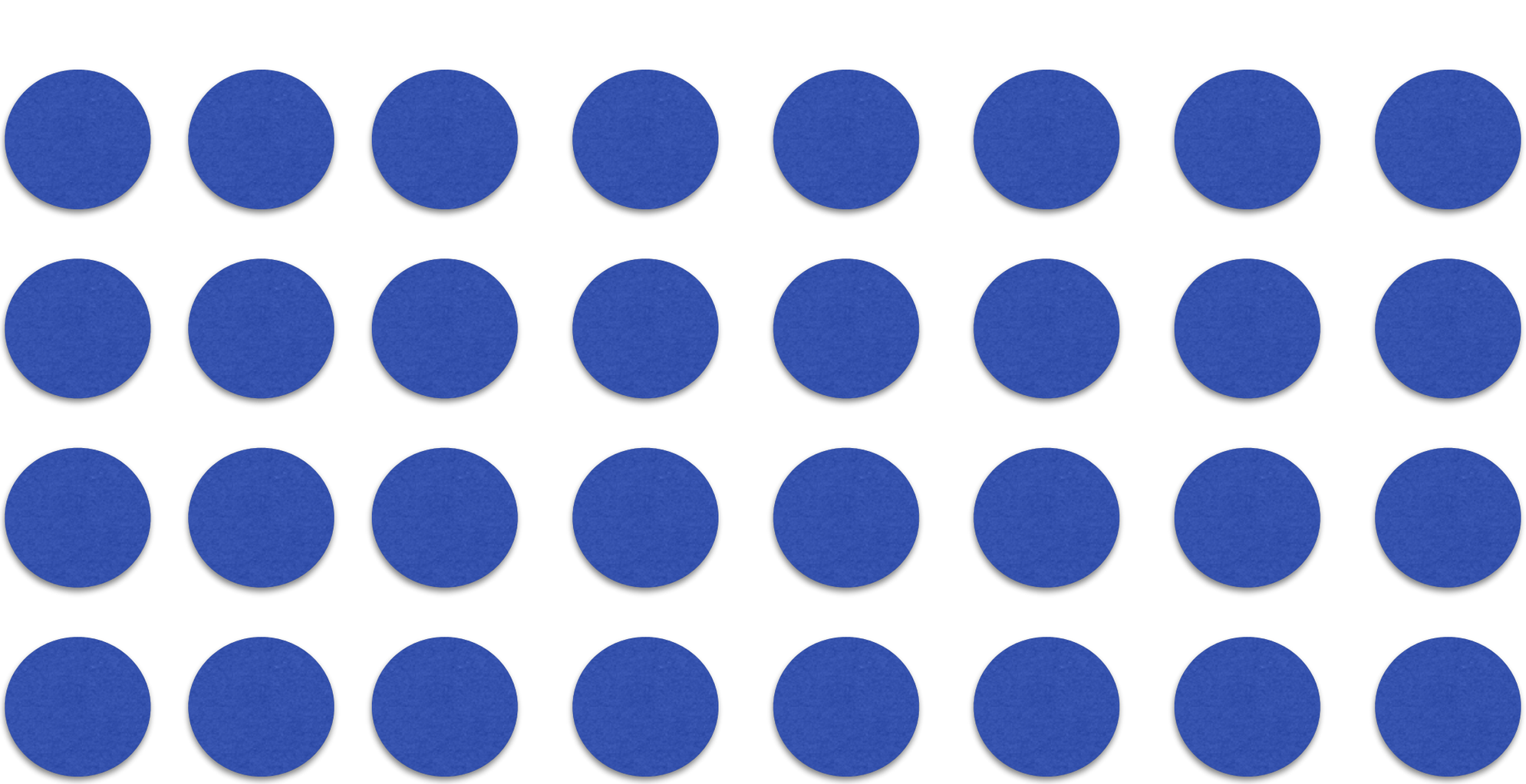
$$60 + 6 = 66$$


Multiplication:
How can you represent your question using ten frames?
3 x 18 =
6 x 7 =
2 x 18 =
6 x 7 = 42
(6 x 5) + (6 x 2) = 42
30 12
14 14 14
4 10 a 10 a
30 + 12 = 42


Multiplication:
How can you represent your question using base 10 blocks?
3 x 12 =
Break Factor into two
_____ x (_____ + _____) =
(_____ x _____) + (_____ x _____) =
12
Break Factor into two
10
2
3
30
6
3 x (10 + 2) =
(3 x 10) + (3 x 2) = 36
5
4 x 12 =

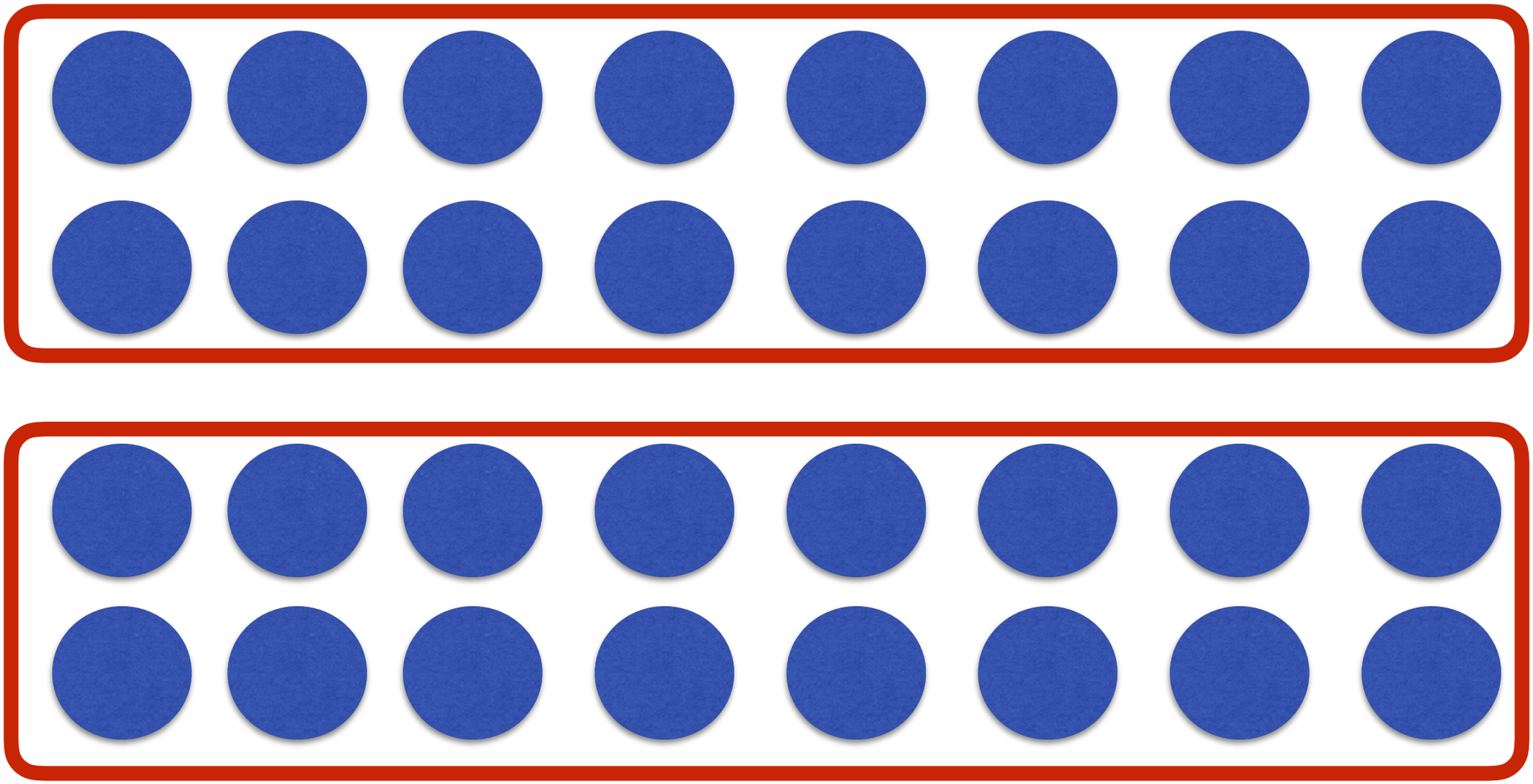
How does halving and doubling help you solve a question you don't know?

$$4 \times 8 =$$



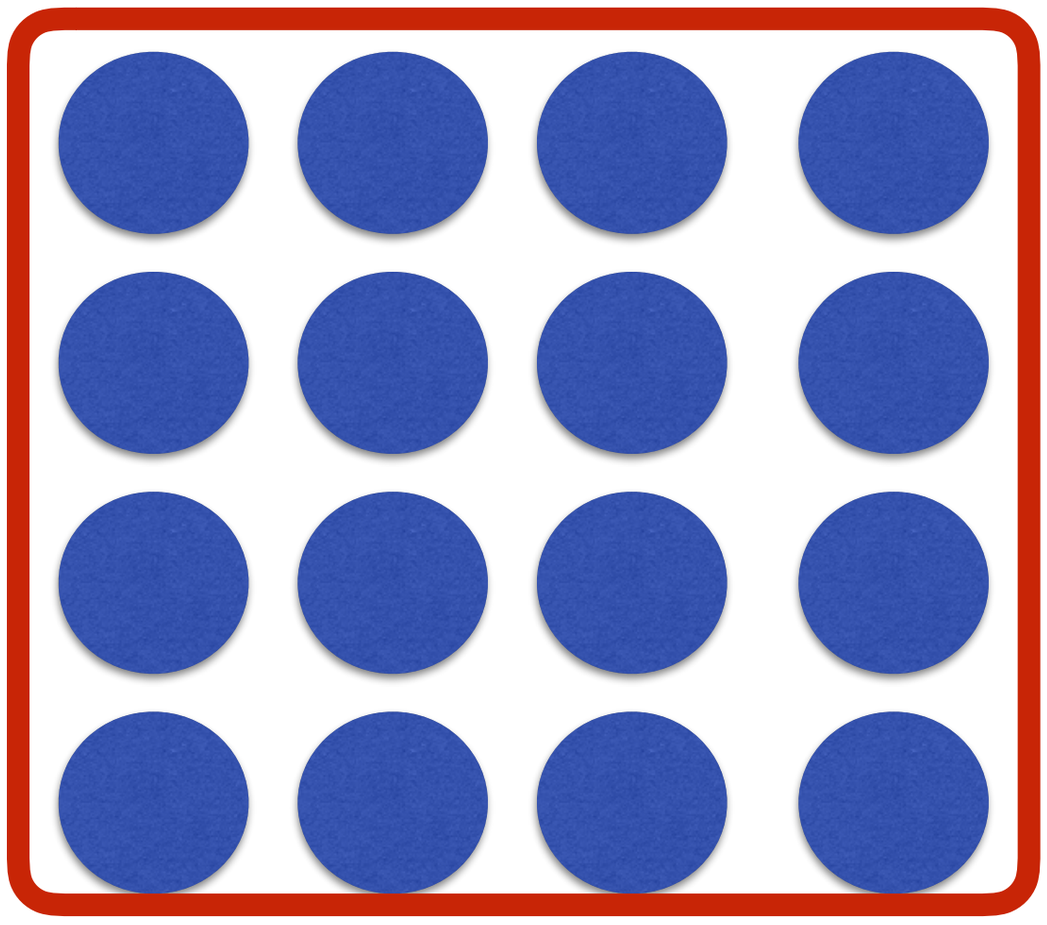
How does halving and doubling help you solve a question you don't know?

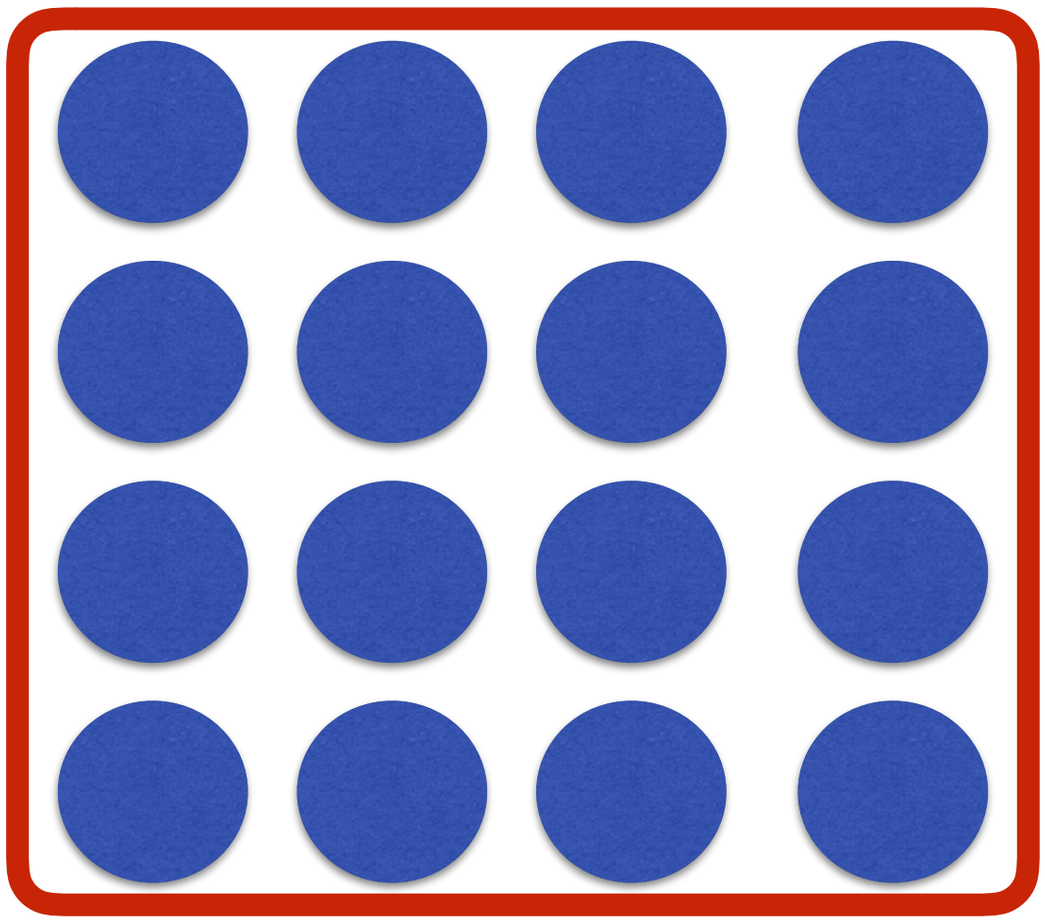
$$4 \times 8 = 2 \times (2 \times 8)$$



How does halving and doubling help you solve a question you don't know?

$$4 \times 8 = 2\,(4 \times 4)$$





ASSOCIATIVE PROPERTY

How you group the factors does not matter - the product is still the same!

$$(6 \times 4) \times 2 = 6 \times (4 \times 2)$$

$$24 \times 2 = 6 \times 8$$

$$48 = 48$$

How can you use facts you know to help you solve a question you don't know?

