

SD36/STA VIRTUAL FOCUS DAY

FRIDAY, FEBRUARY 25TH

A NEW HOPE: Positive solutions for teaching in a changing world.

Workshops include climate change, anti-racism, inclusion, and Indigenous education as well as curriculum supports for Math, Science and Literacy.



Key note speaker Len Pierre of the Katzie First Nation will be presenting "Decolonizing Education and Institutionalizing Cultural Safety."

**If You Only Knew The Power of Visualizing:
A New Hope for Math Class**

Ally

Andy Emerson (2018)

I belong to the K'ómoks First Nation and we are deep into the British Columbia treaty process. I truly have mixed feelings about our involvement in this. By choosing to engage in the process, we enter a world of consultants and negotiators and other strange, scary and wonderful creatures. We partake in a world of borrowing and debt; of meetings and fights. We enter without knowing whether we are journeying into the dark side or are on a path towards the light.

What I do know is that under the treaty process, our community has begun to fracture. Our very future as a people is at stake. Will treaty define who we are or will our culture do that? Will treaty lead us to form a "Treaty Empire" or a "Treaty Rebellion"?

When we look around us, we see plenty of people that are



Join a "Treaty Empire" or a "Treaty Rebellion"?

When we look around us, we see plenty of people that are opposed to Indigenous peoples taking up their rights. They believe that we "get too much from the government already" or that we're always "looking for handouts". They believe that by simply saying that we're now on an "equal playing field" that somehow we are. We are not...and the modern Treaty system makes sure of that!

What Indigenous people need are allies—individuals who will use their positions of privilege to speak up for Indigenous peoples. Perhaps more importantly, we also need them to listen to what we have to say and not presume that their positions of privilege or authority somehow negate our voice. Indigenous peoples value our allies from all cultures and walks of life and encourage these friends to walk (or roll) together with us into the future...



Chris Hunter

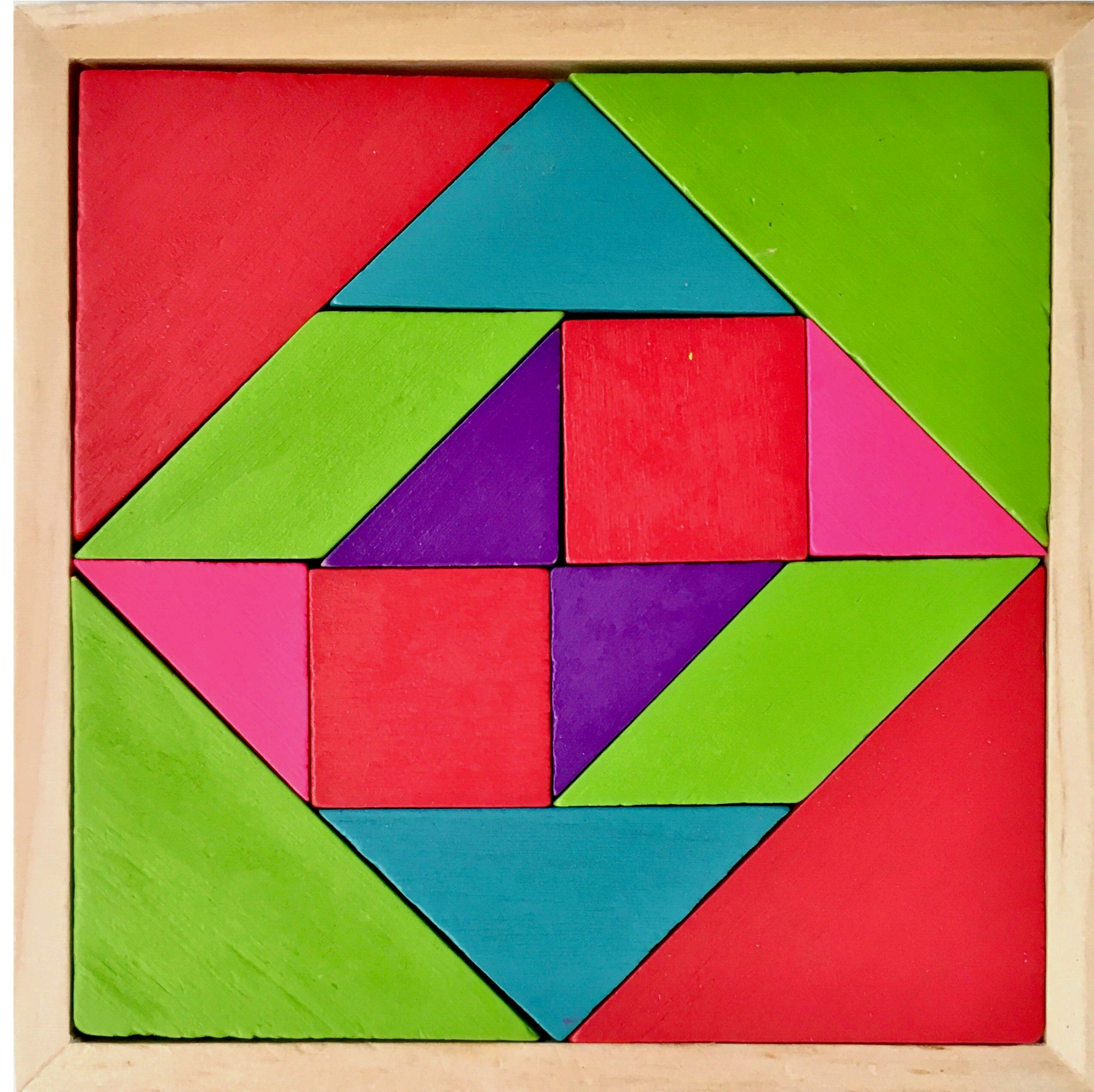
K-12 Numeracy Helping Teacher

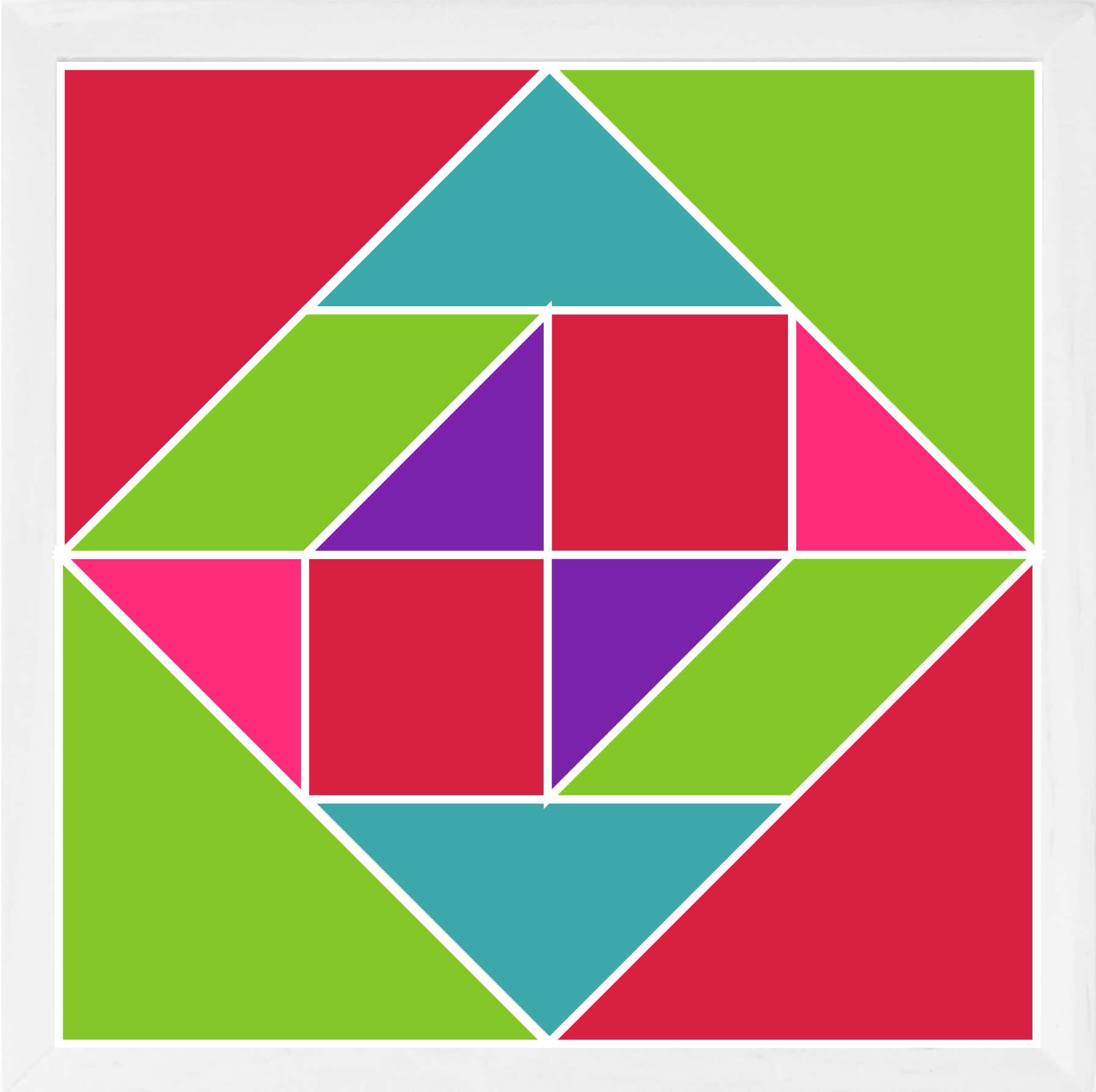
email: hunter_c@surreyschools.ca

Twitter: [@ChrisHunter36](https://twitter.com/ChrisHunter36)