https://www.mathlearningcenter.org/resources/apps

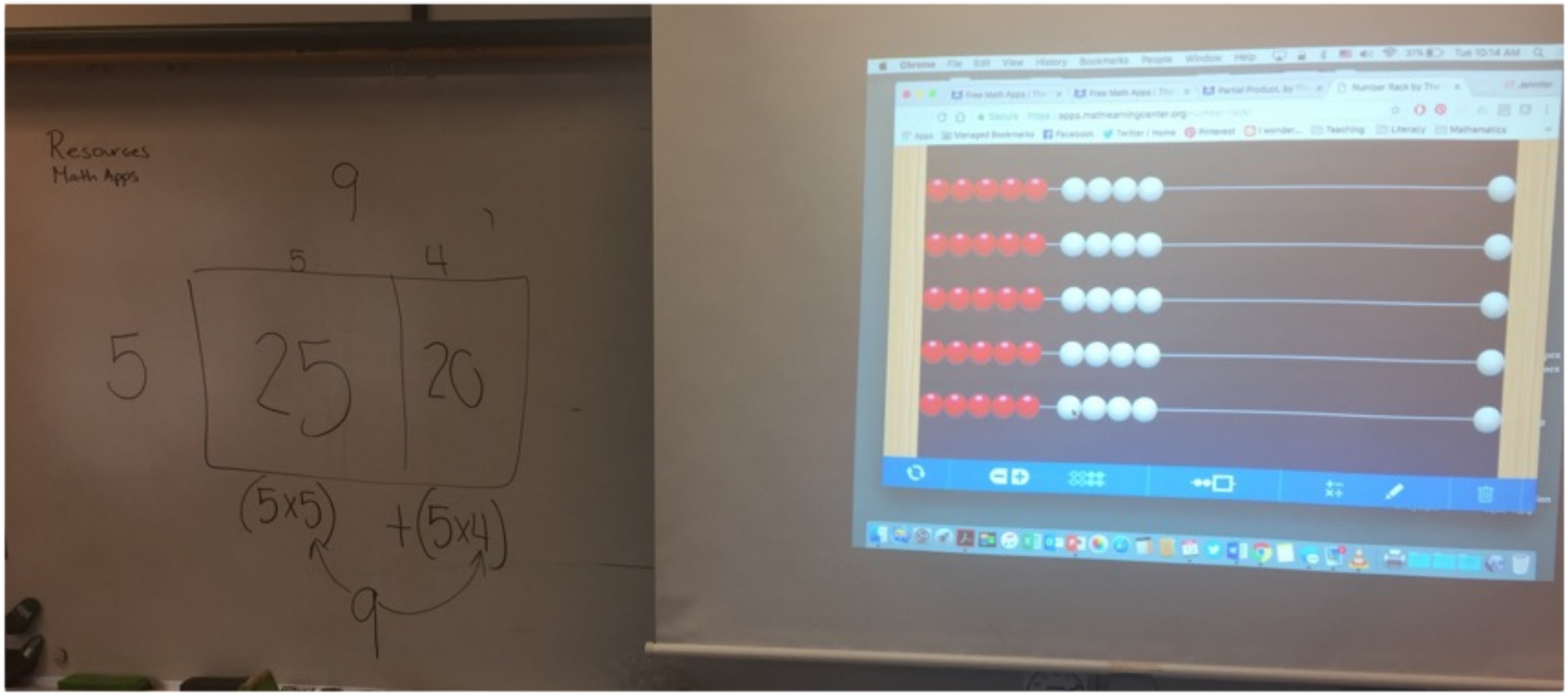
Open Web App

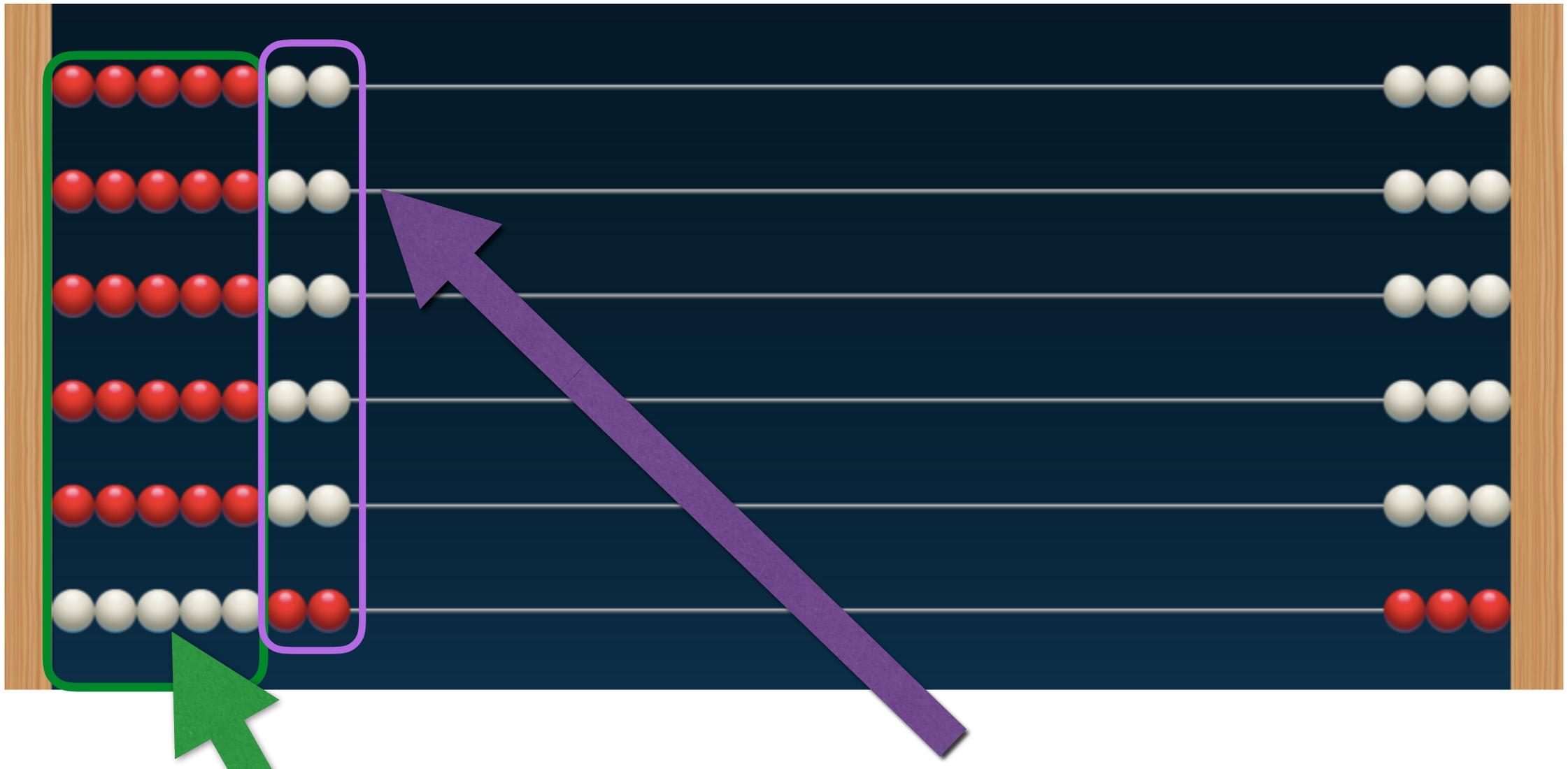
Apple App Store

Chrome Store

Number Rack

Number Rack facilitates the natural development of children's number sense. Rows of movable, colored beads encourage learners to think in groups of fives and tens, helping them to explore and discover a variety of addition and subtraction strategies. Free activities and free book available.


Resources
Math Apps
9
5
4
5
25
20
(5x5)
+(5x4)
9



6 x 5 = 30

Plus

6 x 2 = 12

30 +12 = 42

ou use facts you know to help you solve questions you don't know?

(3x5)+(3x3)=
30

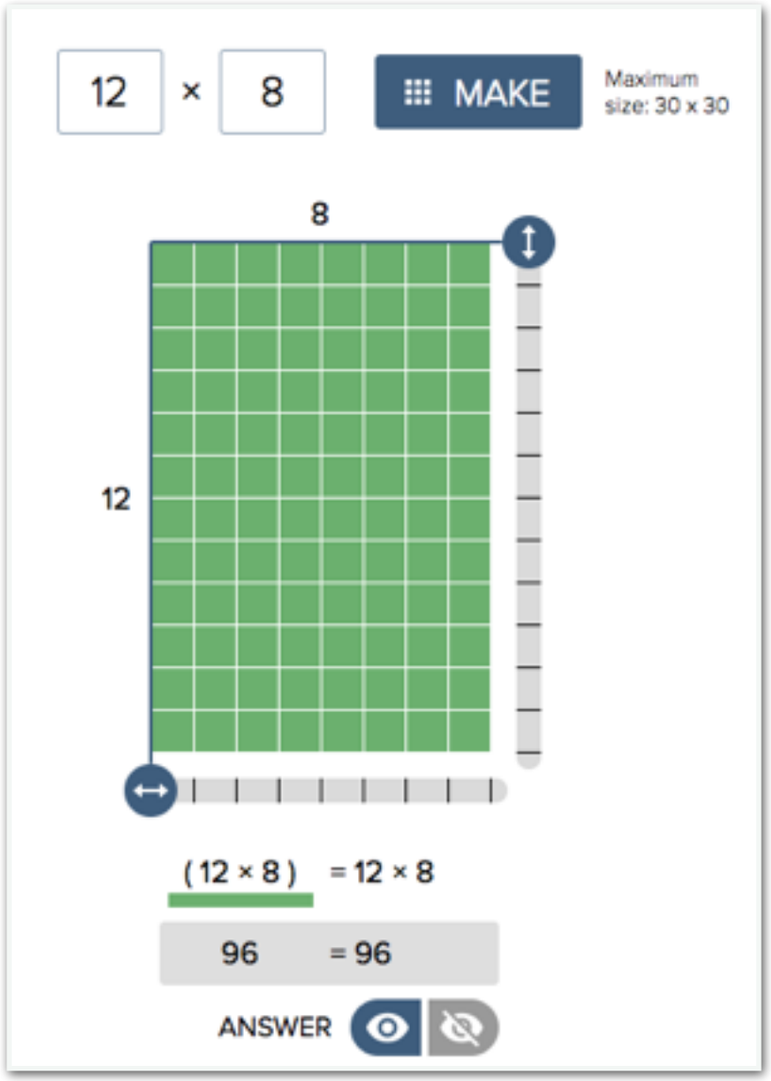
8x3=

(4x3)+(4x3)=8x3

Children have real understanding only of that which they invent themselves, and each time that we try to teach them too quickly we keep them from reinventing it themselves.

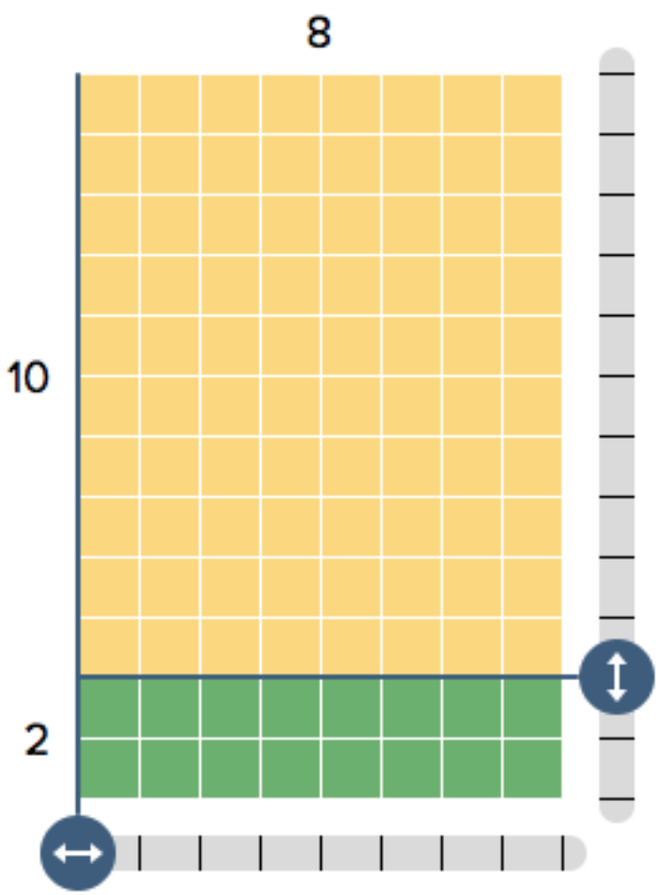
- Piaget

How can you use facts you know to help you solve a question you don't know?



https://www.mathlearningcenter.org/resources/apps

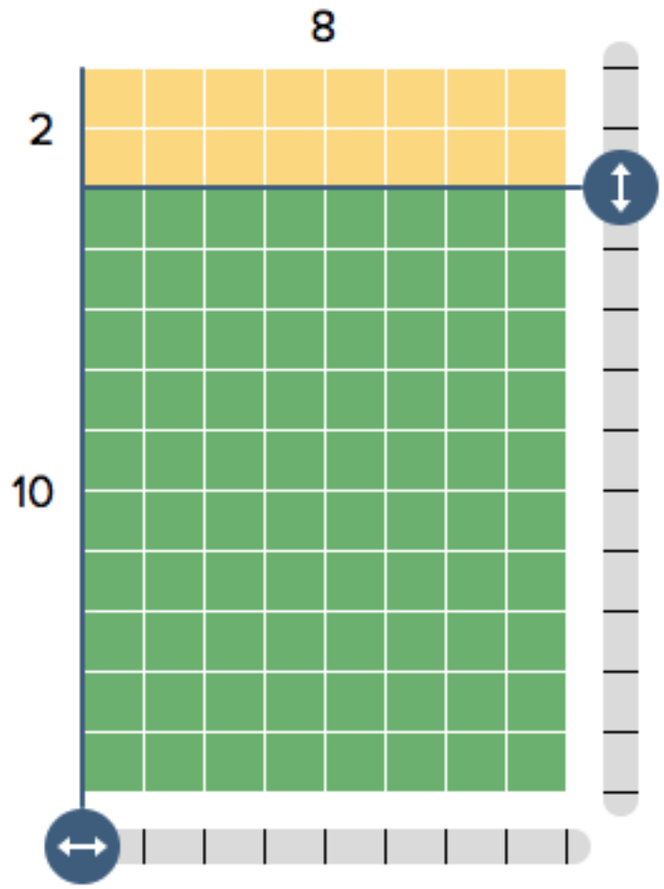
12 × 8 MAKE Maximum size: 30 x 30



(10 × 8) + (2 × 8) = 12 × 8

ANSWER

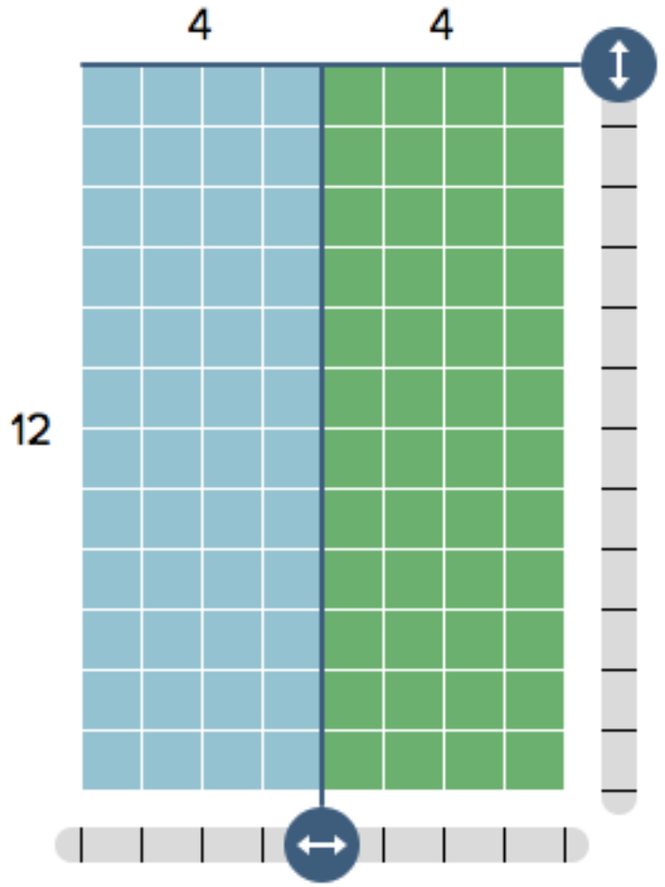
12 × 8 MAKE Maximum size: 30 x 30



(2 × 8) + (10 × 8) = 12 × 8

ANSWER

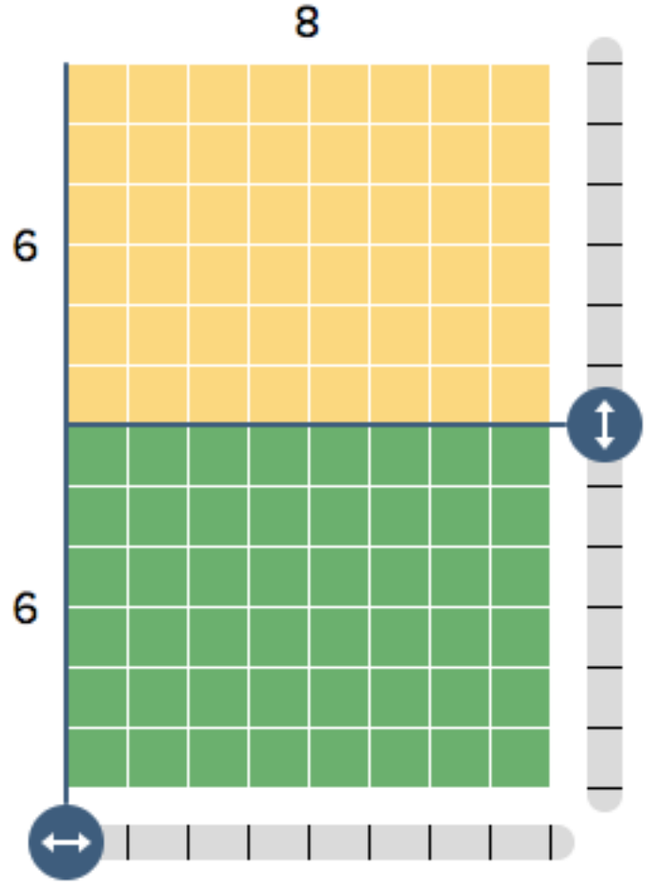
12 × 8 MAKE Maximum size: 30 x 30



(12 × 4) + (12 × 4) = 12 × 8

ANSWER

12 × 8 MAKE Maximum size: 30 x 30

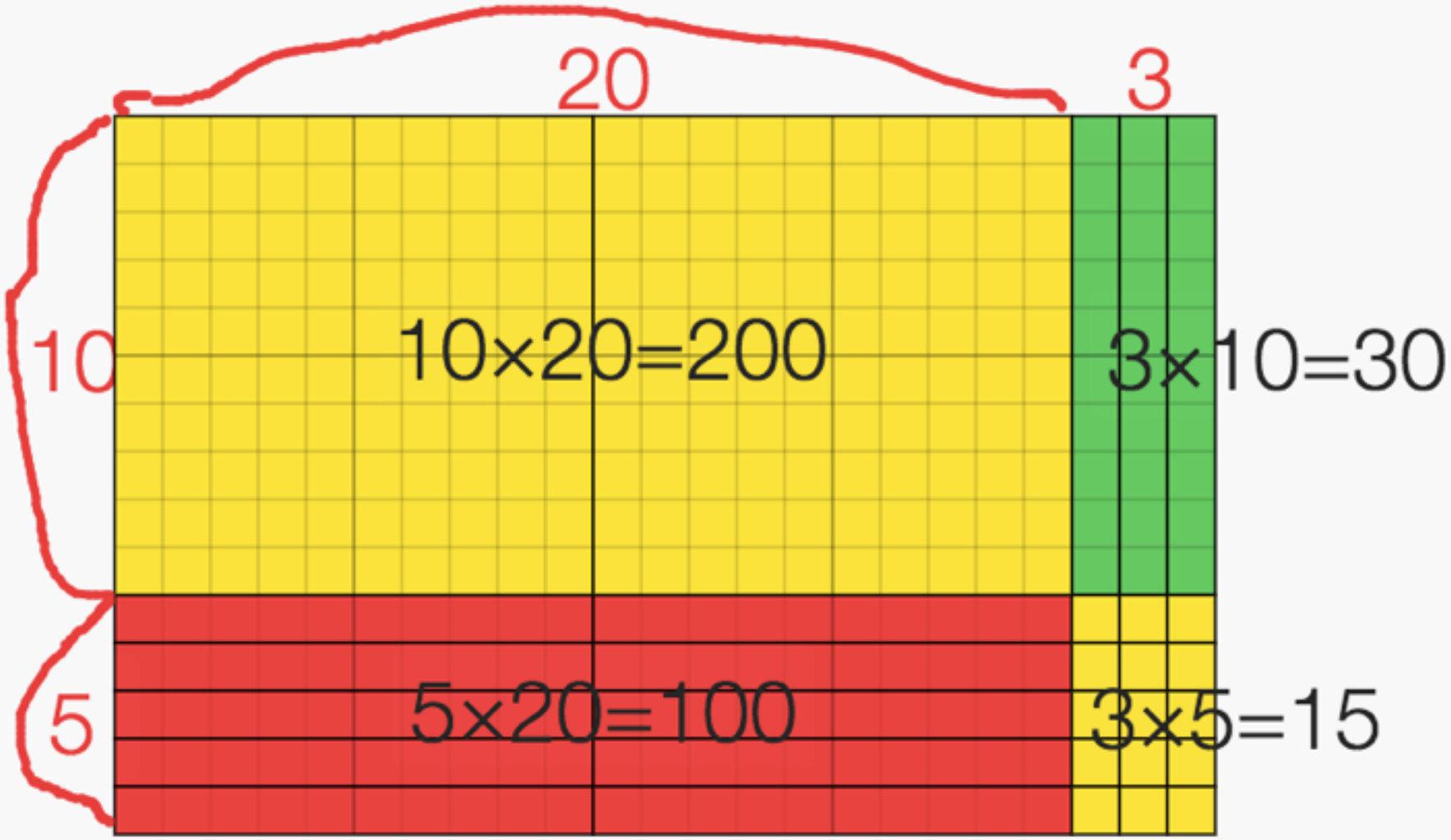


(6 × 8) + (6 × 8) = 12 × 8

ANSWER

Secure | https://www.mathlearningcenter.org/web-apps/number-pieces/

Apps | Managed Bookmarks | Facebook | Twitter / Home | Pinterest | I wonder... | Teaching | Literacy | Mathematics | Web 2.0 Programs | Personal Reading



23×15=345

200+100+30+15

Same site - this is called Number Pieces

Three Act Tasks

1) The Question, 2) Gathering Information, and 3) The Reveal.
The entire activity typically takes a full math period or the acts can be split up and worked on across multiple days. The goal of the activity is to engage children in asking mathematical questions, identifying information that will allow them to answer the question, developing a mathematical model of the situation, and revising their models to more closely reflect the real world.

Act One

Act Two


There are 58 packages of skittles in the jar.


ORIGINAL
Skittles

Act Three

"Play is often talked about as if it were a relief from serious learning. But for children play is serious learning. Play is really the work of childhood."

Fred Rogers

What is our role in playful inquiry?

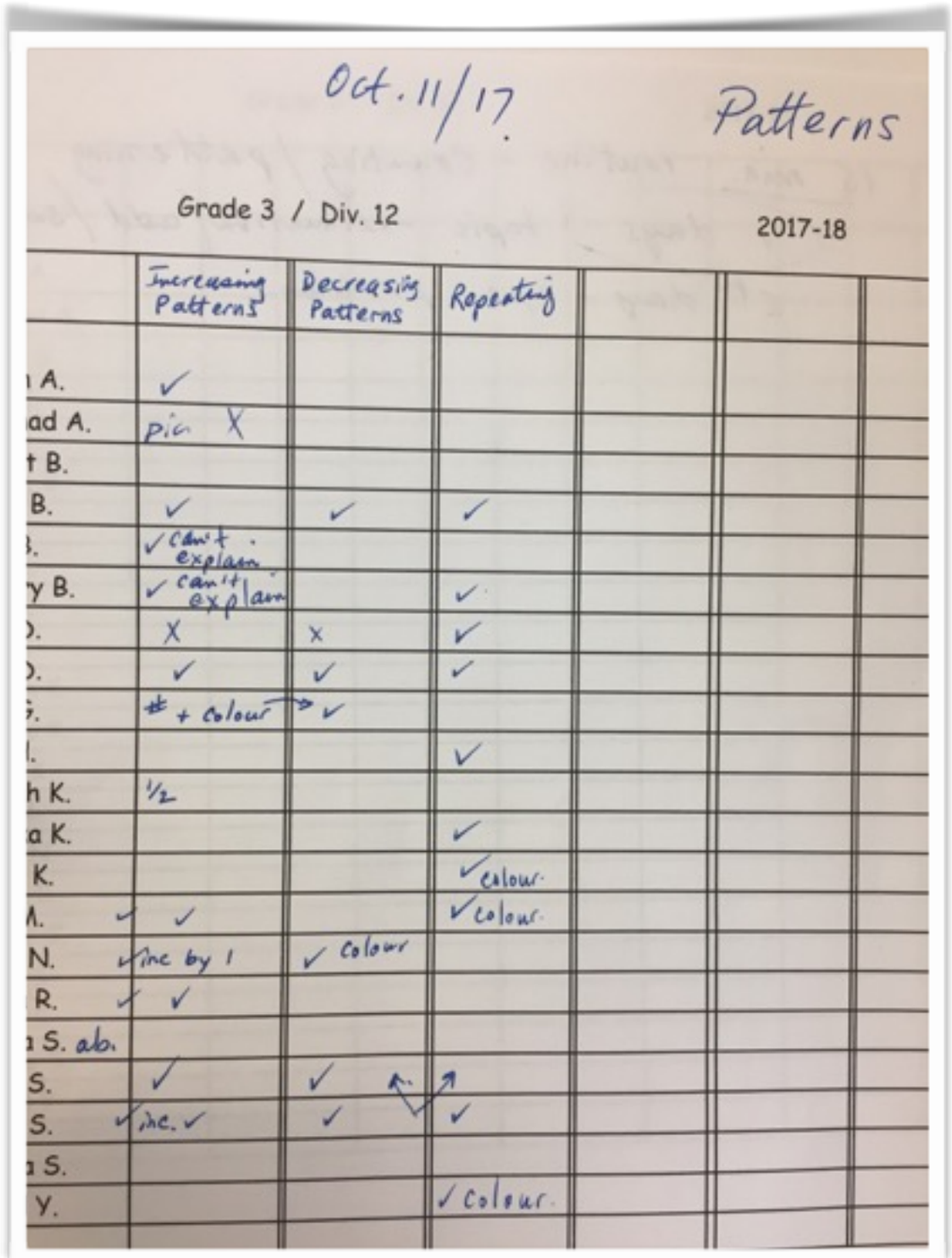
- talk less and listen more
- be open to the children's questions
- ask open questions - design inviting, playful learning opportunities
- notice and name the curricular competencies
- ask questions to nudge learning
- use mathematical vocabulary
- build in time to reflect and connect
- know and honour student's interests
- establish a culture that supports wondering and playfulness

Formative Assessment

We circulate and observe. Based on what we see, we ask questions to clarify our understanding and nudge learning forward.

We document the learning we see using anecdotal notes, photos, videos, checklists, collection of student work samples.

Performance Based Assessment



Oct. 11/17

Patterns

Grade 3 / Div. 12

2017-18

	Increasing Patterns	Decreasing Patterns	Repeating			
A.	✓					
ad A.	pic ✗					
t B.						
B.	✓	✓	✓			
.	✓ can't explain					
y B.	✓ can't explain		✓			
.	✗	✗	✓			
.	✓	✓	✓			
.	# + colour →	✓				
.			✓			
h K.	1/2					
a K.			✓			
K.			✓ colour.			
M. ✓	✓		✓ colour.			
N. ✓	inc by 1	✓ colour				
R. ✓	✓					
a S. abs.						
S.	✓	✓				
S. ✓	inc. ✓	✓	✓			
a S.						
Y.			✓ colour.			

Journal Prompts

- Multiplication can be represented using
- I created…
- I'm proud of…
- I know…
- I'm thinking now…
- This reminds me of…
- Today I learned…
- A connection I have…
- I noticed…

Multiplication: How do we revisit this topic throughout the year?

2017/18 School Calendar

Calendarpedia
Your source for calendars

August 2017

Su	Mo	Tu	We	Th	Fr	Sa
		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		

September 2017

Su	Mo	Tu	We	Th	Fr	Sa
					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

October 2017

Su	Mo	Tu	We	Th	Fr	Sa
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				

November 2017

Su	Mo	Tu	We	Th	Fr	Sa
			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		

December 2017

Su	Mo	Tu	We	Th	Fr	Sa
					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						

January 2018

Su	Mo	Tu	We	Th	Fr	Sa
	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			

February 2018

Su	Mo	Tu	We	Th	Fr	Sa
				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			

March 2018

Su	Mo	Tu	We	Th	Fr	Sa
				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

April 2018

Su	Mo	Tu	We	Th	Fr	Sa
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					

May 2018

Su	Mo	Tu	We	Th	Fr	Sa
		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		

June 2018

Su	Mo	Tu	We	Th	Fr	Sa
					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

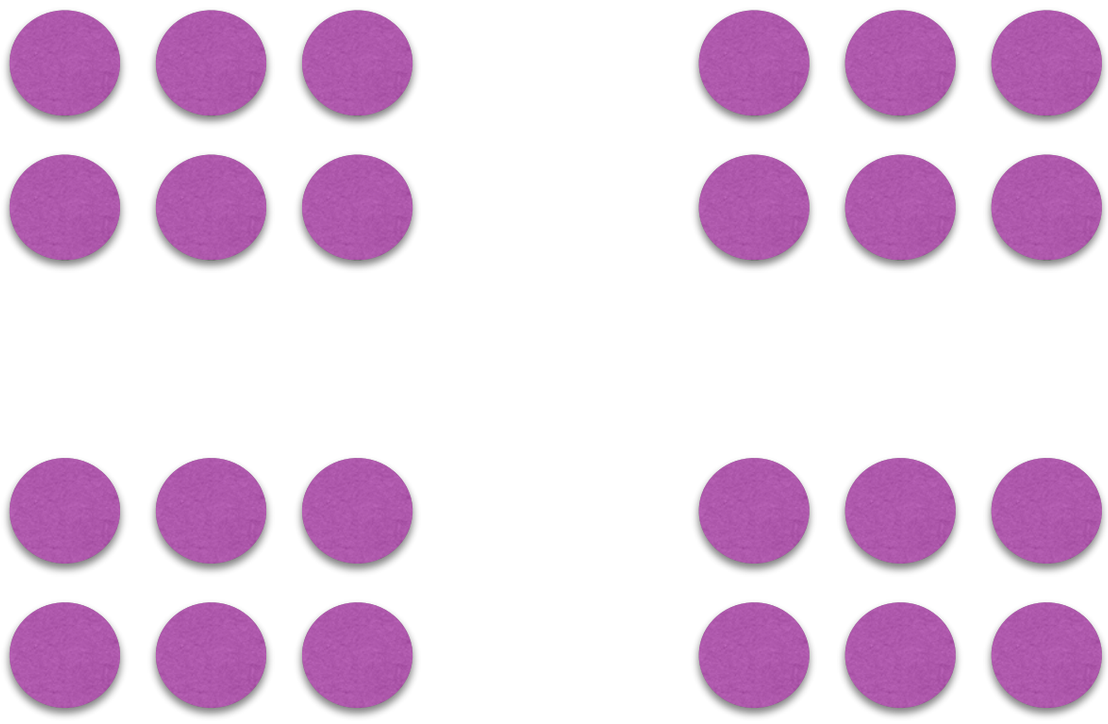
July 2018

Su	Mo	Tu	We	Th	Fr	Sa
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				

Number Talks Using Quick Images

Learning Intentions:

- develop multiple strategies for Decomposing (Mental Math)
- developing flexibility through use of multiple strategies
- Computational Fluency
- Place Value



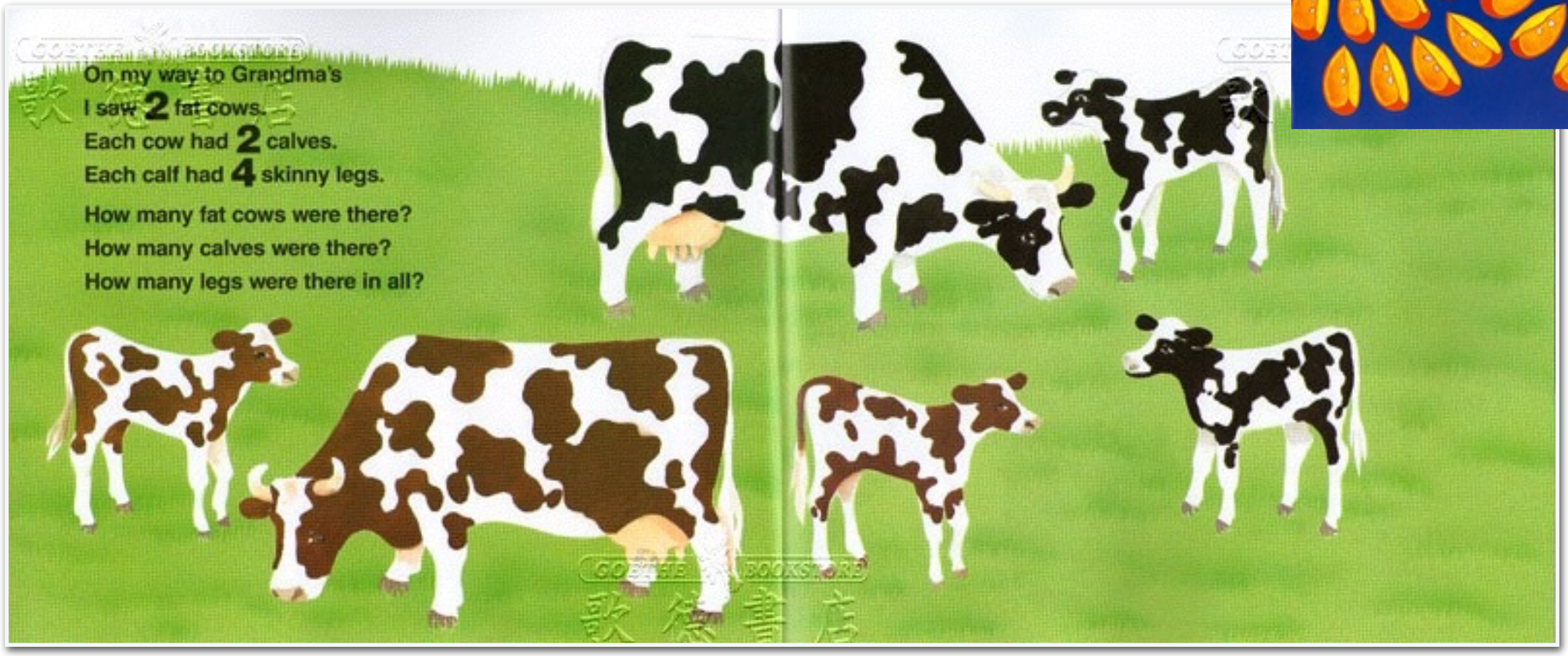
How many?

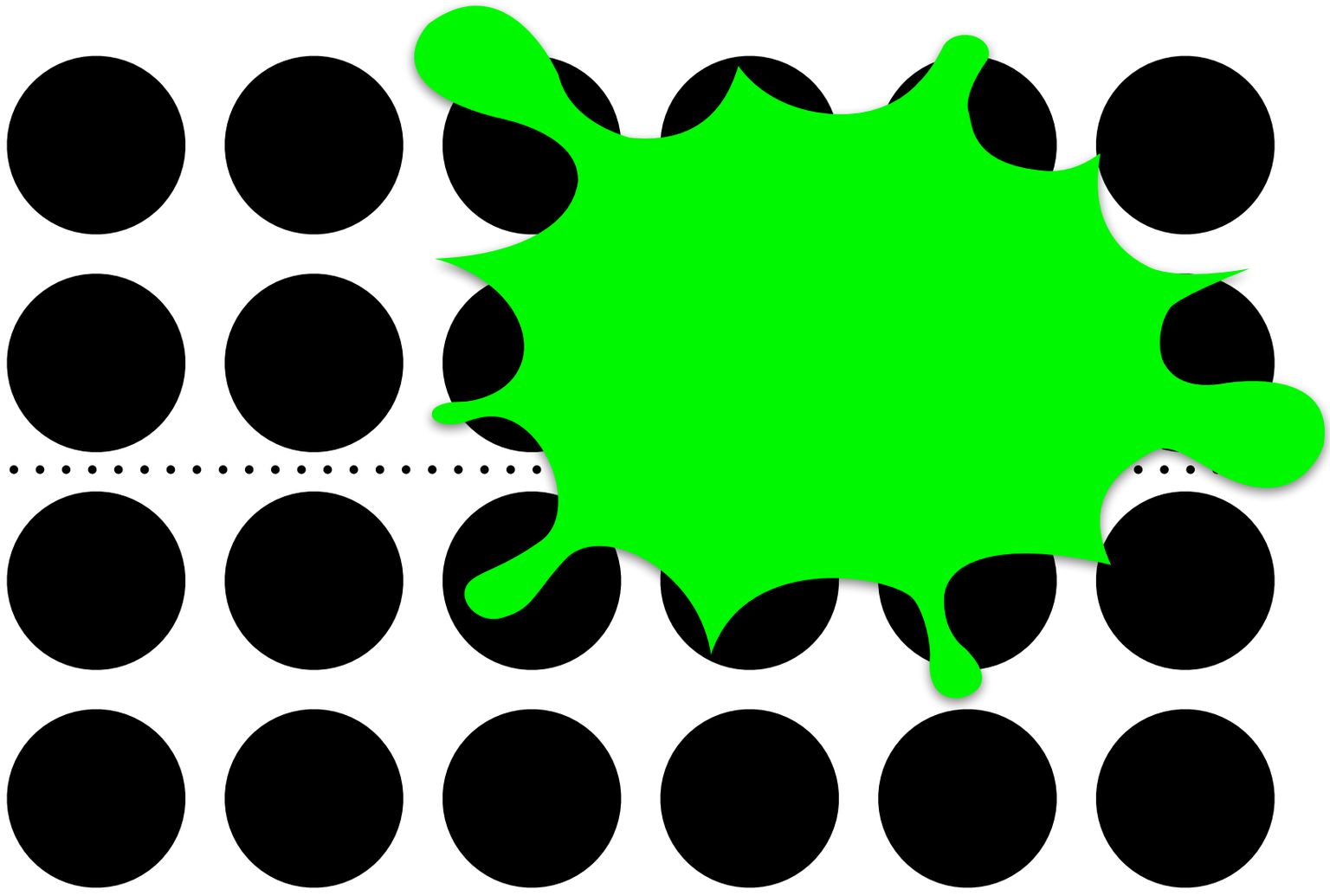
How did you see them?