blog: chrishunter.ca

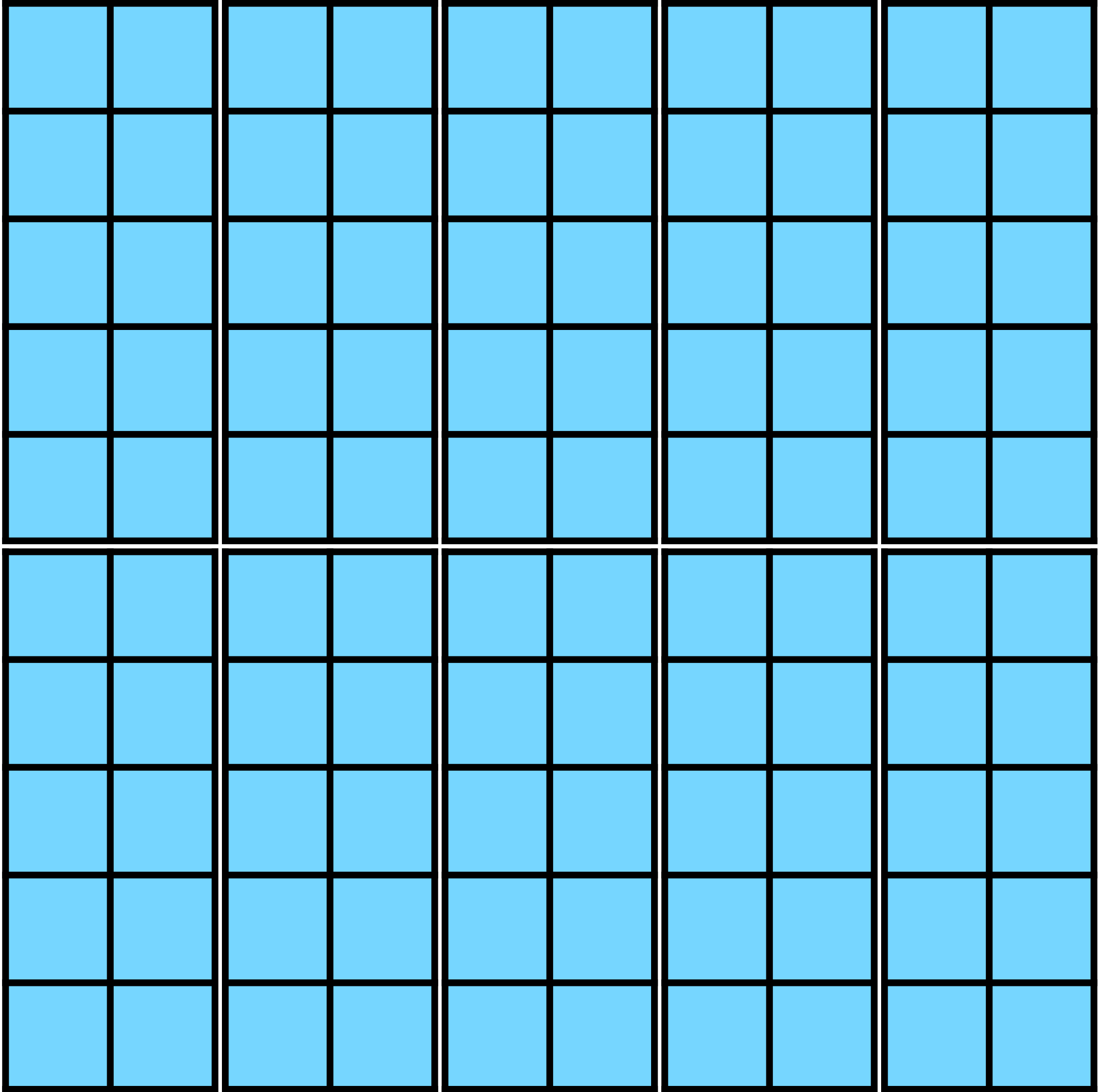


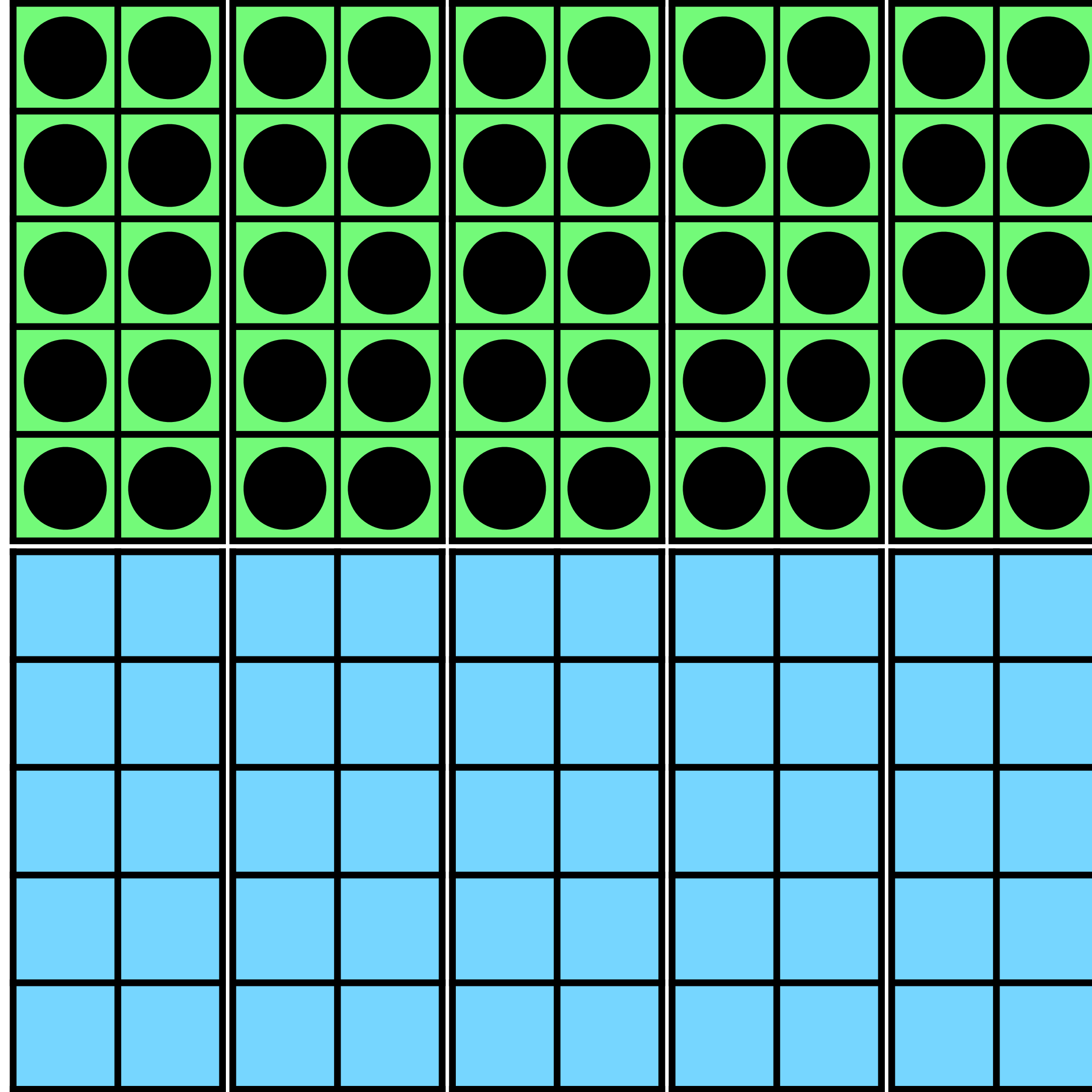






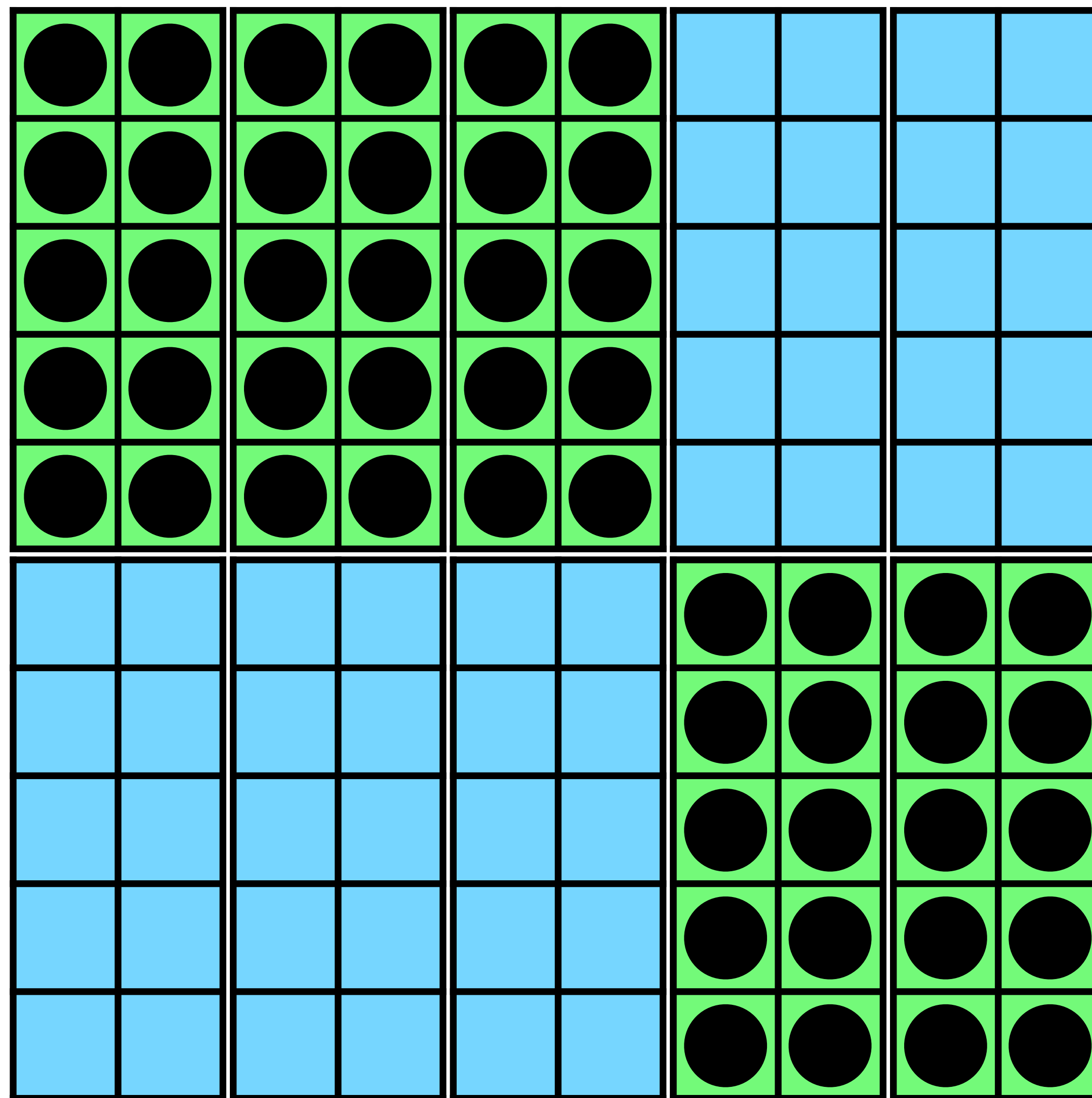






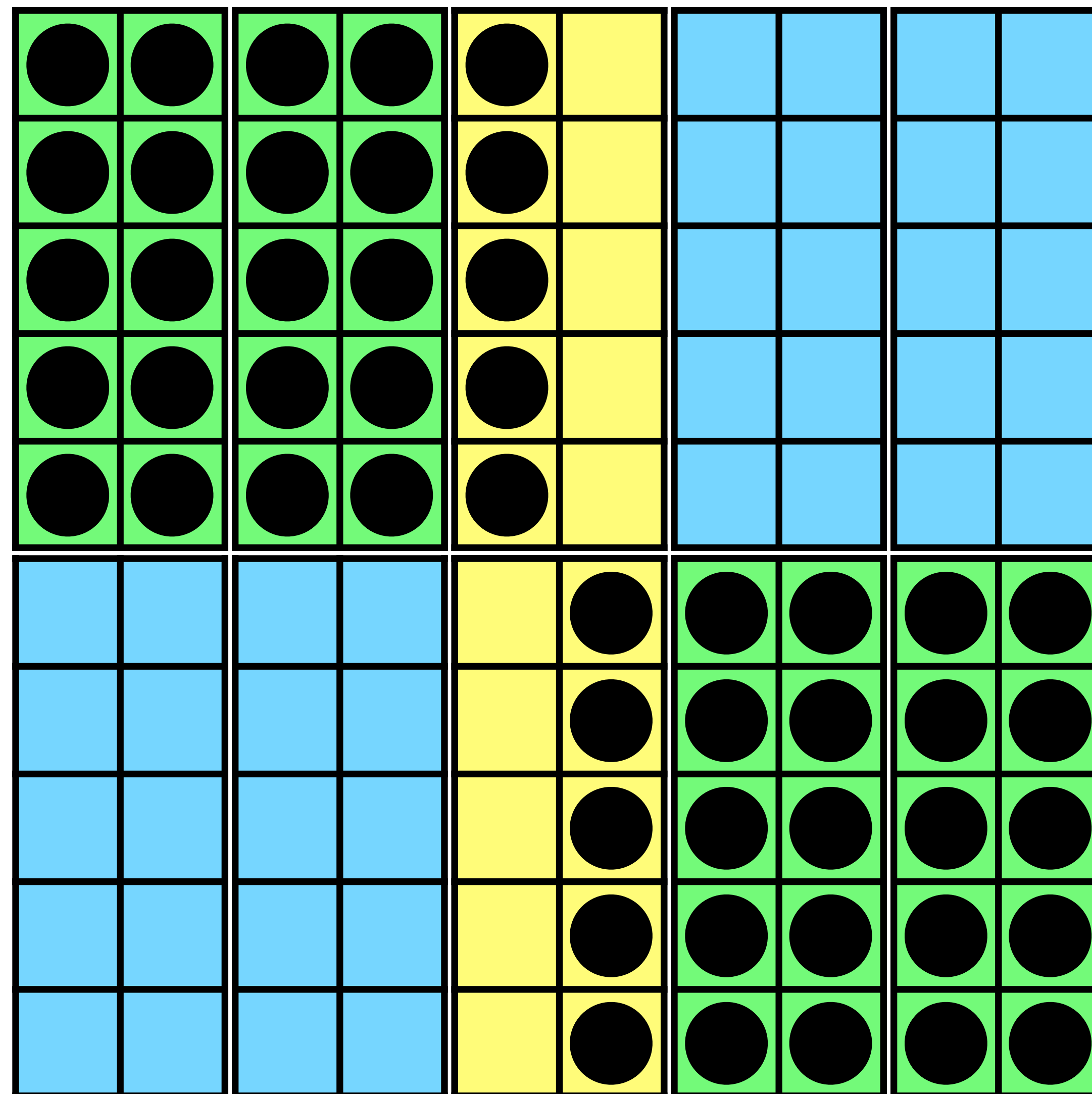
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$$\frac{50}{100} = 0.50$$



$$\frac{5}{10} = 0.5$$

$$\frac{50}{100} = 0.50$$

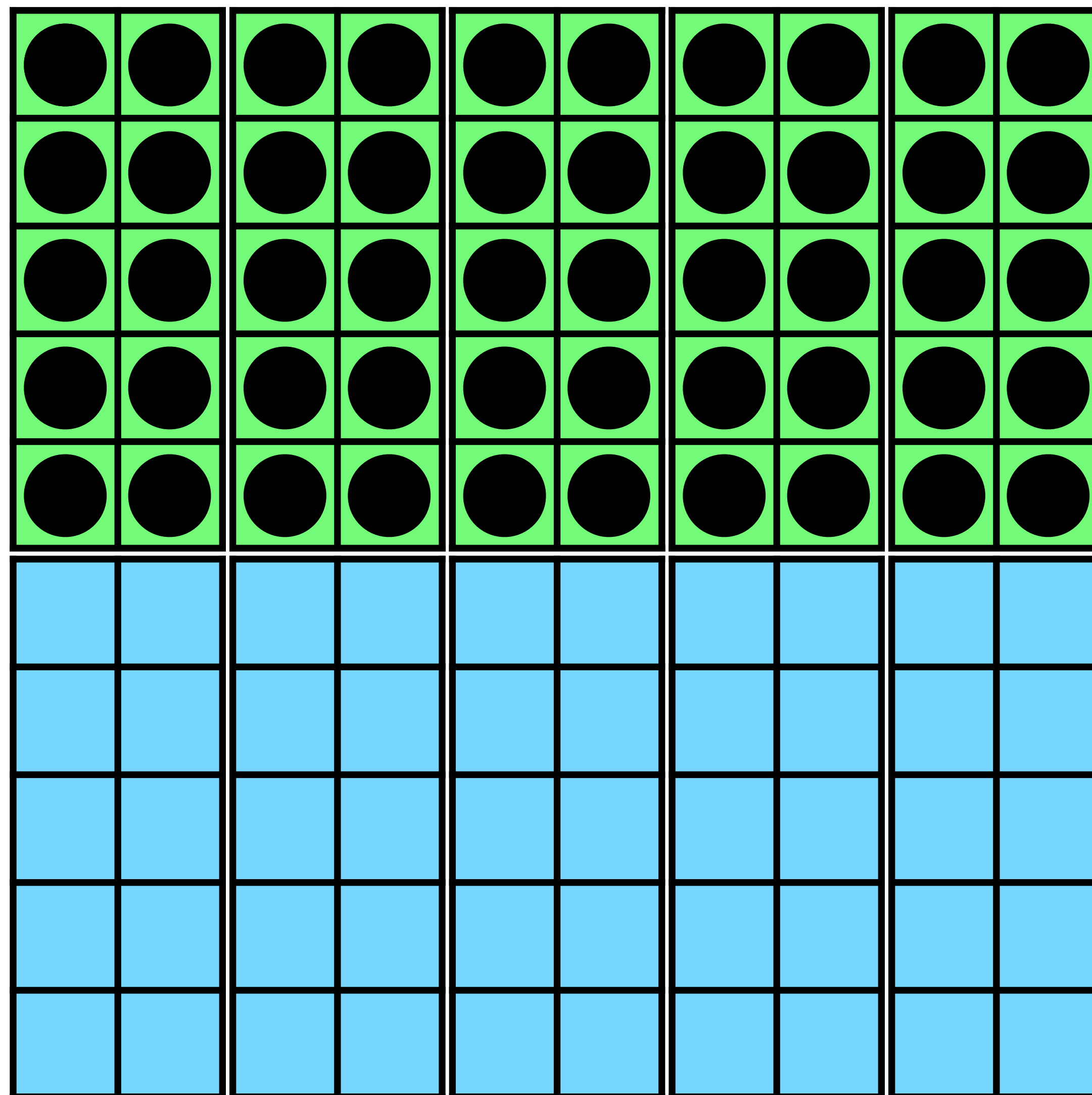


$$\frac{5}{10} = 0.5$$

$$\frac{50}{100} = 0.50$$

$$\frac{2}{4} = 2 \times 0.25$$

$$\frac{10}{20} = 10 \times 0.05$$

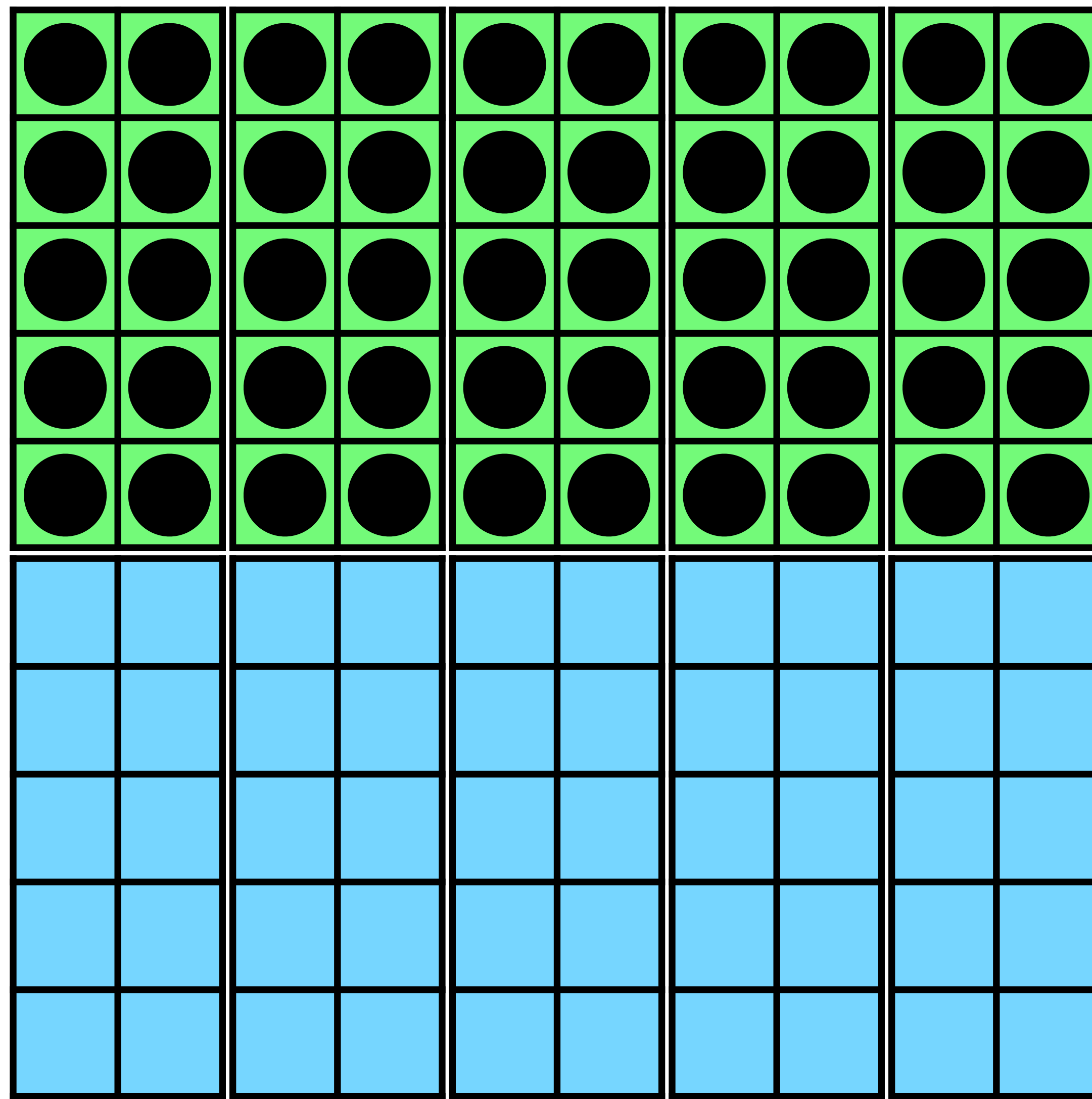
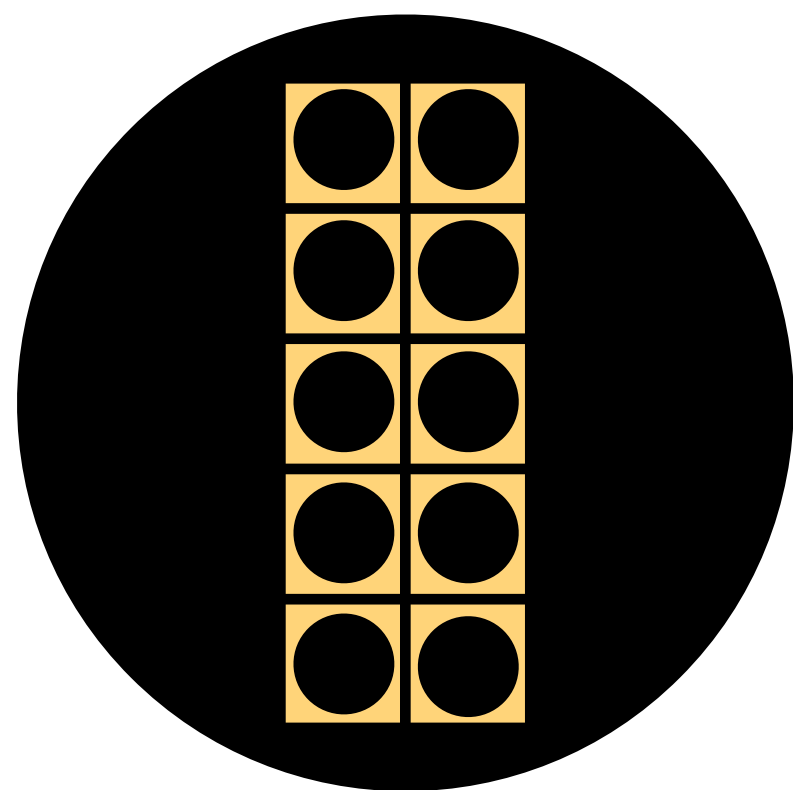