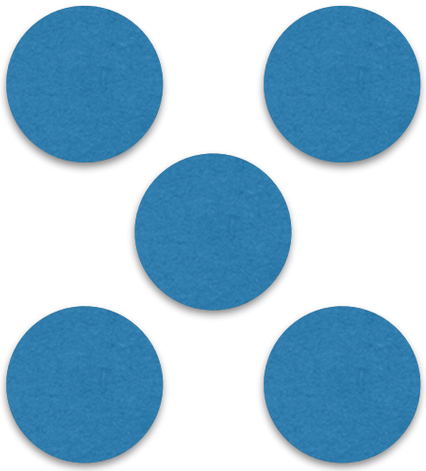
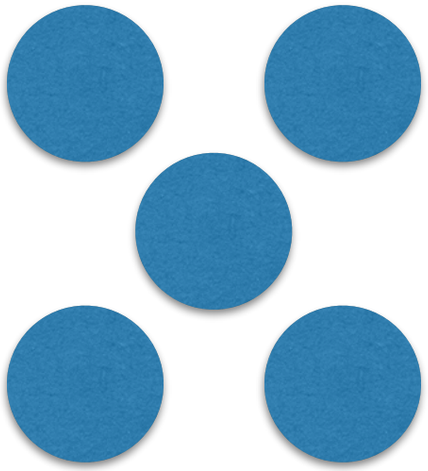
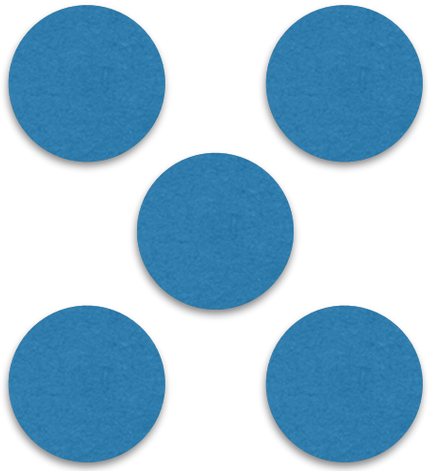
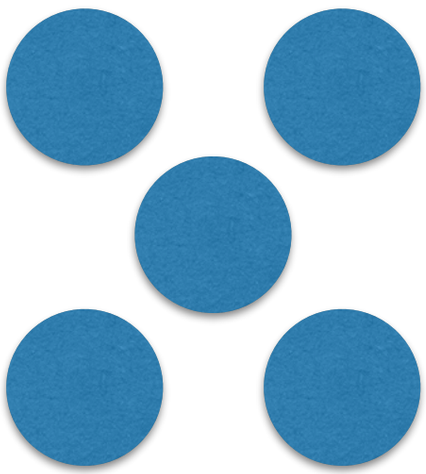
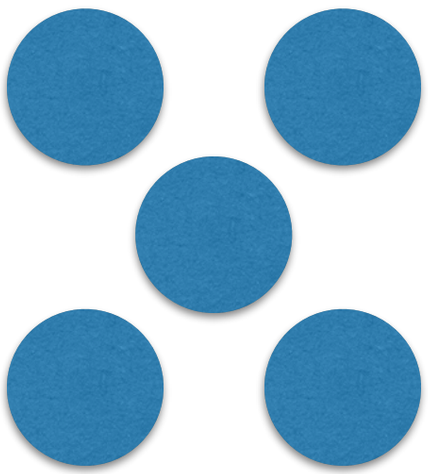
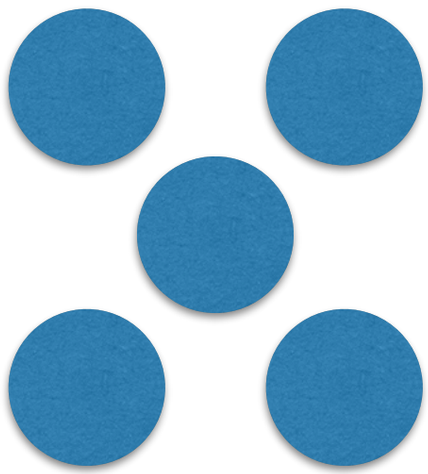
How could we describe this page using multiplication?

How many legs are there altogether?

How many horns?





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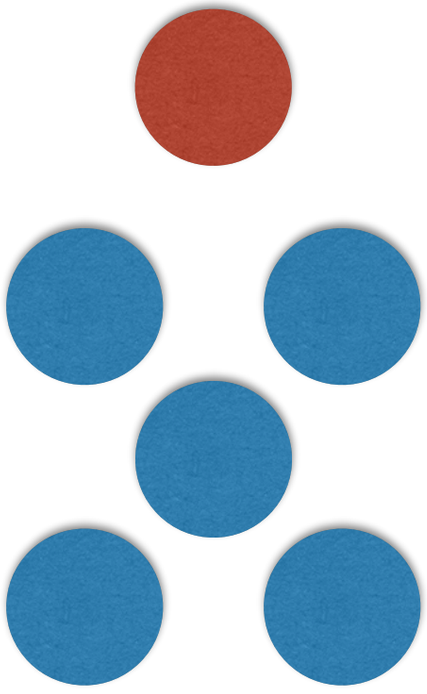
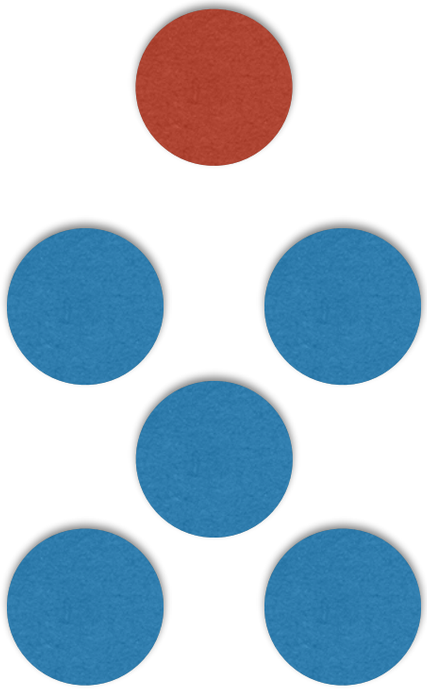
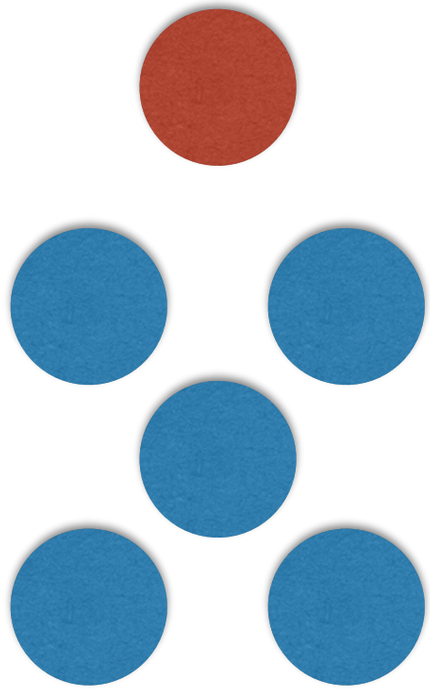
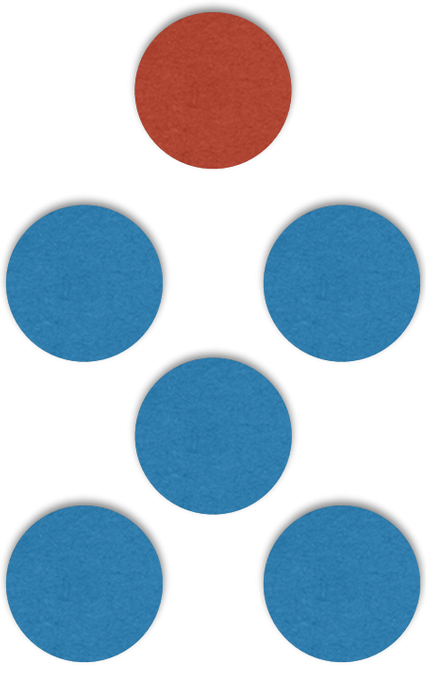
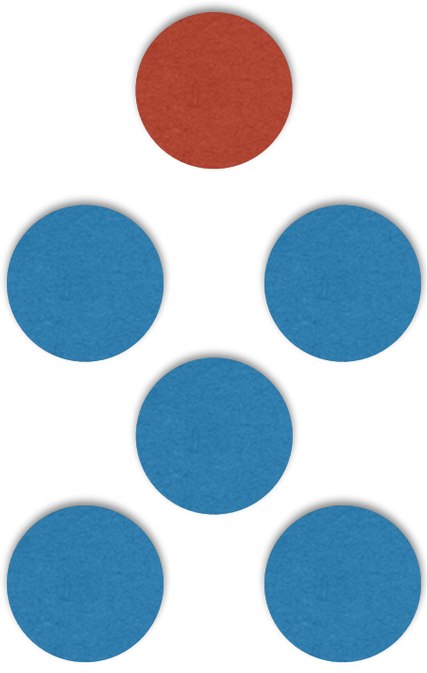
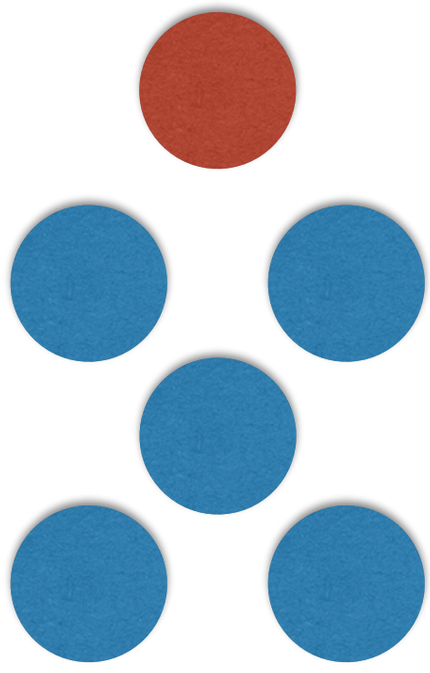

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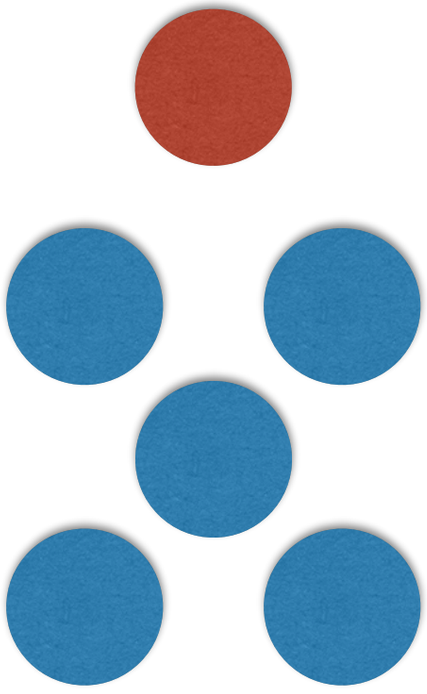
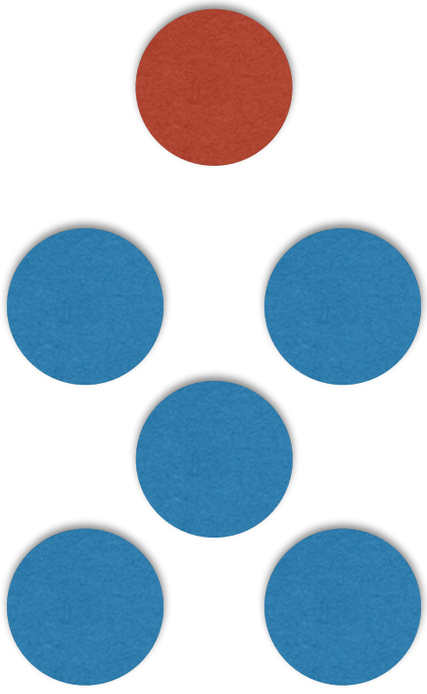
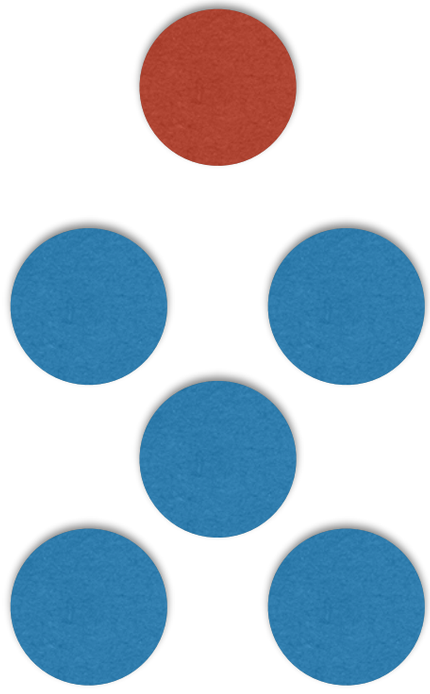
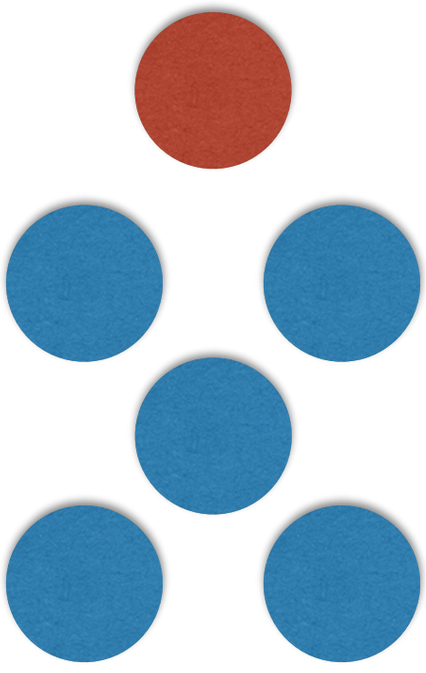
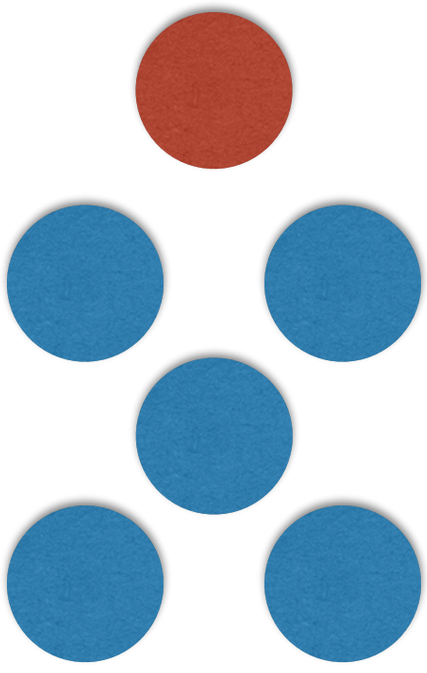
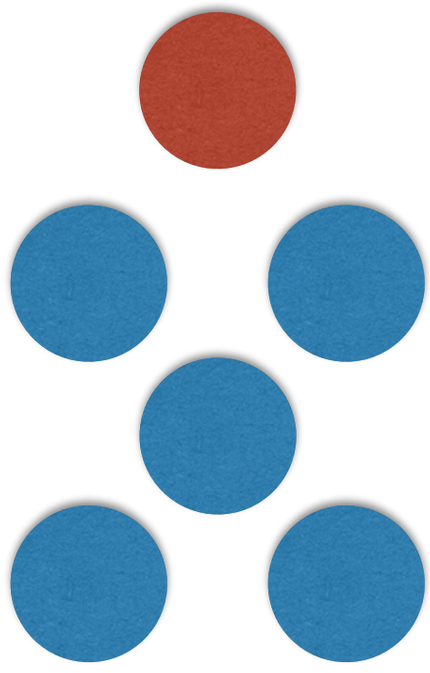