$$\frac{5}{10} = 0.5$$

$$\frac{50}{100} = 0.50$$

$$\frac{2}{4} = 2 \times 0.25$$

$$\frac{10}{20} = 10 \times 0.05$$



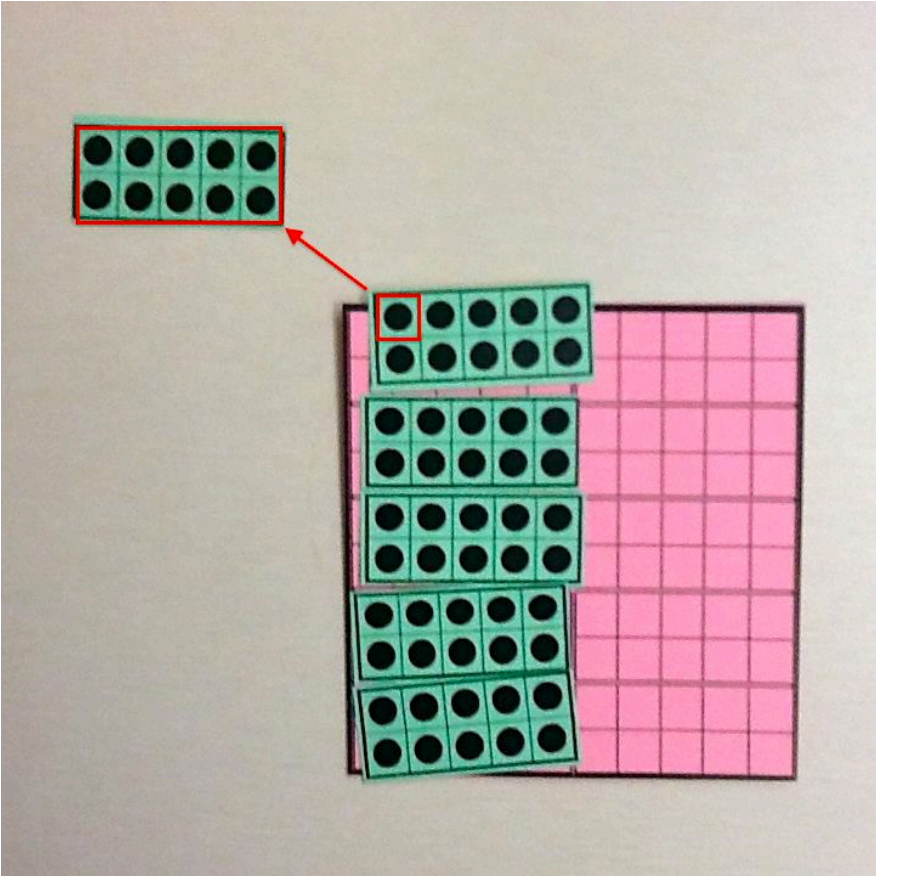
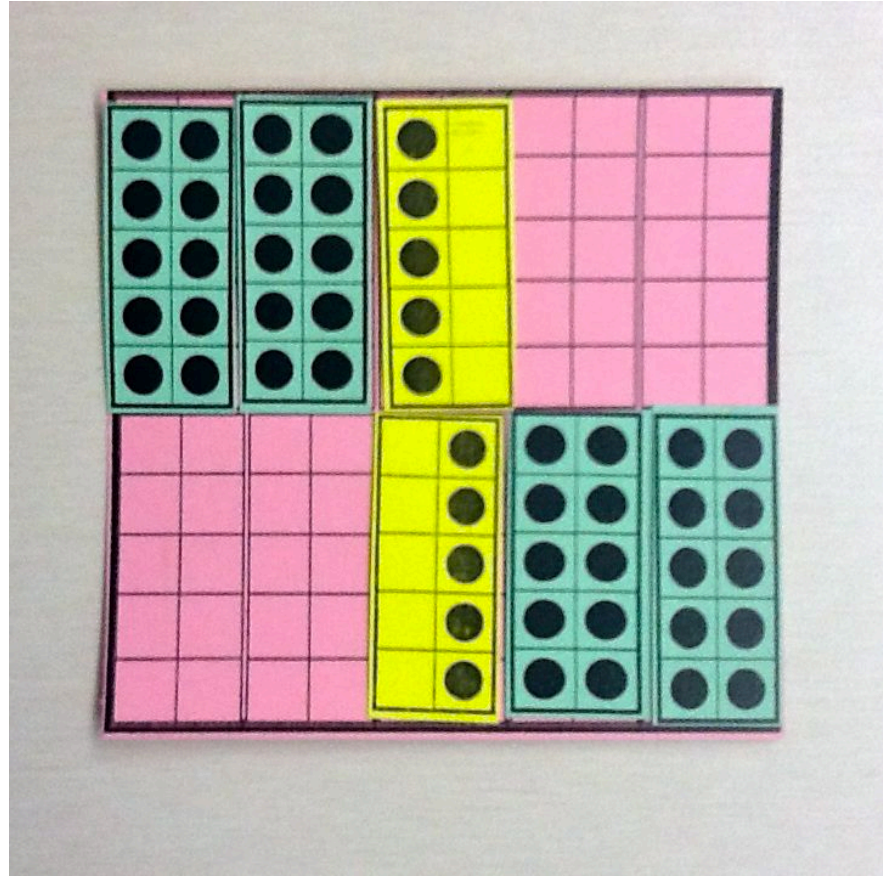
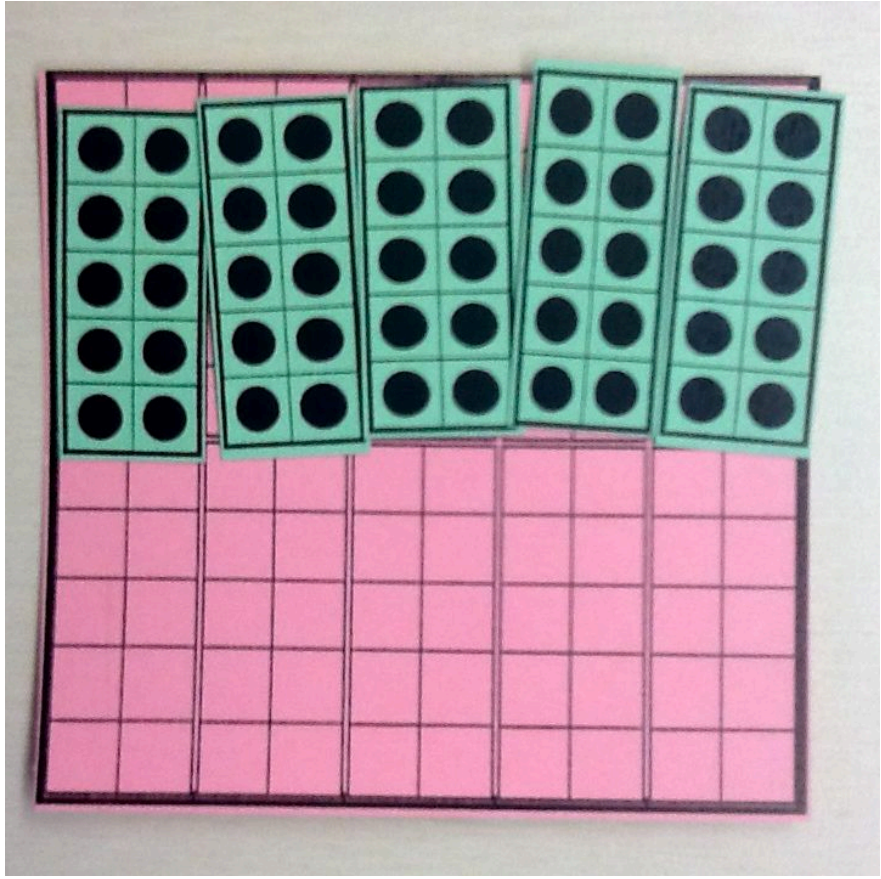
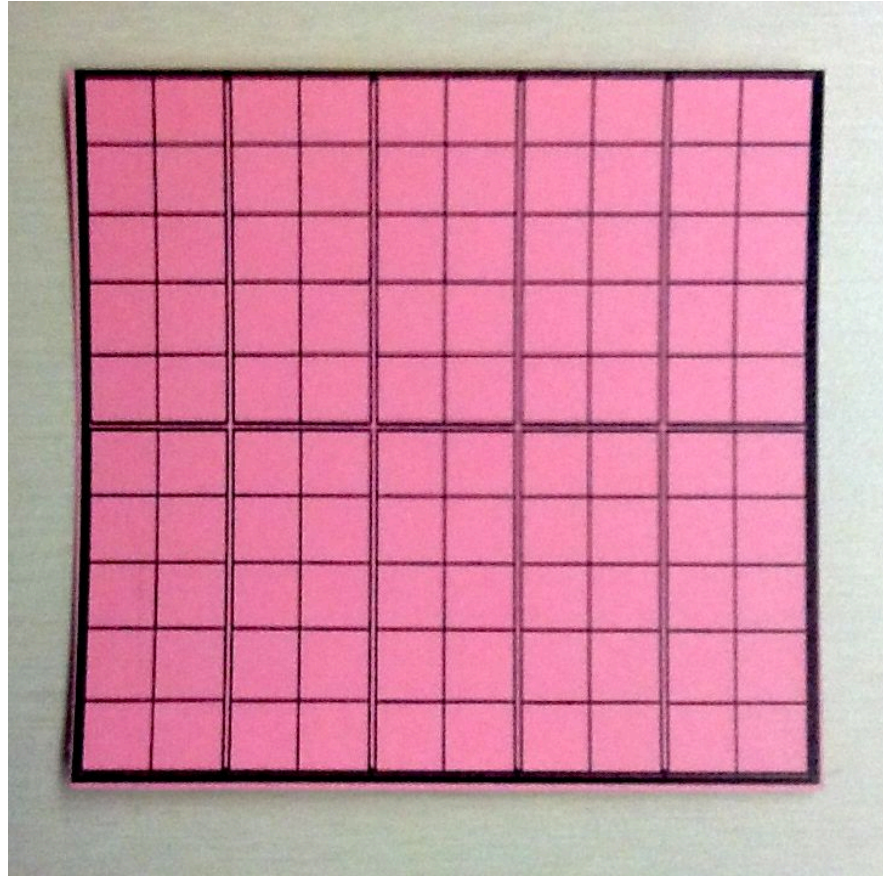
$$\frac{5}{10} = 0.5$$


$$\frac{50}{100} = 0.50$$

$$\frac{2}{4} = 2 \times 0.25$$

$$\frac{10}{20} = 10 \times 0.05$$

$$\frac{500}{1000} = 0.500$$



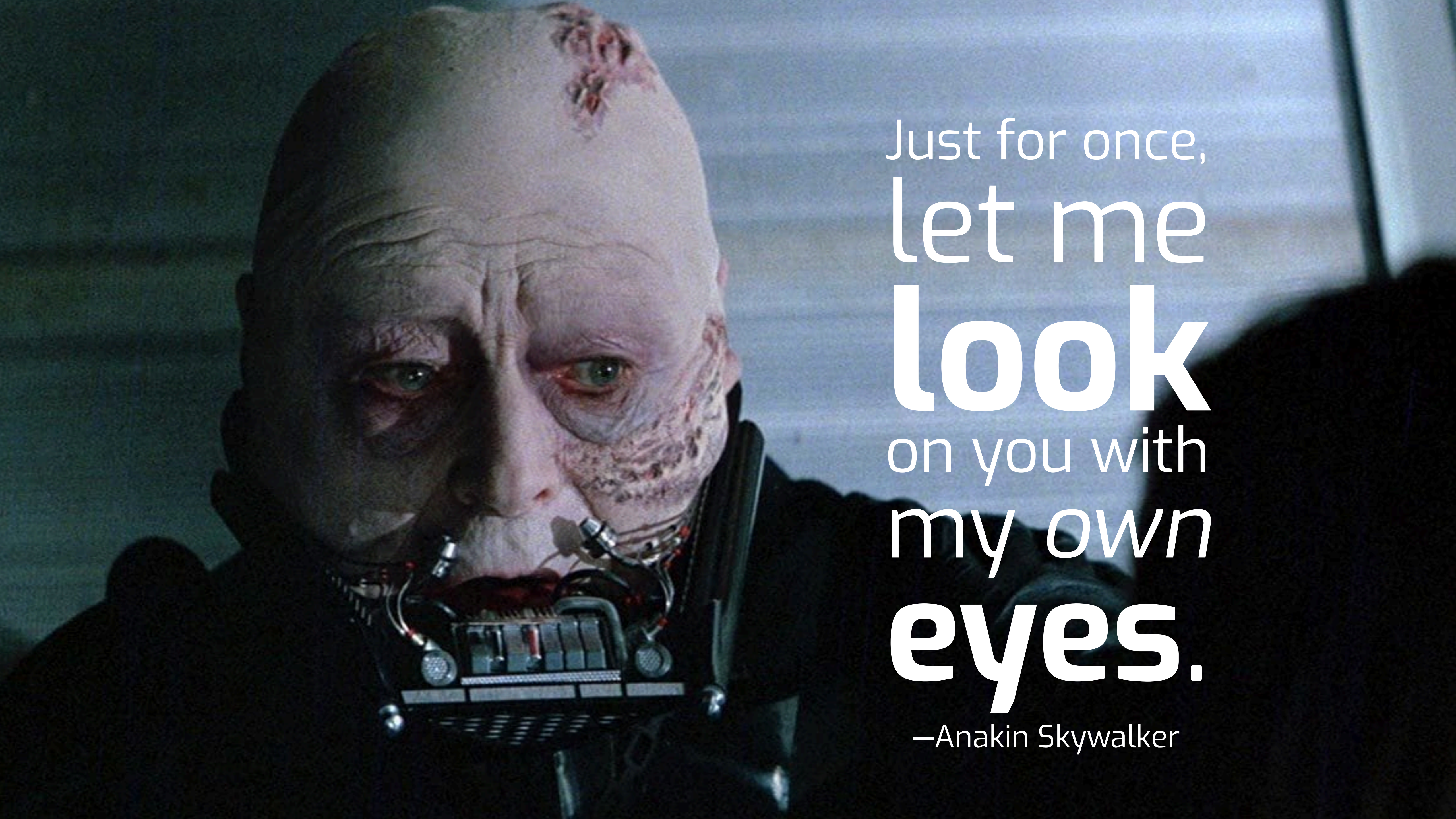
A scene from Star Wars: The Clone Wars showing Yoda in the center, looking towards two Jedi Padawans on either side. They are in a dark, circular room with a blue floor and a starry background. Yoda is wearing his characteristic green robes and has his hands clasped. The Padawans are wearing blue helmets and robes. The text "Truly wonderful, the mind of a child is." is overlaid on the right side of the image.

Truly
wonderful,
the mind of
a child is.

—Yoda


Visualization (WNCP) is the process of **thinking in images** to compose, decompose, or transform mathematical concepts.

Van de Walle et al., 2018, p. 7



Just for once,
let me
look
on you with
my own
eyes.

—Anakin Skywalker

A close-up shot of Obi-Wan Kenobi, an older man with a white beard and a brown hood, looking down with a slight smile at a young boy with long brown hair. In the background, the blue and silver head of a droid is visible. The scene is set in a sandy, desert-like environment.

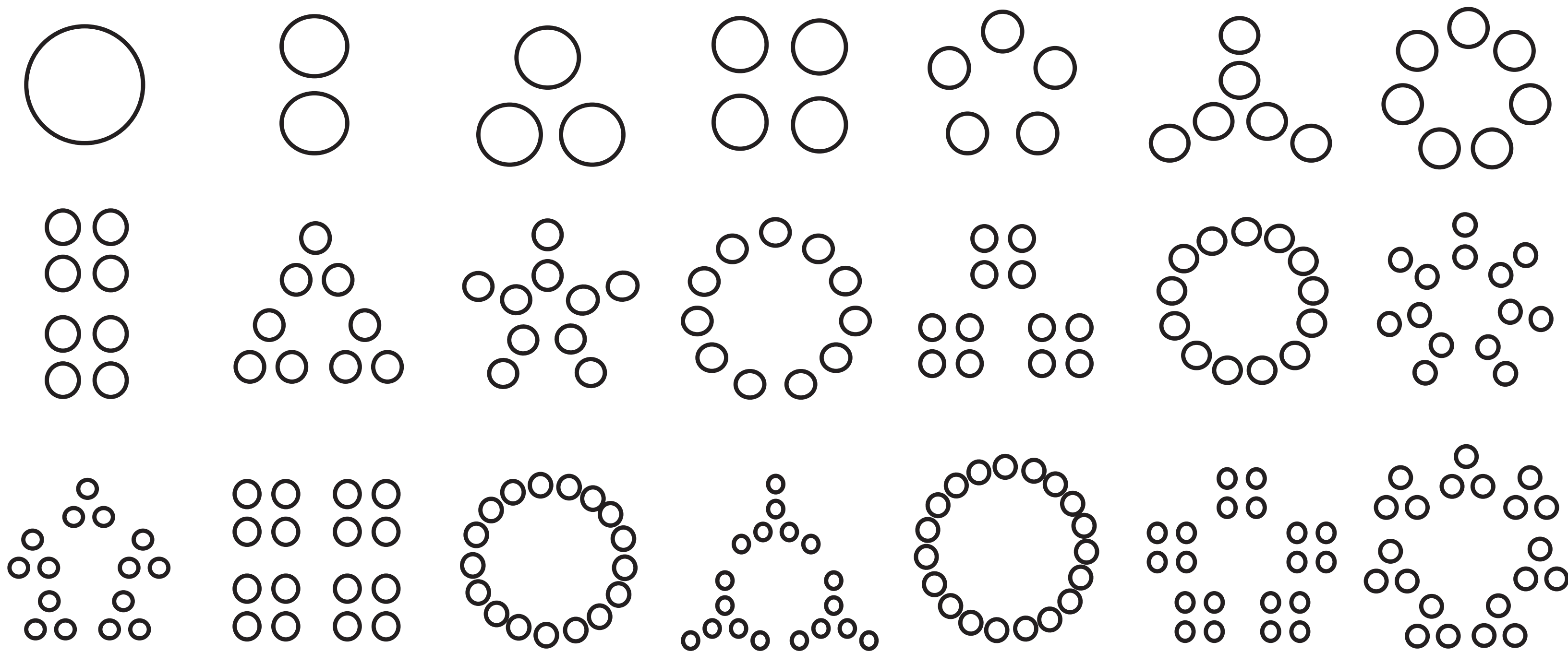
These aren't
the droids
you're
looking
for.

—Obi-Wan Kenobi

A speech bubble with a black background filled with small white stars, resembling a night sky. The bubble has a white outline and a pointed tail at the bottom left. Inside the bubble, the text "What is multiplication?" and "What does it **look** like?" is written in white. The first line is in an italicized serif font, and the second line is in a similar font but with the word "look" in a bold, sans-serif font.

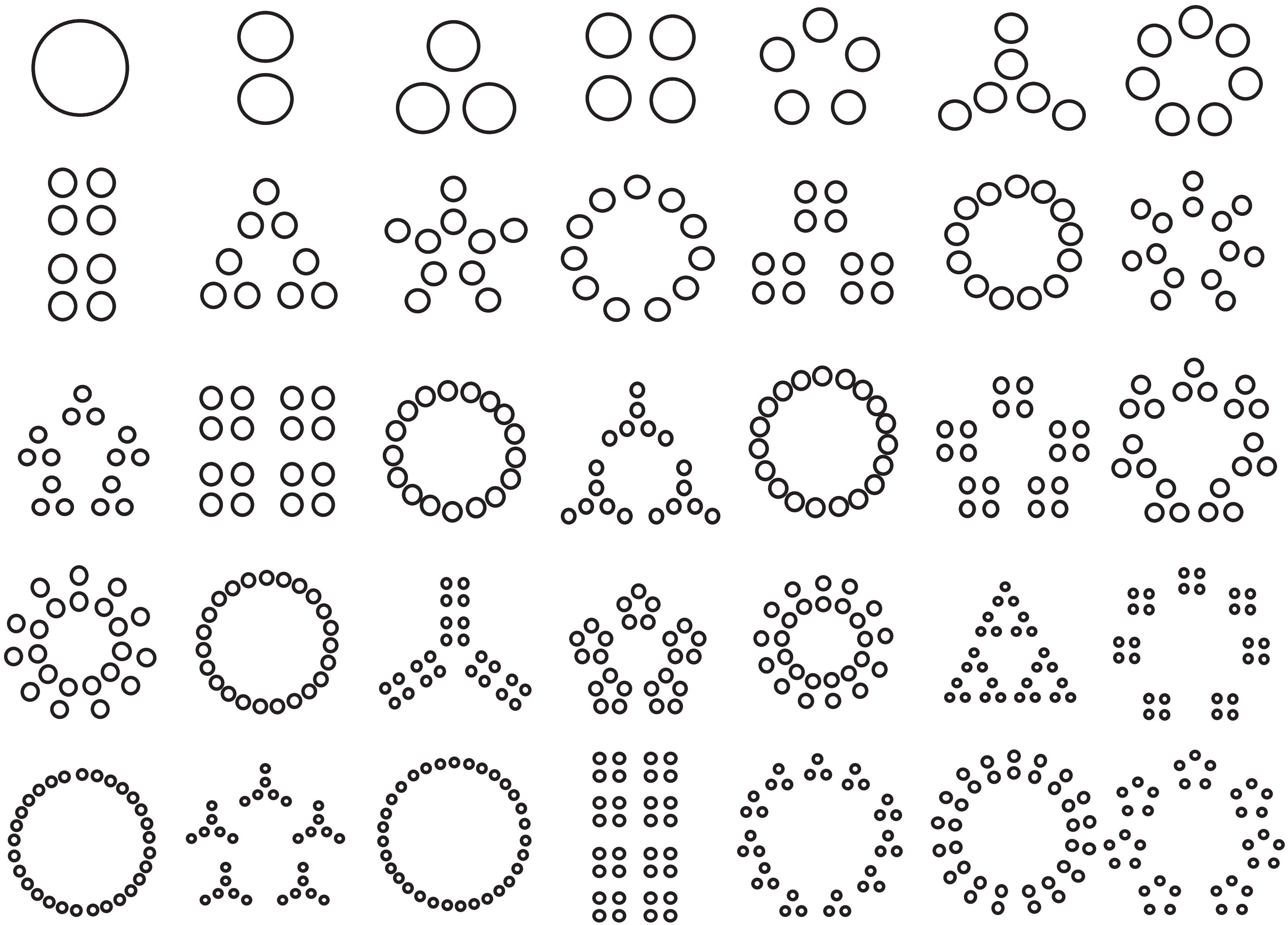
What is multiplication?
*What does it **look** like?*