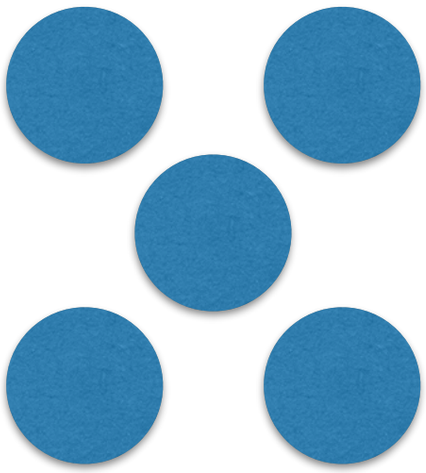

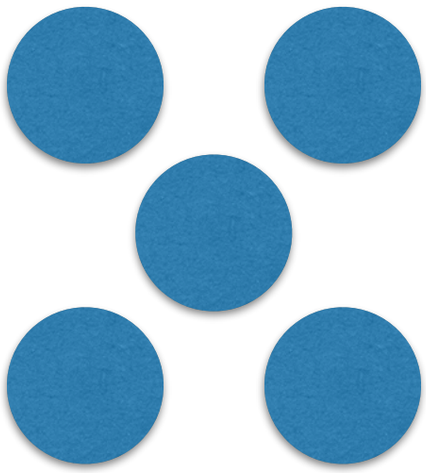

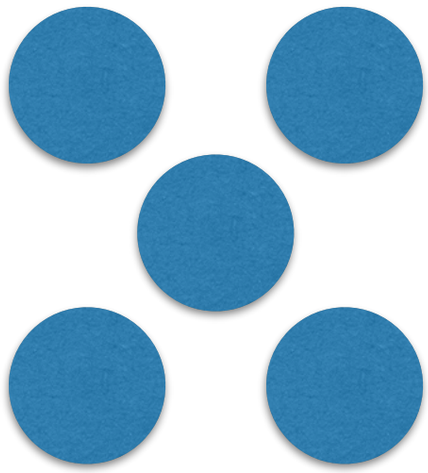

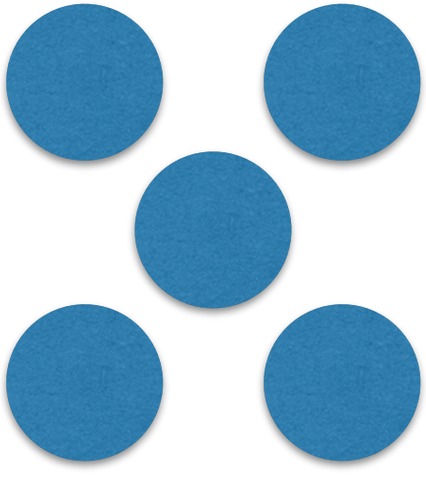

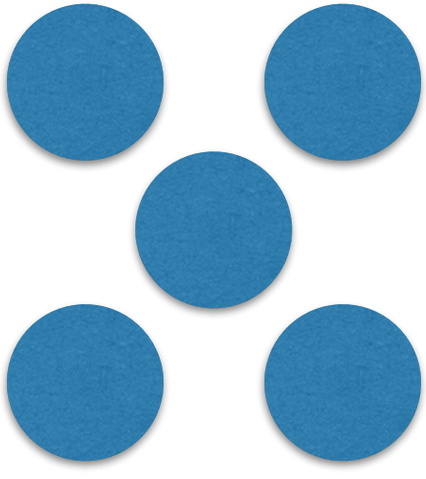

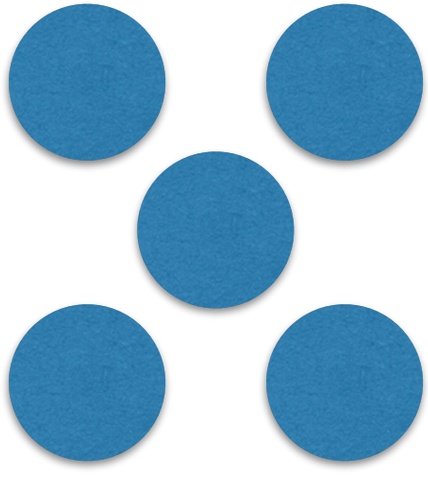

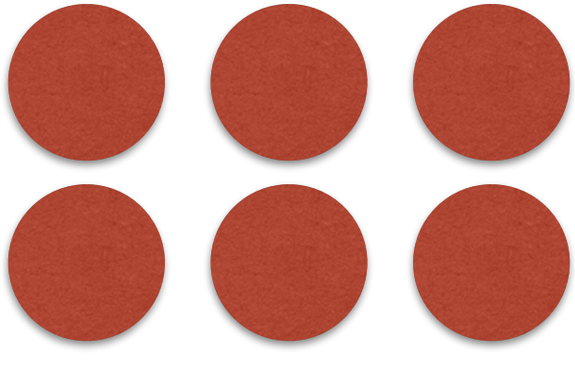

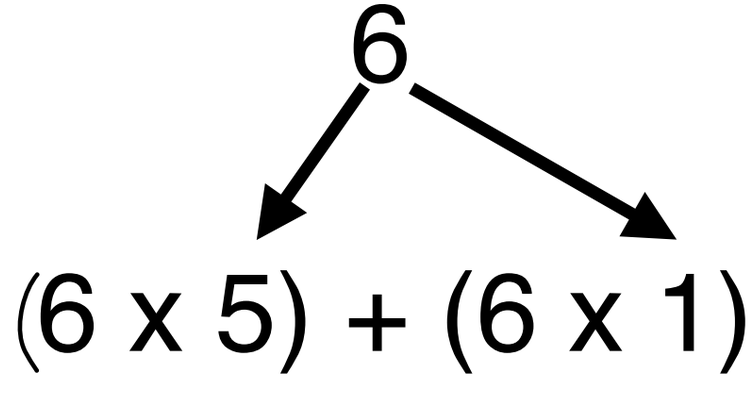
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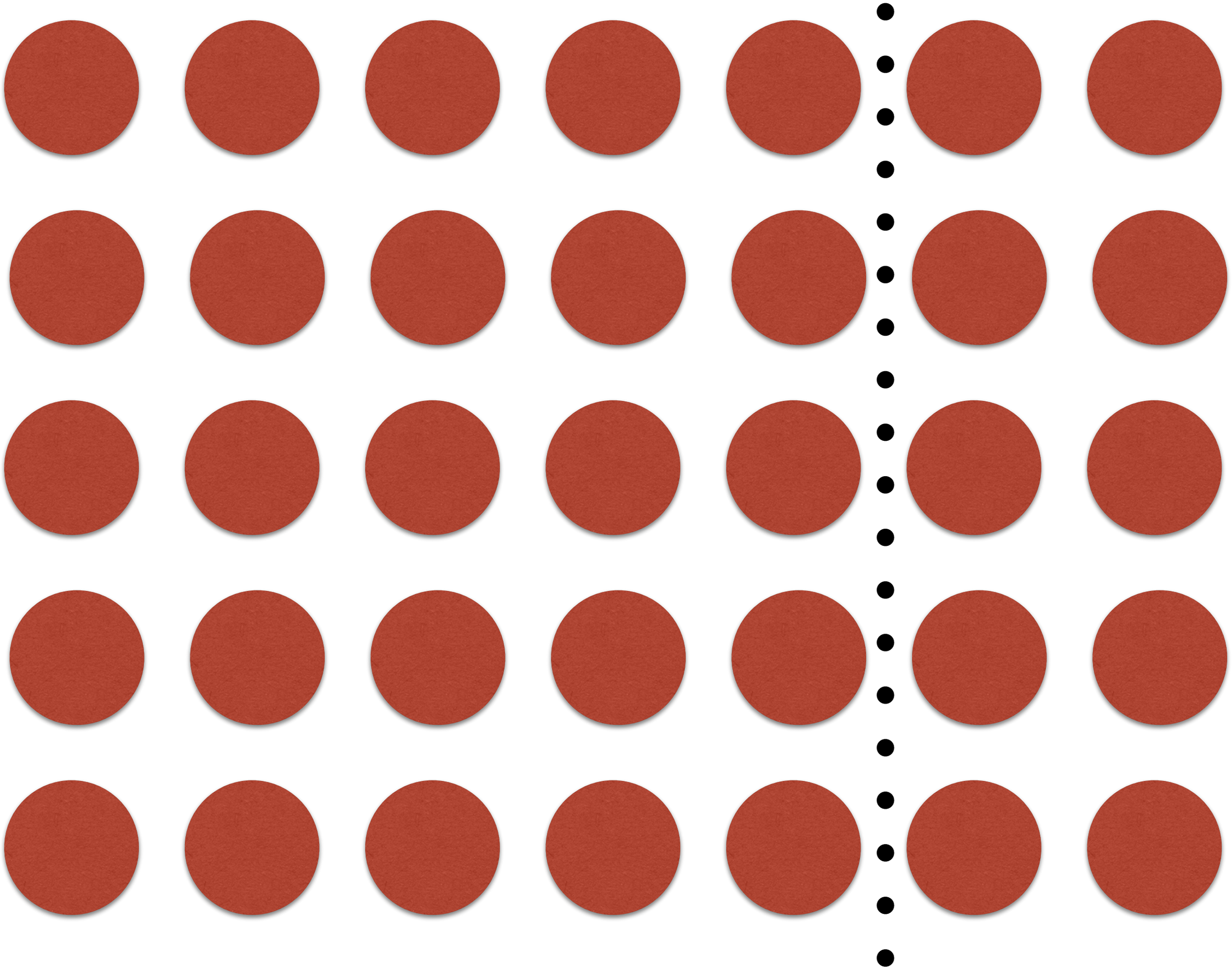

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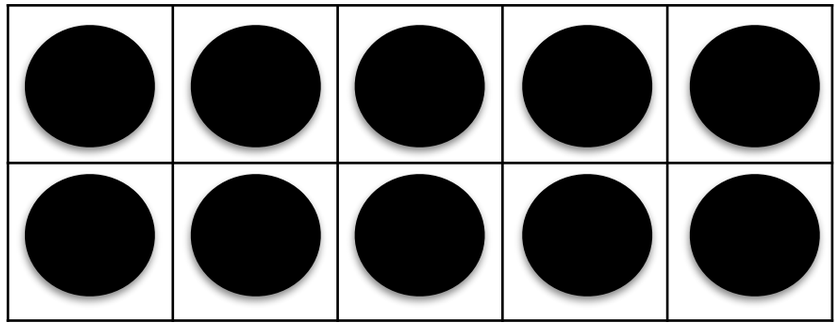
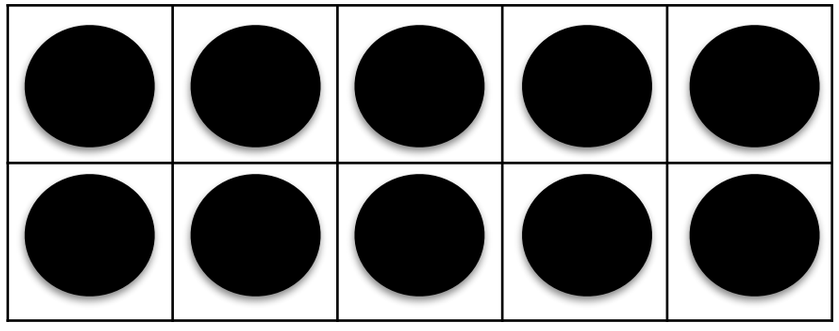
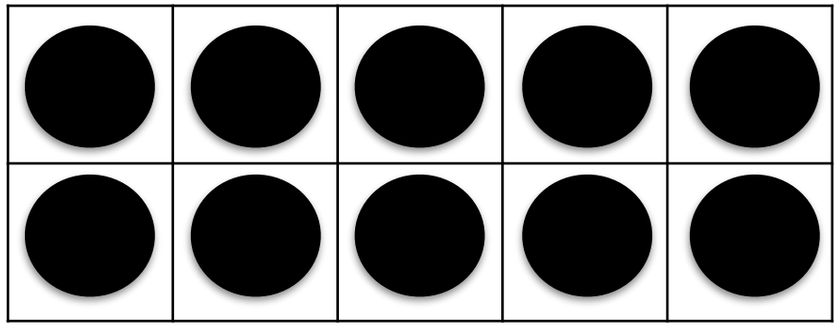
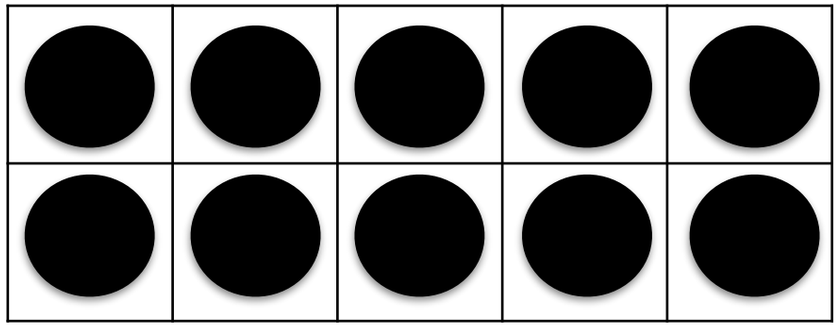
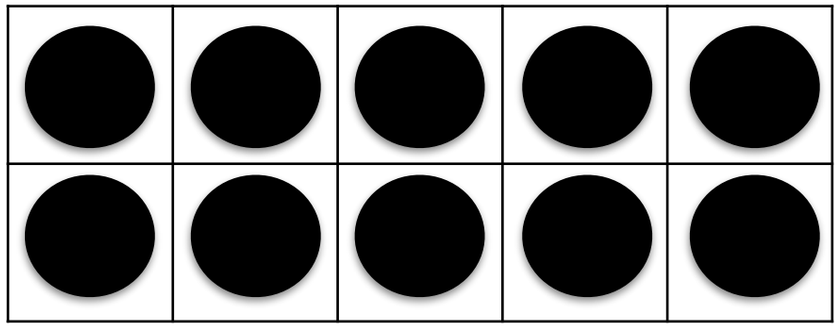
How did you see them?

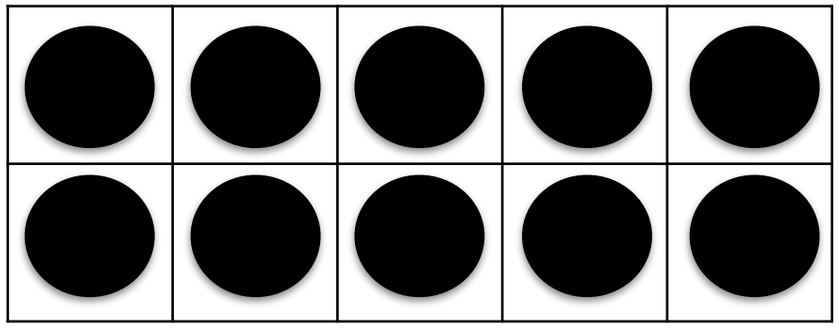


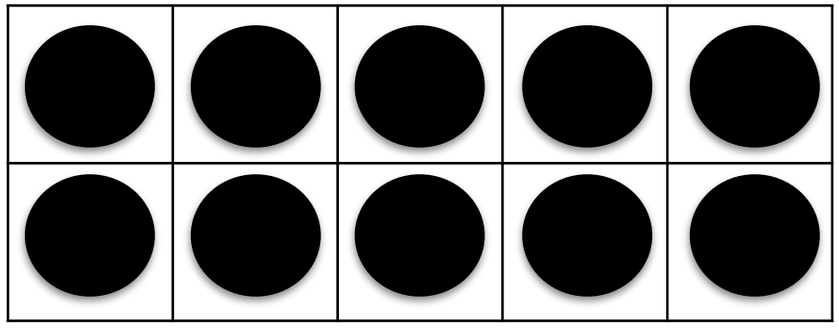


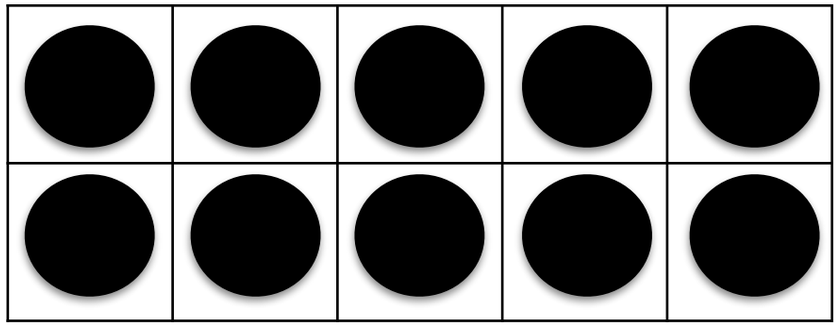












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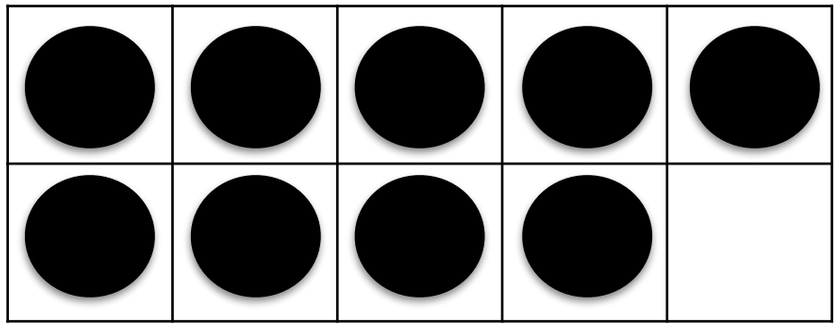
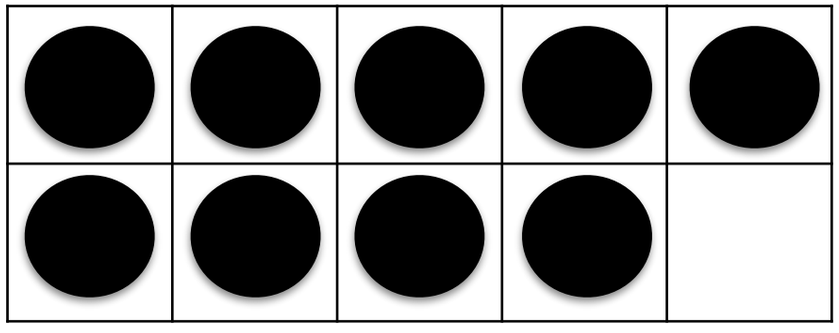
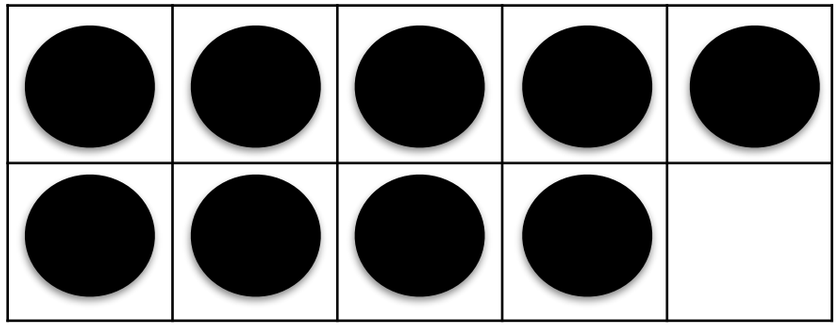
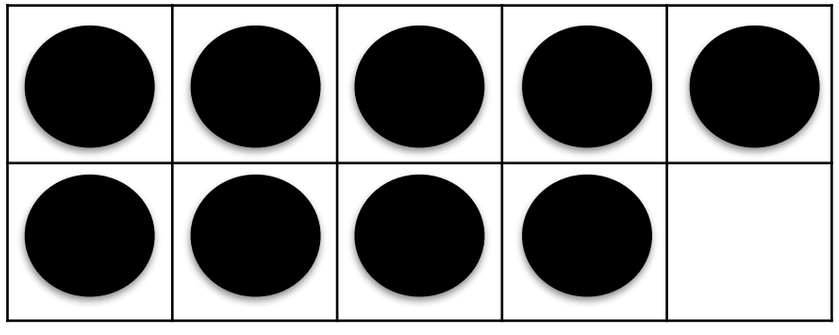
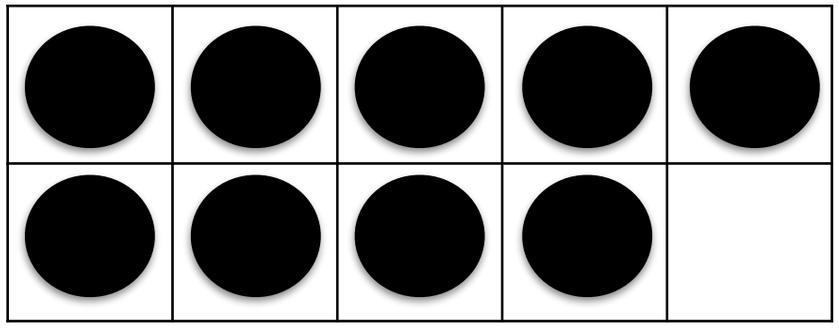
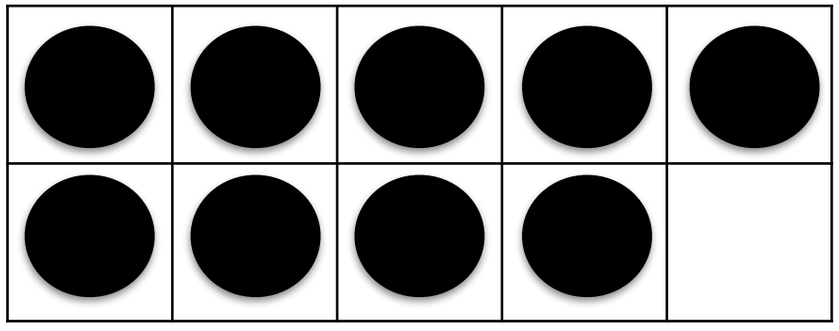


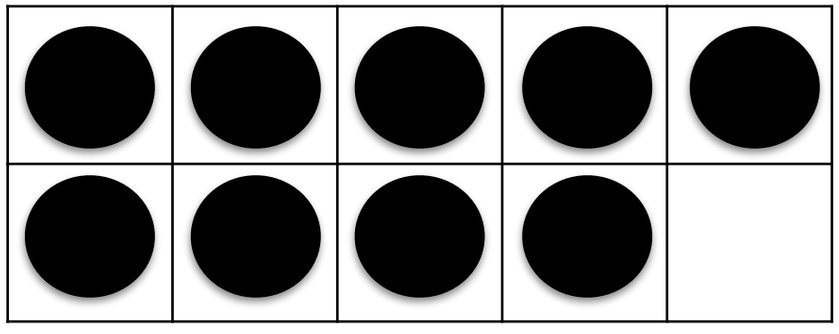


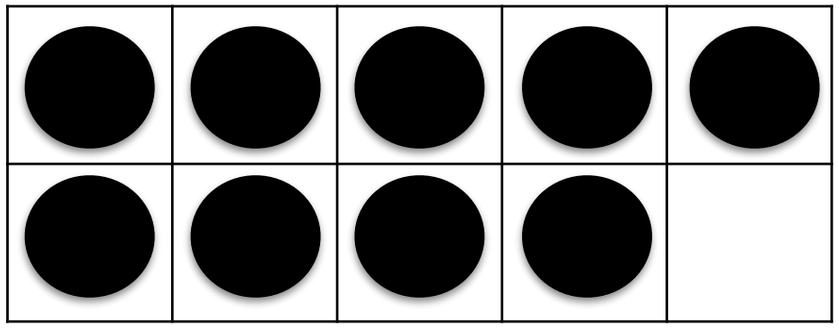


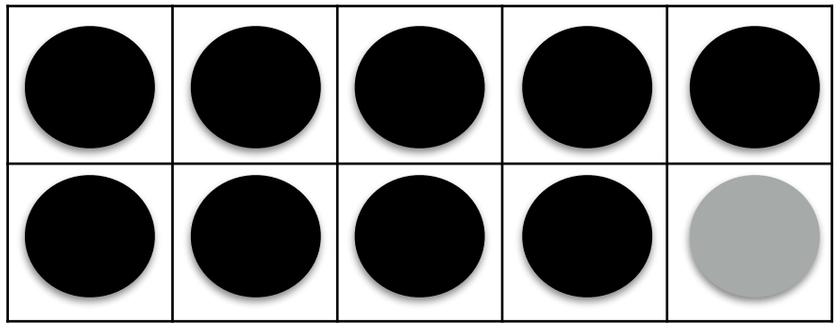


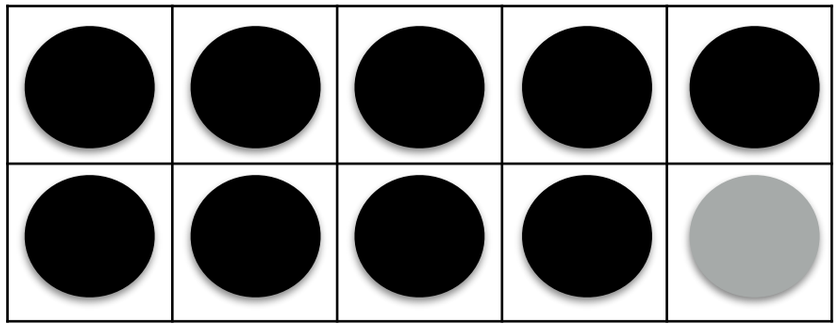


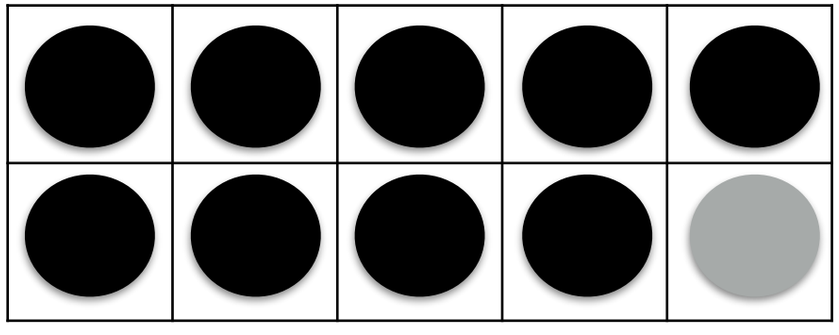


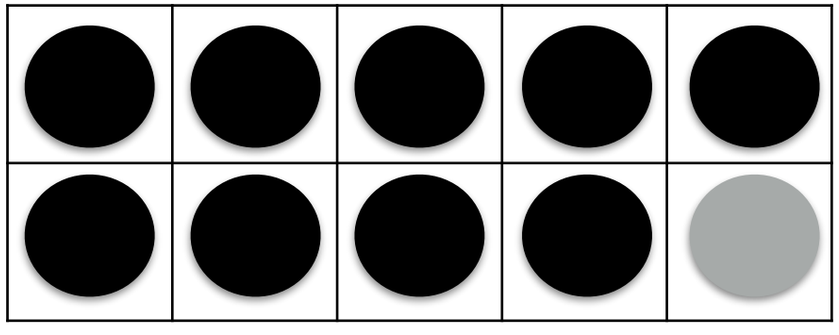


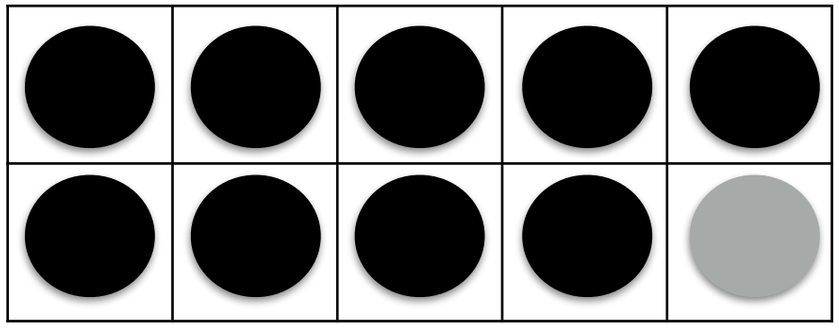


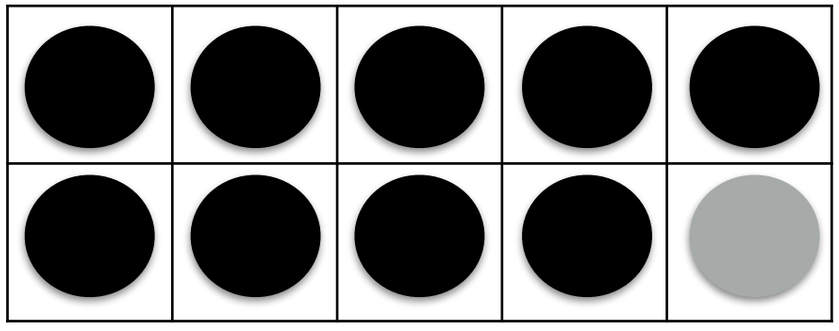


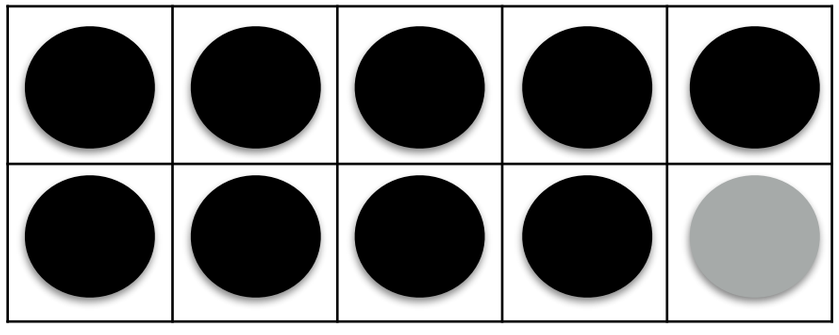


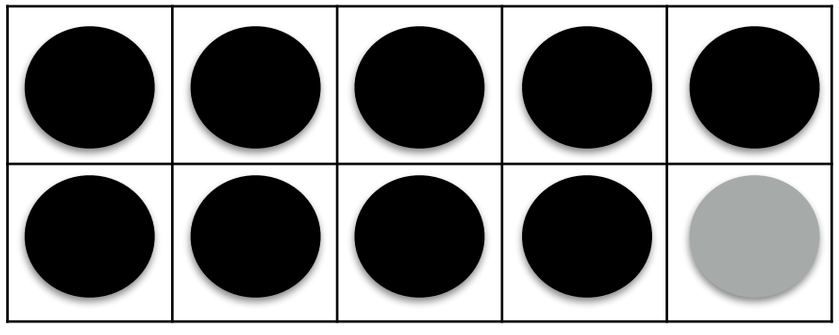


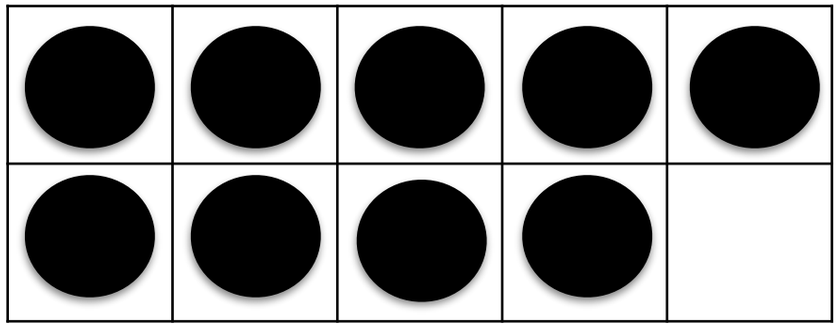
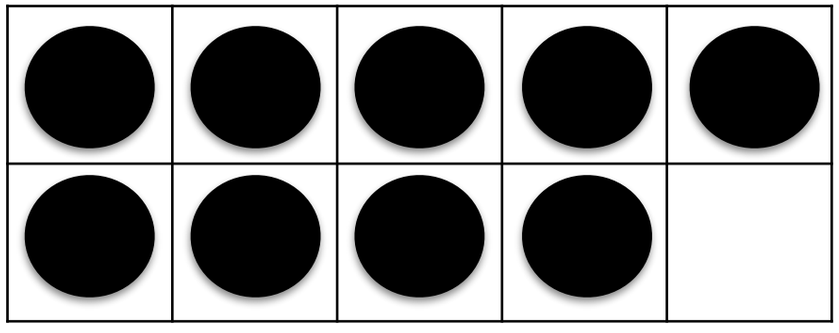
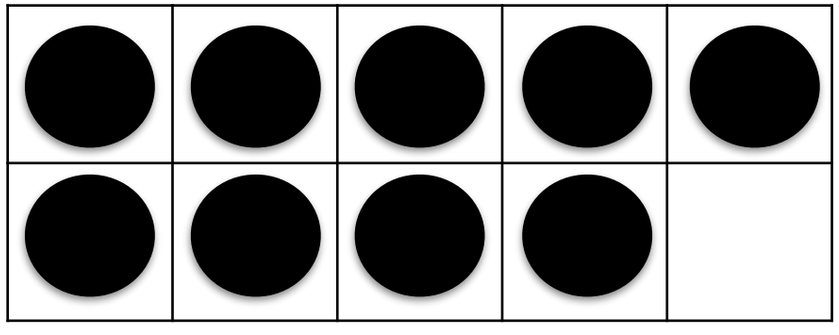
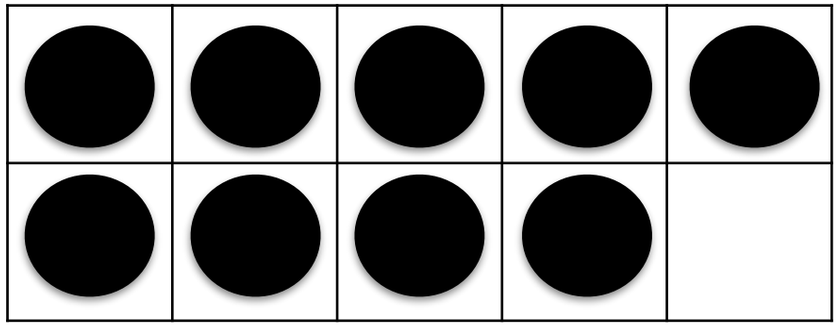
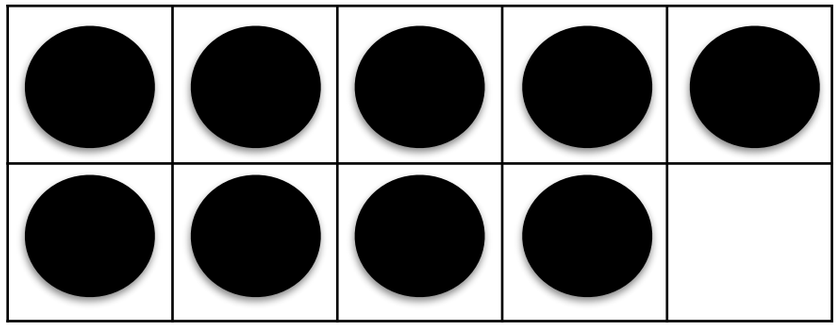
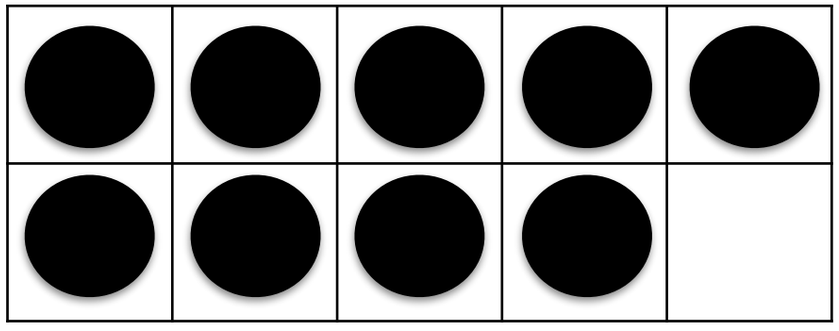
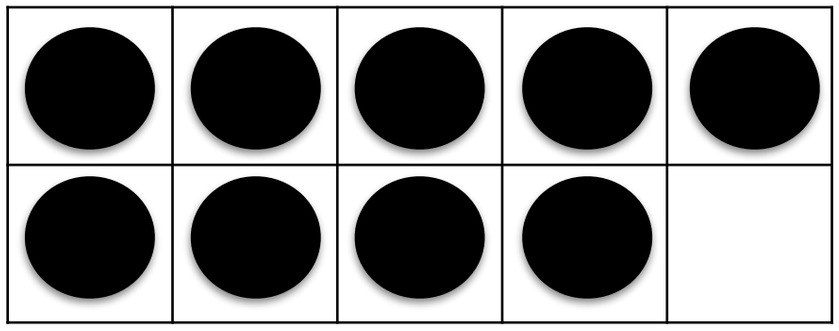
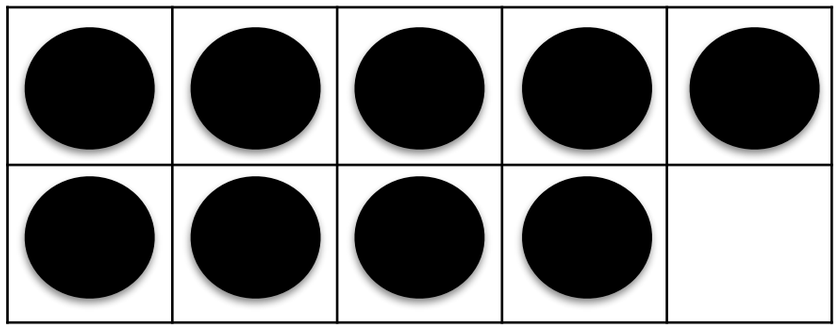