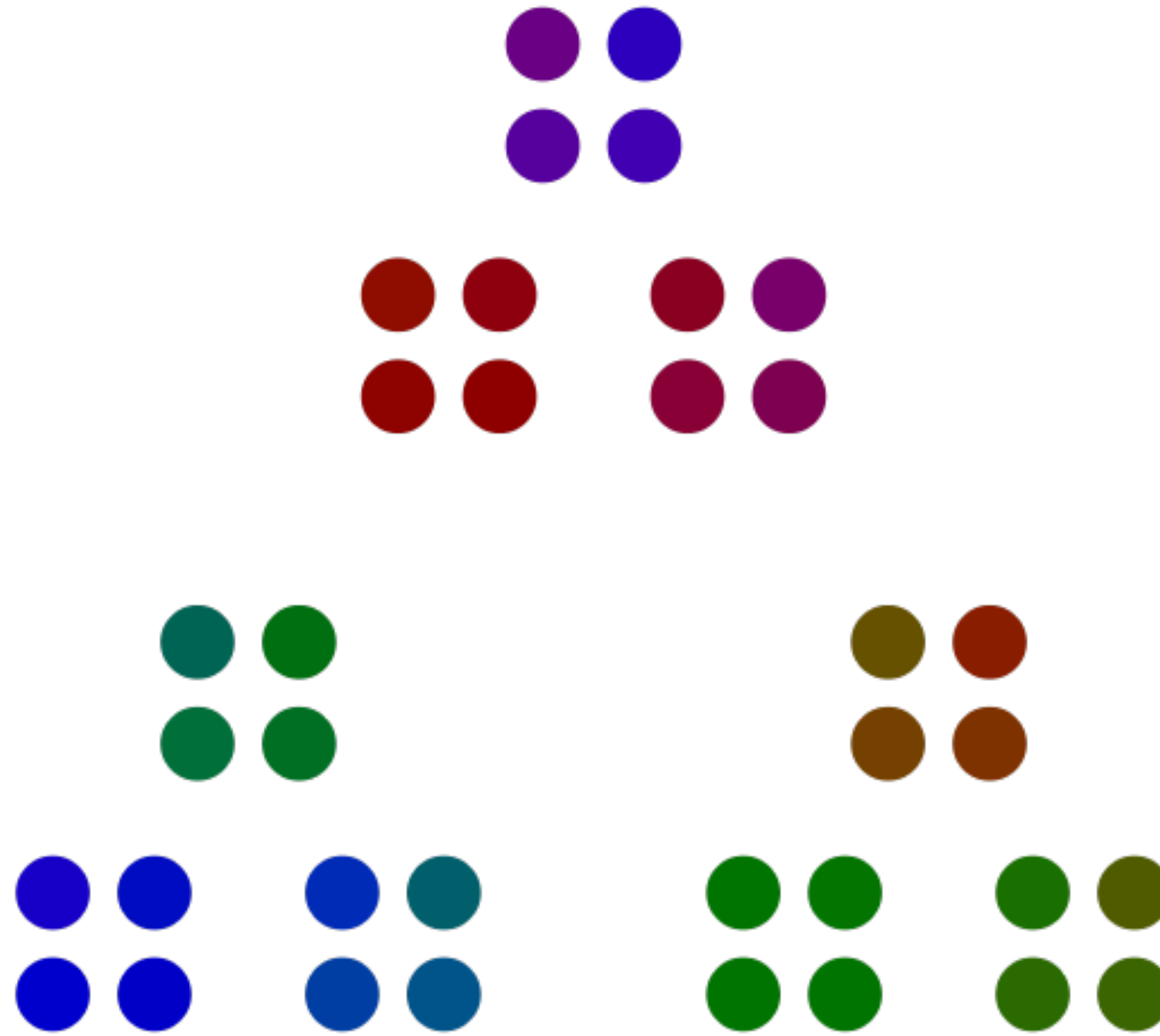
What do you **see**?



Look for patterns.



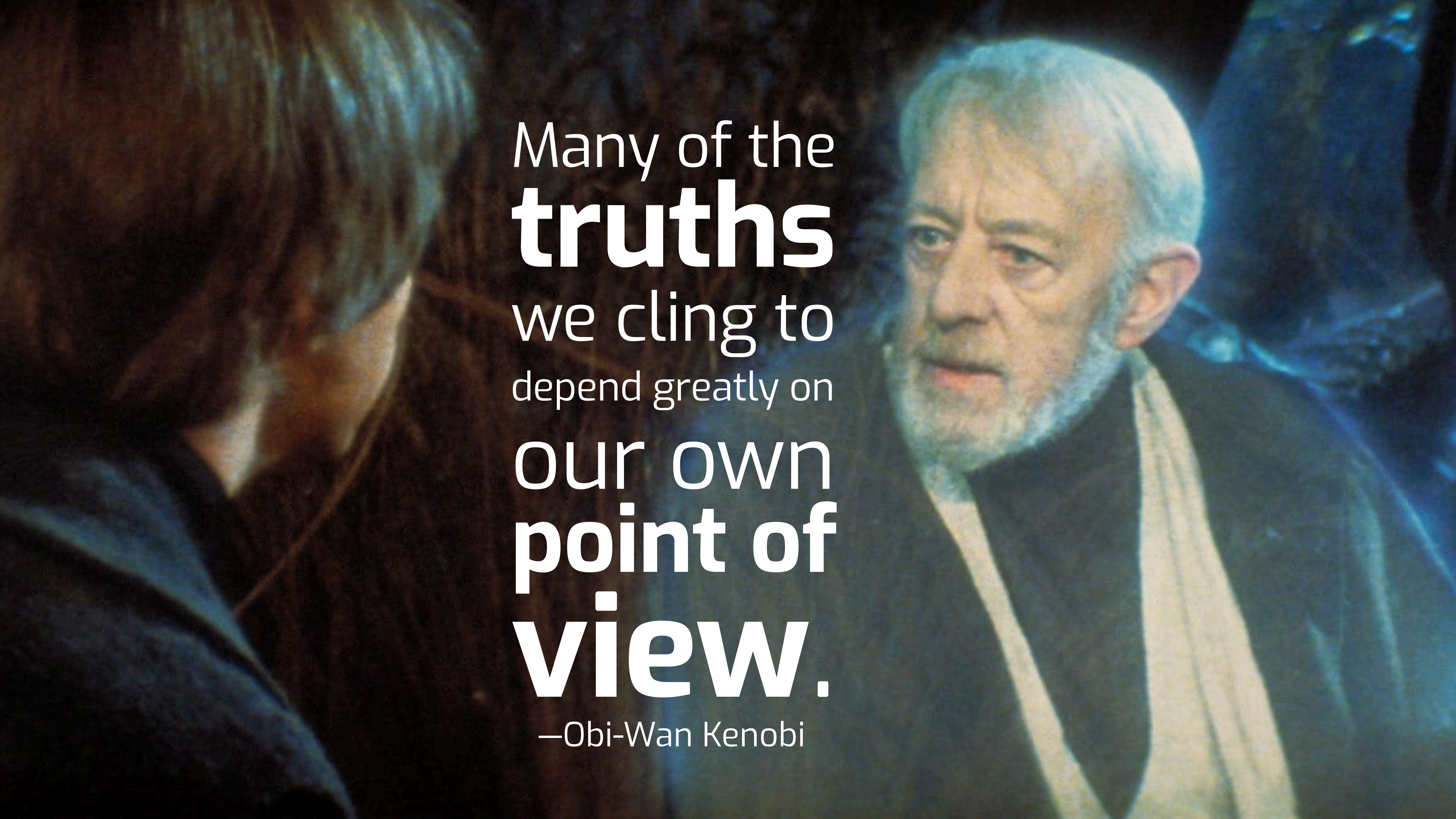




$$36 = 3 \times 3 \times 2 \times 2$$

“Using [...] **different representations** is like examining the concept through a variety of lenses, with each lens providing a **different perspective** that makes the picture (concept) richer and deeper.”

Tripathi, 2008, p. 439

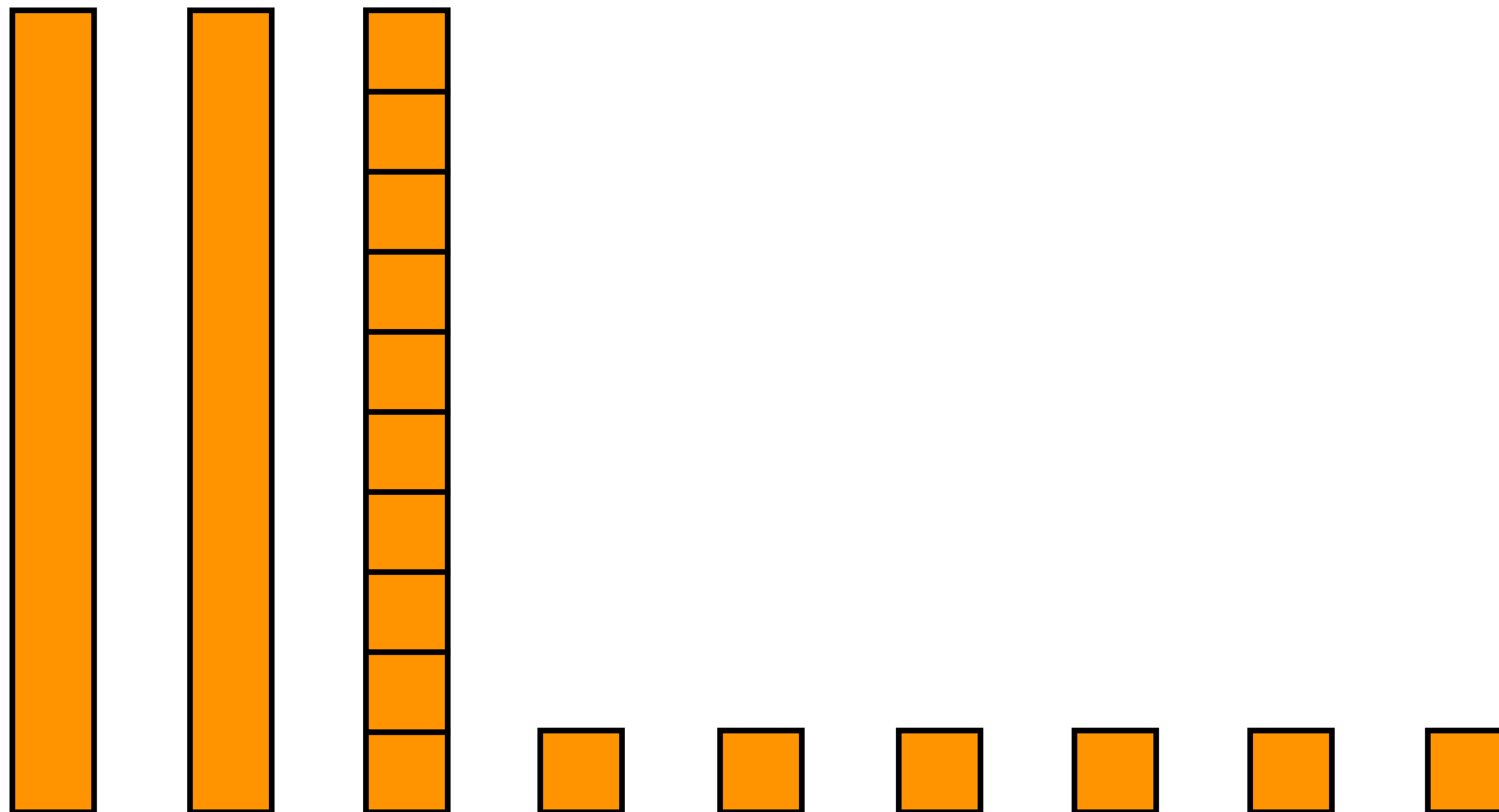
A cinematic still from Star Wars: The Clone Wars. On the left, Anakin Skywalker is shown in profile, looking down with a somber expression. On the right, Obi-Wan Kenobi is shown from the chest up, looking towards Anakin with a serious, contemplative expression. The background is dark and out of focus, suggesting an indoor setting.