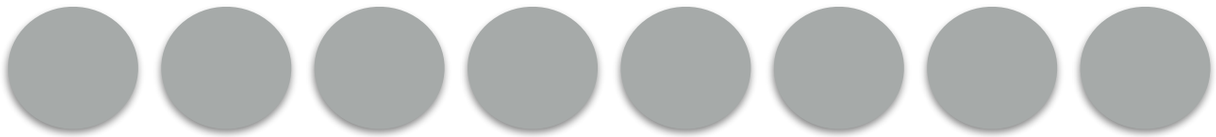


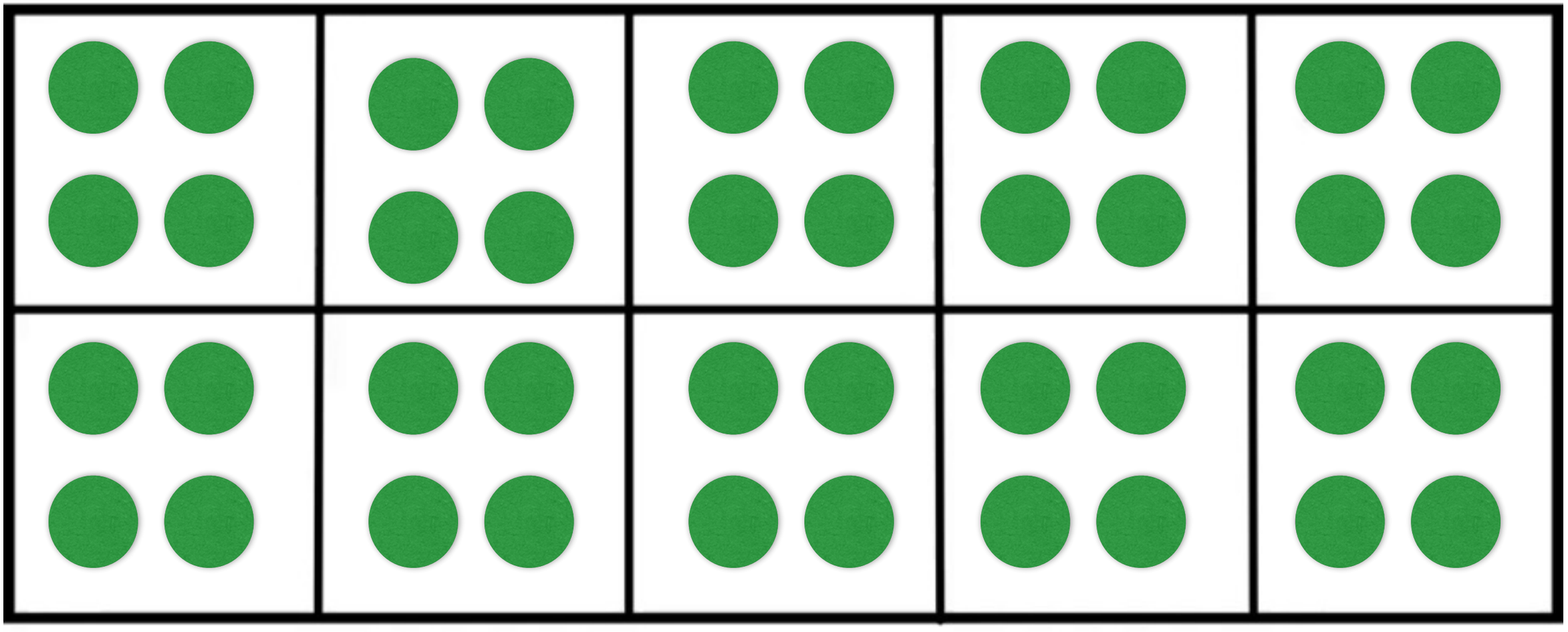




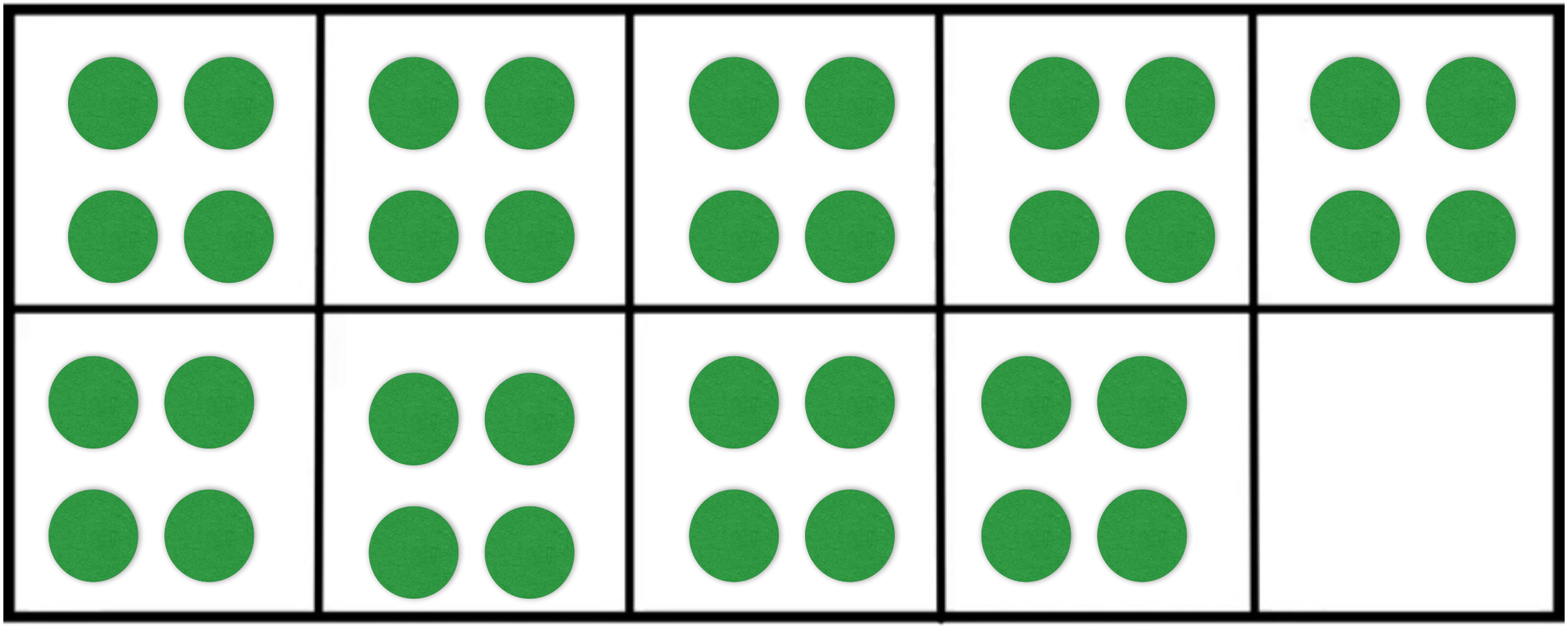
(8 x 10) - 8 = 72





How many?

How did you see them?



How does thinking about the first
image we saw help us
with this new image?

Number Talks

Learning Intentions:

- develop multiple strategies for Decomposing (Mental Math)
- developing flexibility through use of multiple strategies
- Computational Fluency
- Place Value

10 - 15 minutes focussed on one question or a "string" of questions

18 + 7 =

6 x 600
10 x 600
16 x 600
16 x 599

Two-digit x Two-digit example

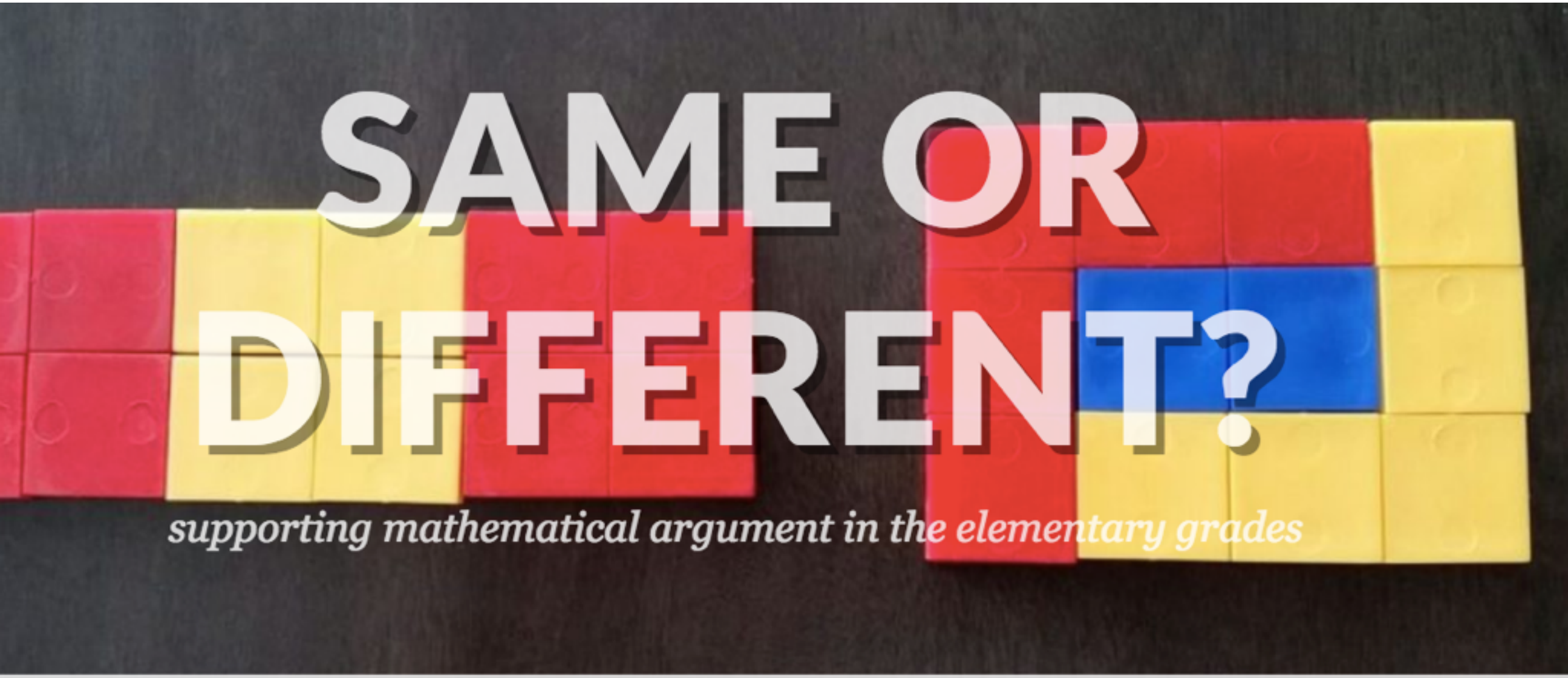
- https://www.teachingchannel.org/videos/4th-5th-grade-number-talks

SAME AND DIFFERENT

What's the learning?:

- identifying relationships between objects, shapes, and numbers
- using reasoning to construct arguments when comparing objects, shapes, and numbers
- develop their ability to communicate mathematical ideas

What is the same?
What is different?



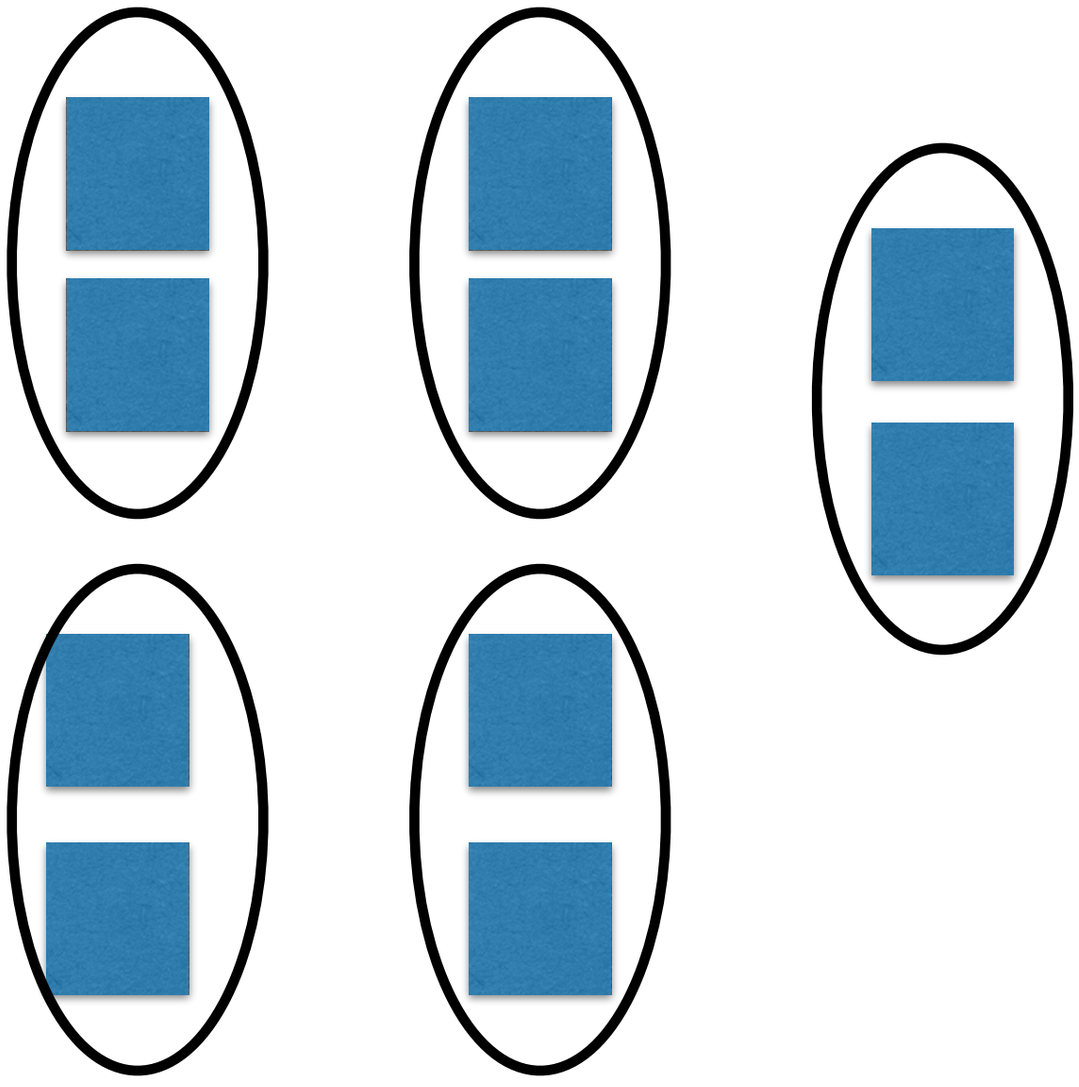
HOME VIDEOS CONTRIBUTORS ABOUT

https://samedifferentimages.wordpress.com/

Website curated by Brian Bushart et al.