Many of the
truths
we cling to
depend greatly on
our own
point of
view.

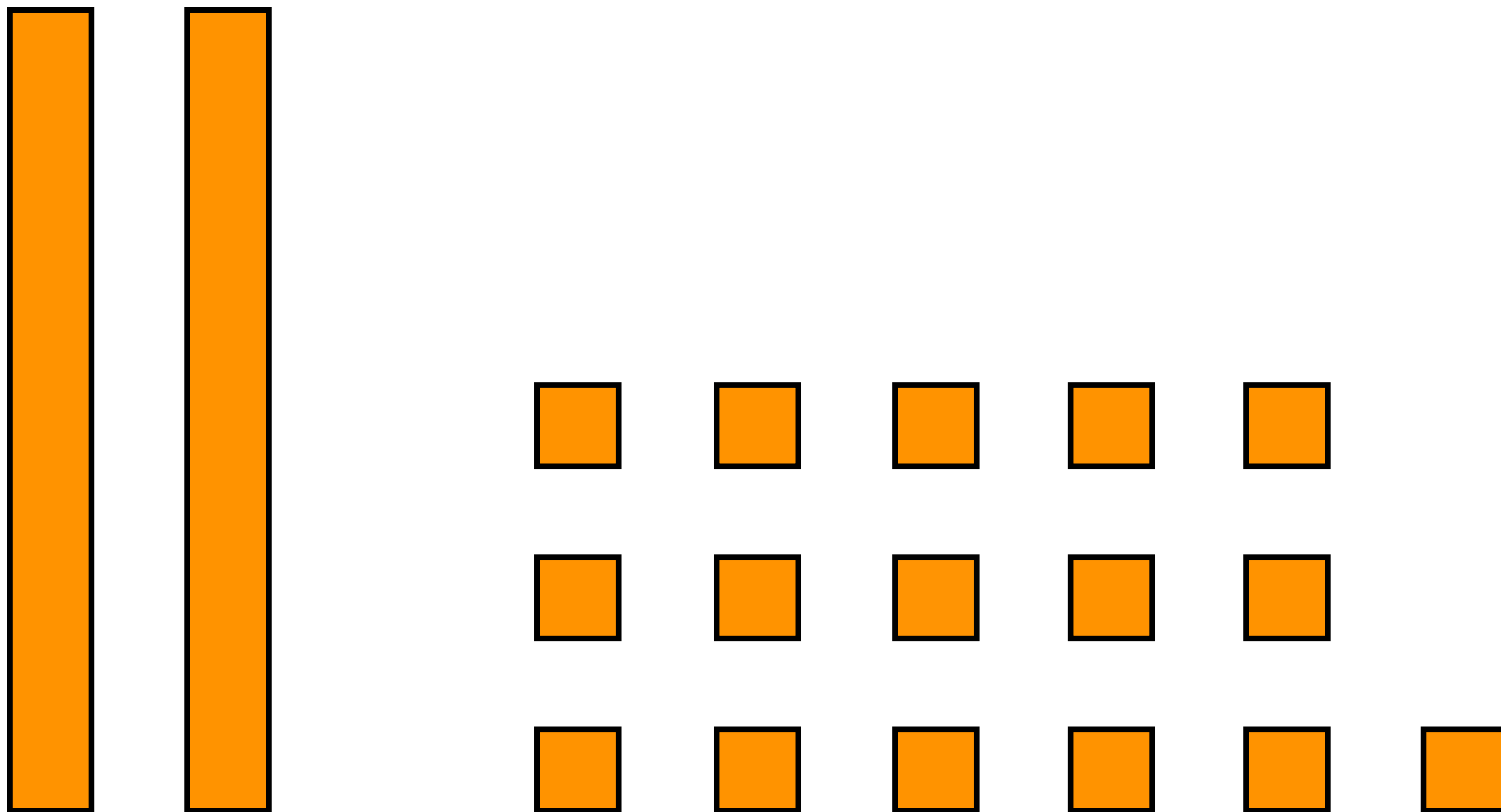
—Obi-Wan Kenobi



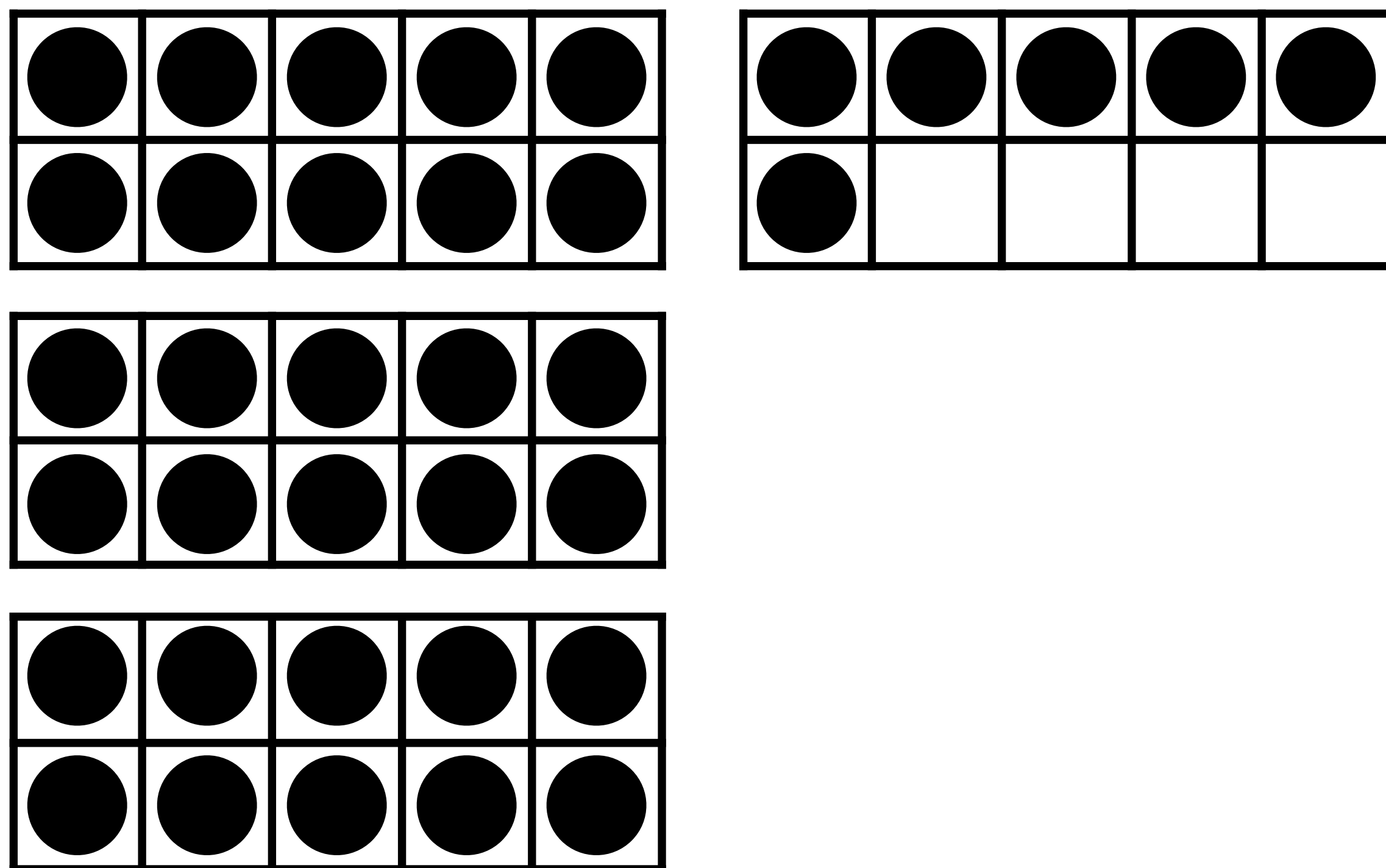
*What does 36 **look** like?*



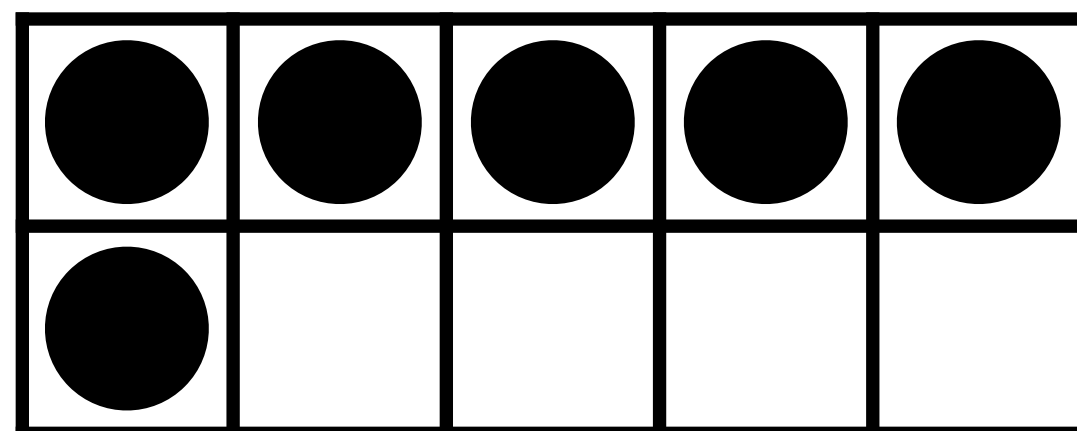
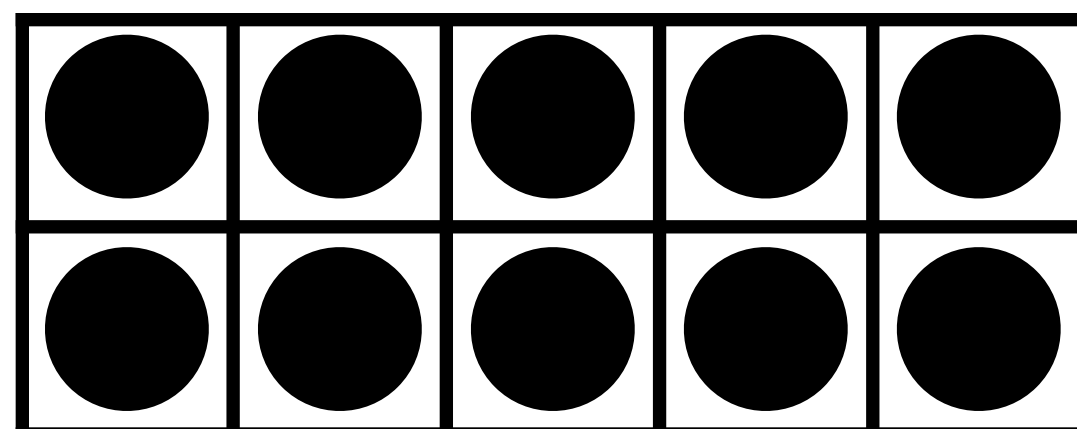
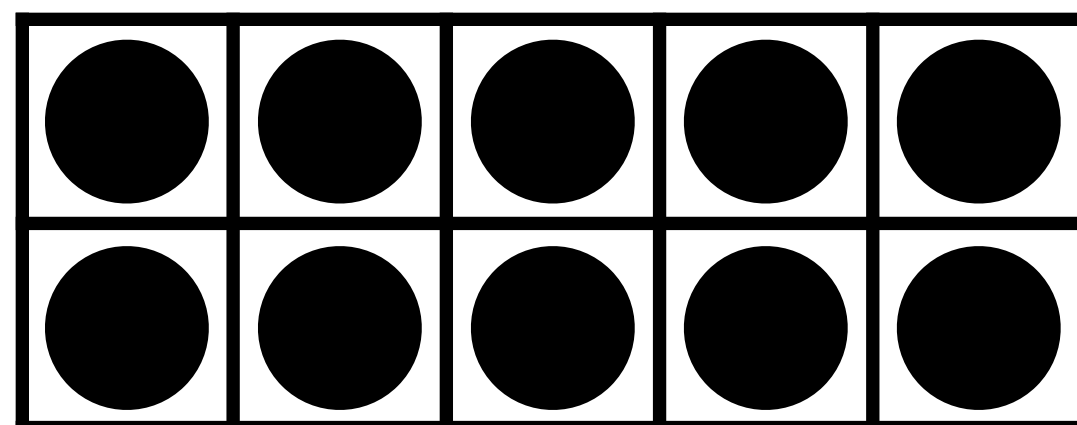
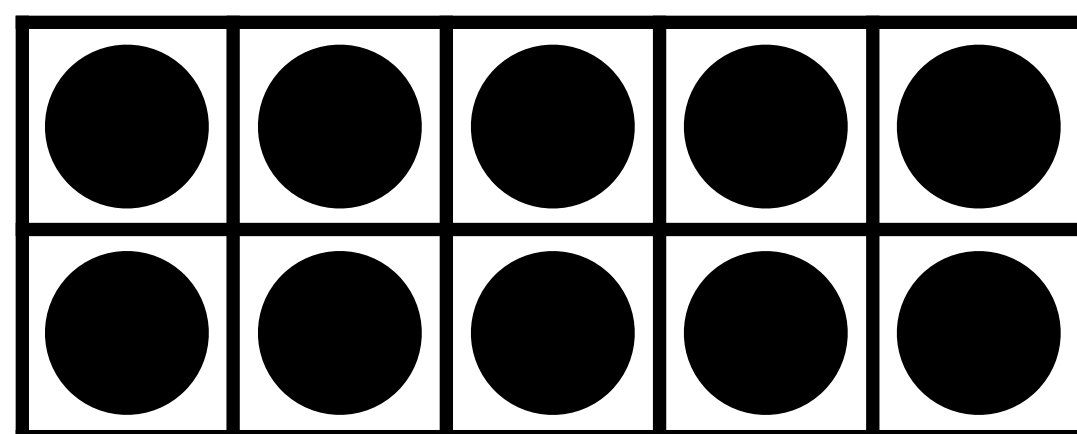
$$36 = 30 + 6$$