#samedifferent

TRUE OR FALSE



= 5 x 2

TRUE OR FALSE

$$3 + 3 + 3 = 4 \times 3$$

TRUE OR FALSE

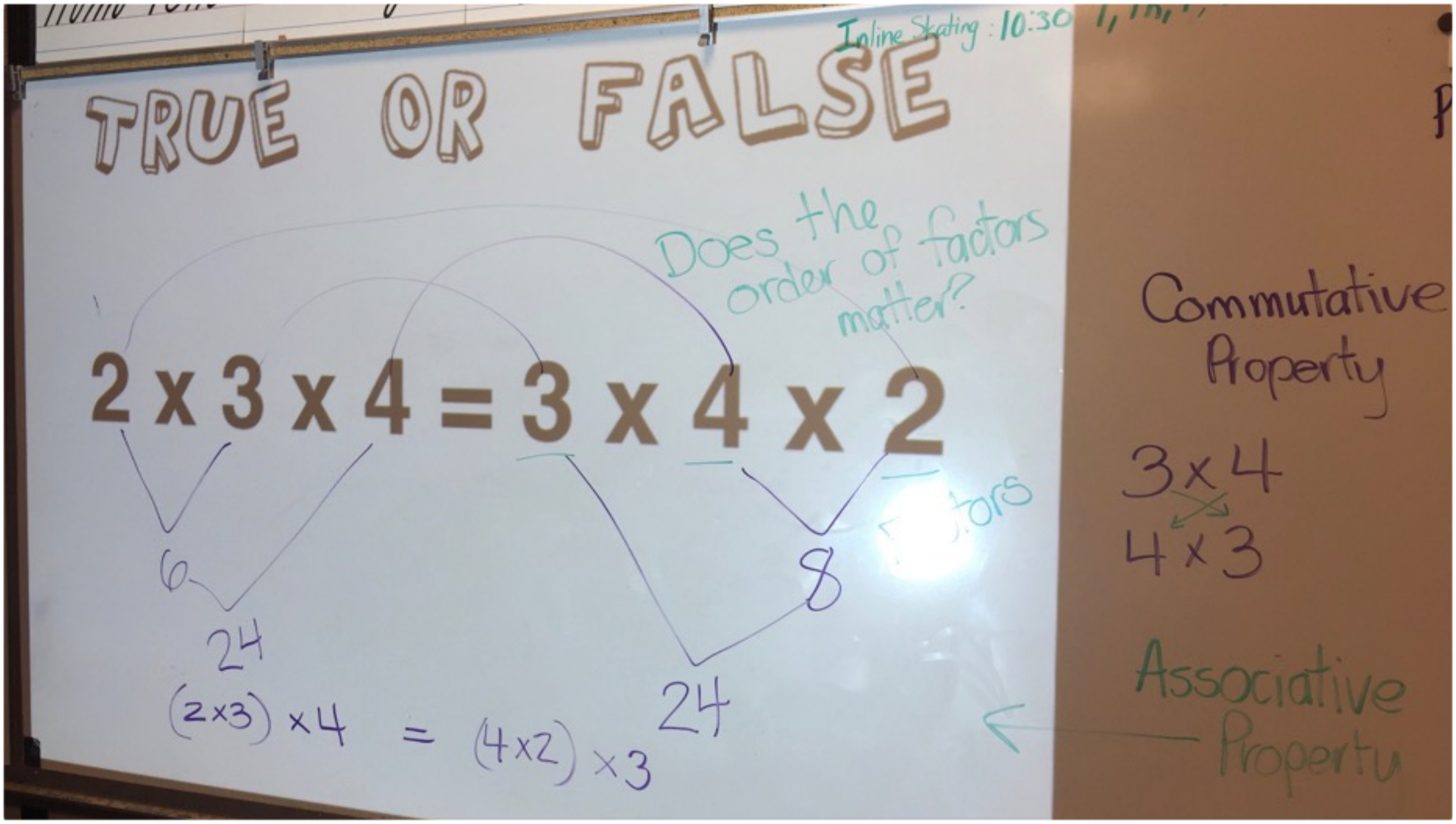
= 4 x 5

TRUE OR FALSE

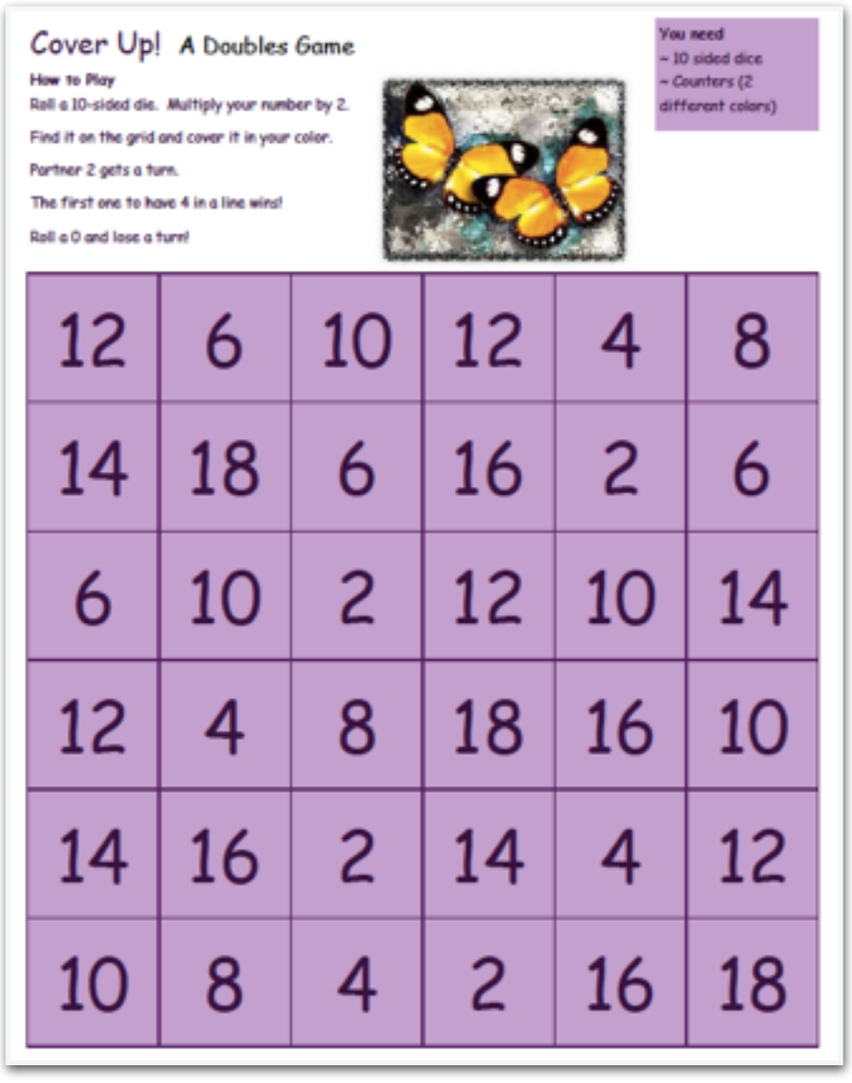
$$2 \times 3 \times 4 = 3 \times 4 \times 2$$

TRUE OR FALSE

$$4 \times 4 = 2 \times 8$$


Inline Skating : 10:30
TRUE OR FALSE
Does the order of factors matter?
2 x 3 x 4 = 3 x 4 x 2
6
24
8
24
(2x3) x4 = (4x2) x3
Commutative Property
3x4
4x3
Associative Property

Multiplication Games



Cover Up! A Doubles Game

You need
- 10 sided dice
- Counters (2 different colors)

How to Play

Roll a 10-sided die. Multiply your number by 2.

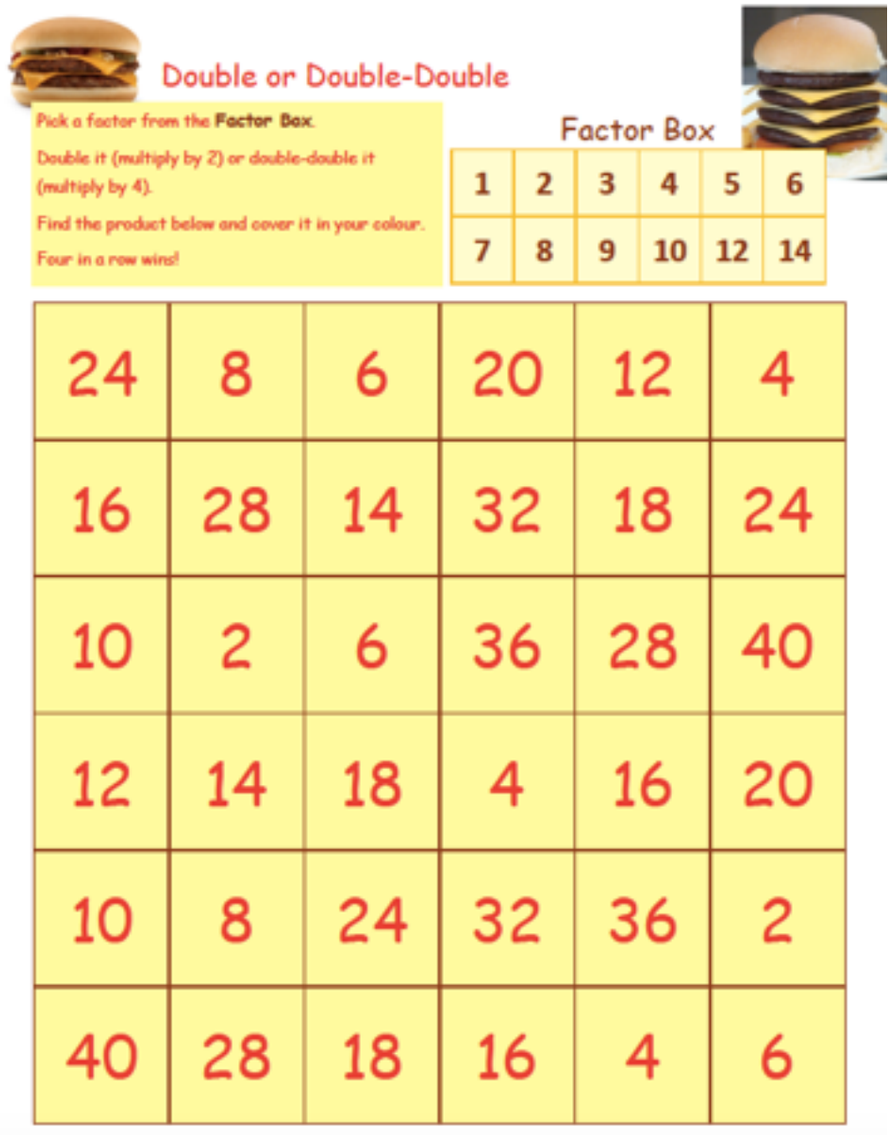
Find it on the grid and cover it in your color.

Partner 2 gets a turn.

The first one to have 4 in a line wins!

Roll a 0 and lose a turn!

12	6	10	12	4	8
14	18	6	16	2	6
6	10	2	12	10	14
12	4	8	18	16	10
14	16	2	14	4	12
10	8	4	2	16	18



Double or Double-Double

Pick a factor from the **Factor Box**.

Double it (multiply by 2) or double-double it (multiply by 4).

Find the product below and cover it in your colour.

Four in a row wins!

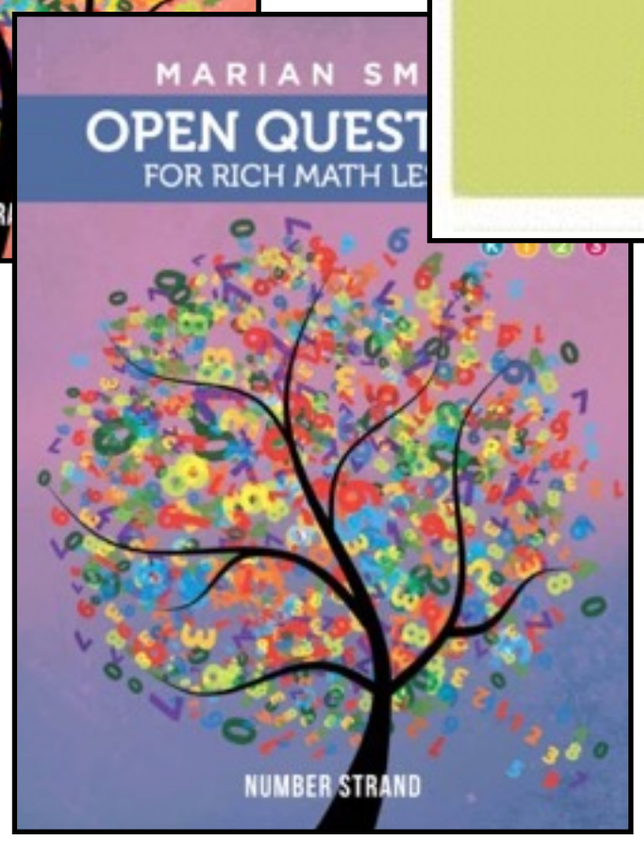
Factor Box

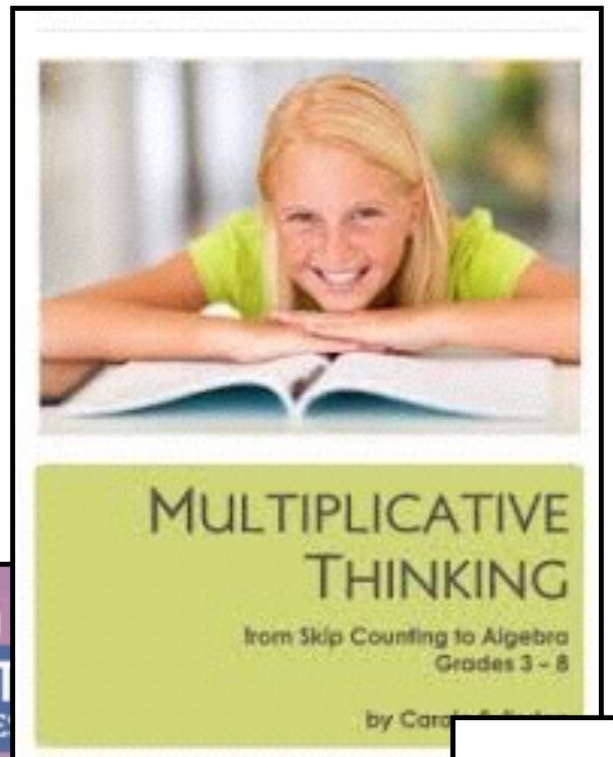
1	2	3	4	5	6
7	8	9	10	12	14

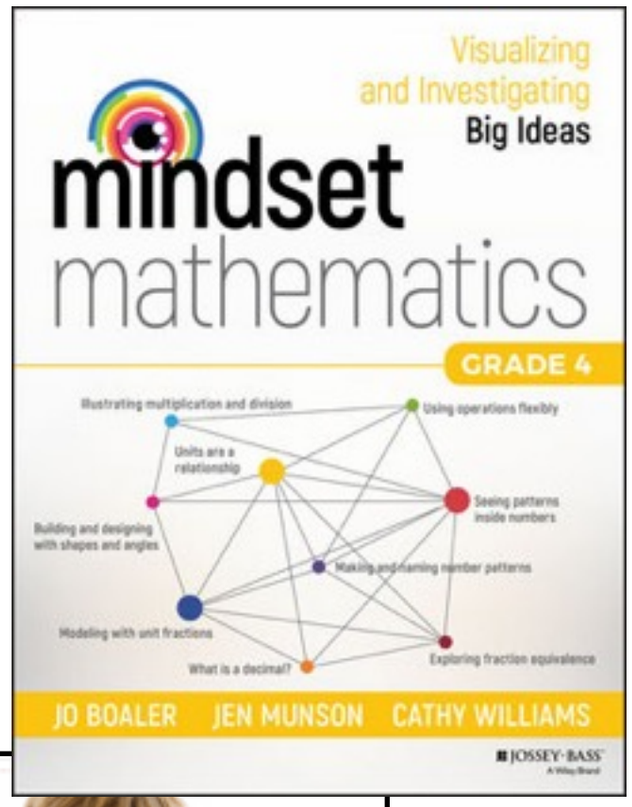
24	8	6	20	12	4
16	28	14	32	18	24
10	2	6	36	28	40
12	14	18	4	16	20
10	8	24	32	36	2
40	28	18	16	4	6

See handout for links to many different multiplication games!

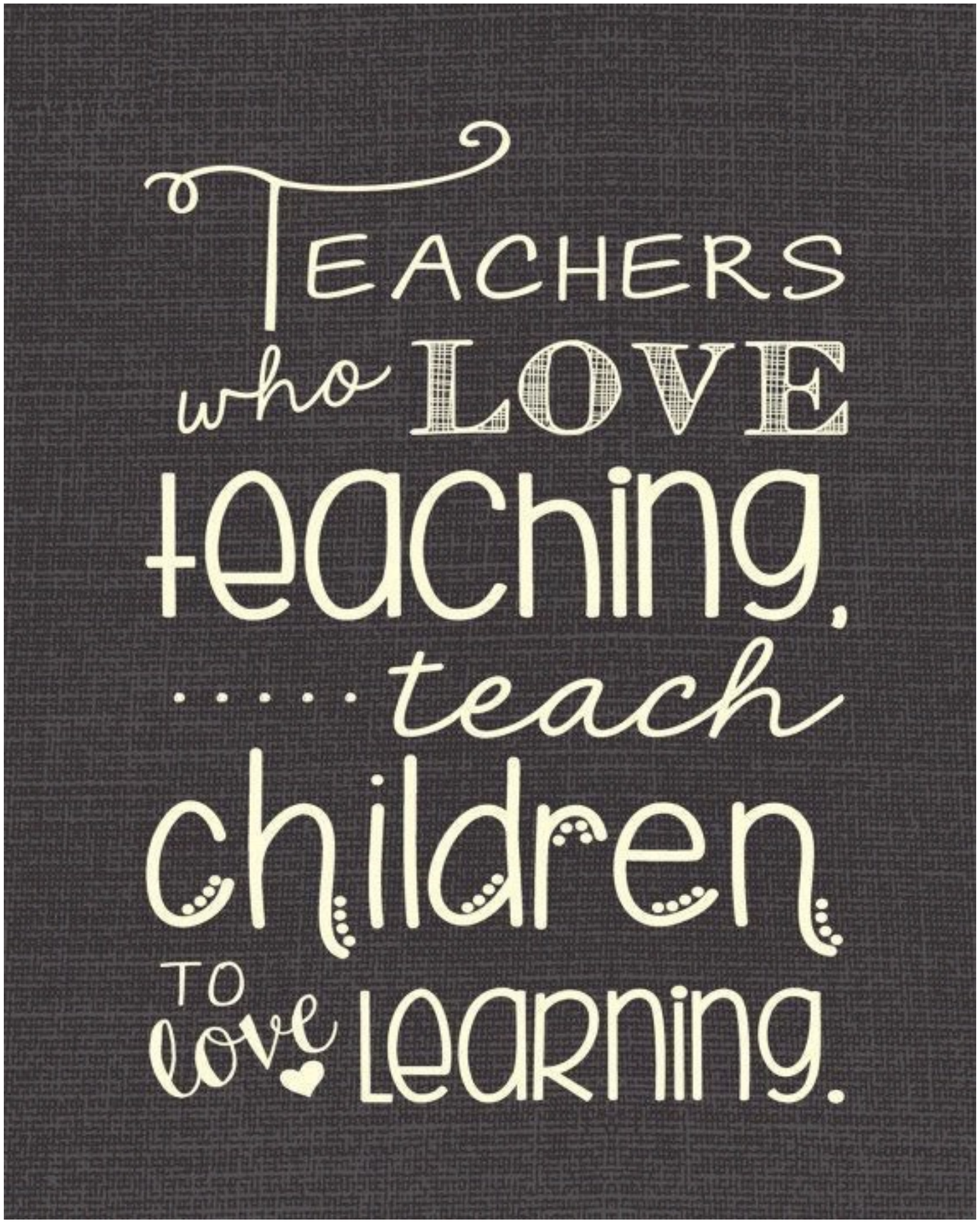
Key Resources:







Fair Shares: Teaching Division in Grades 4-7


Teachers
who LOVE
teaching,
.....teach
children
TO
love
learning.