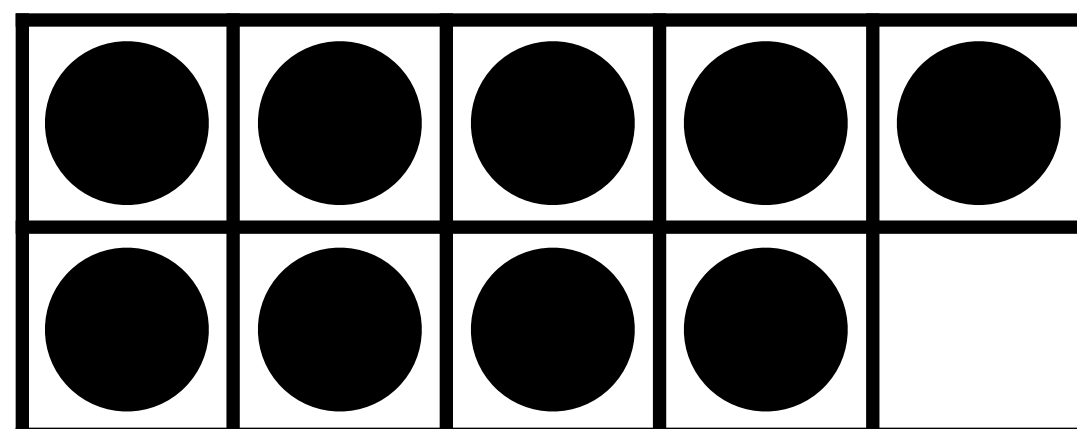
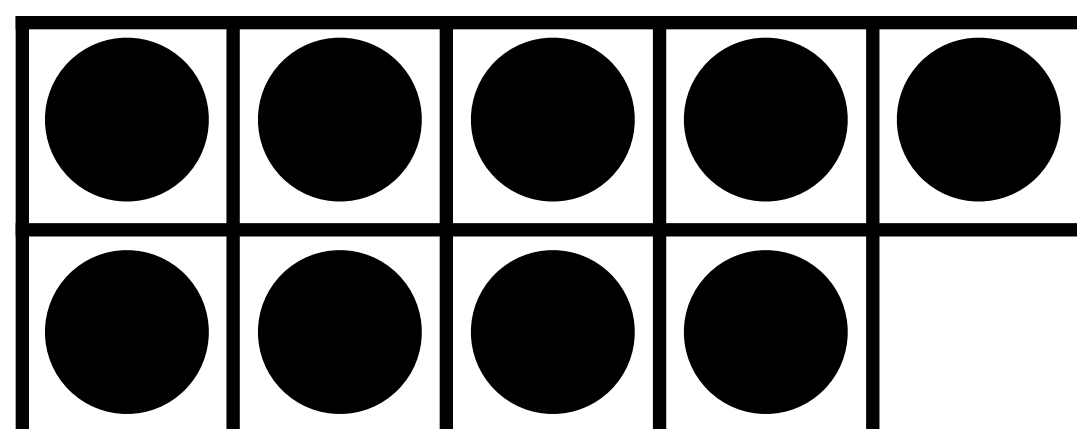
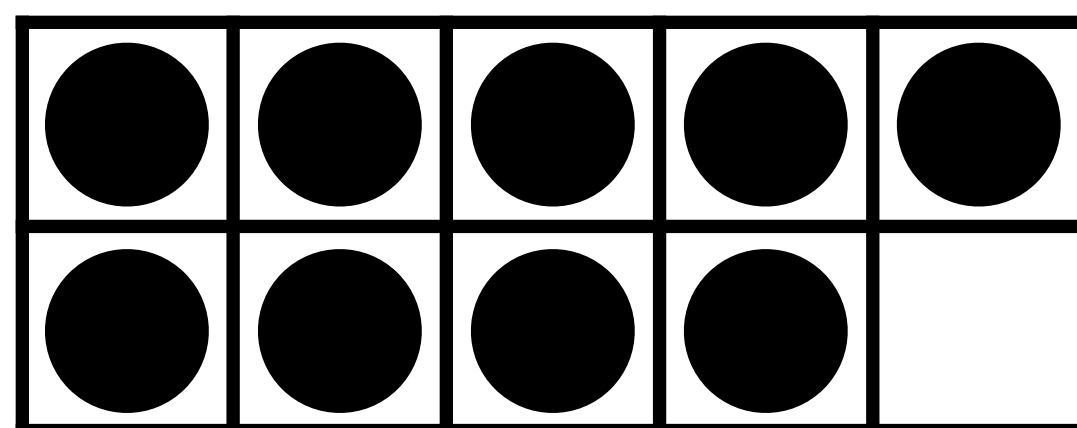
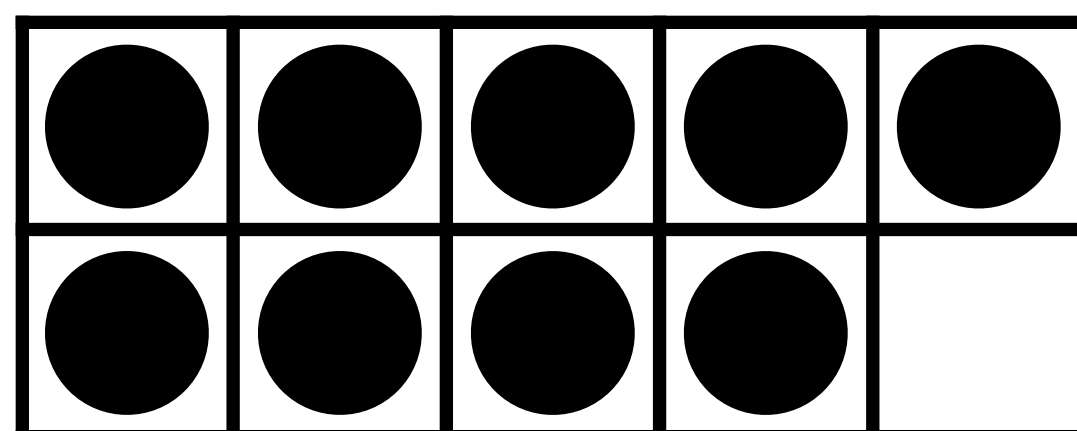
$$36 = 20 + 16$$



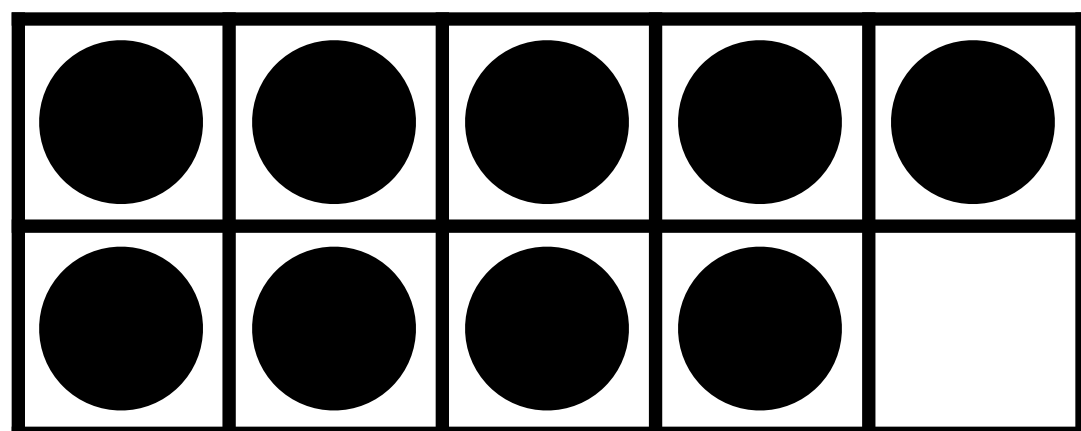
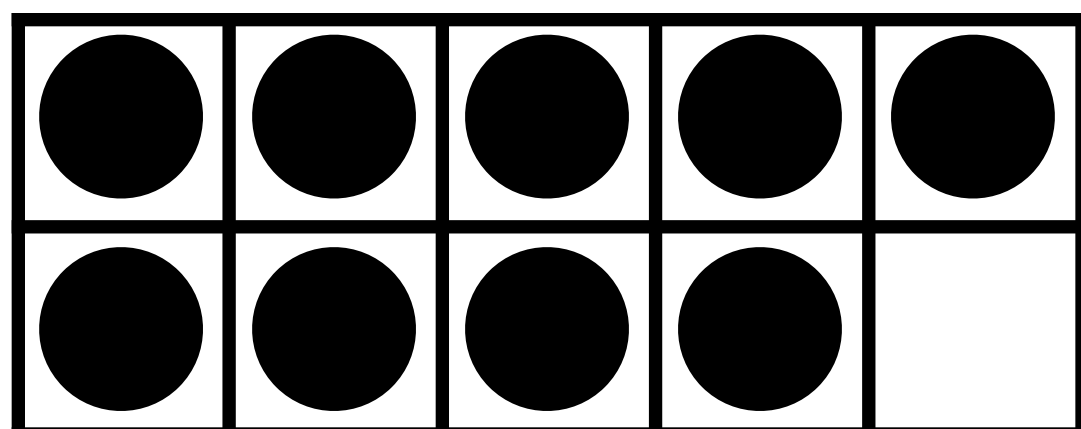
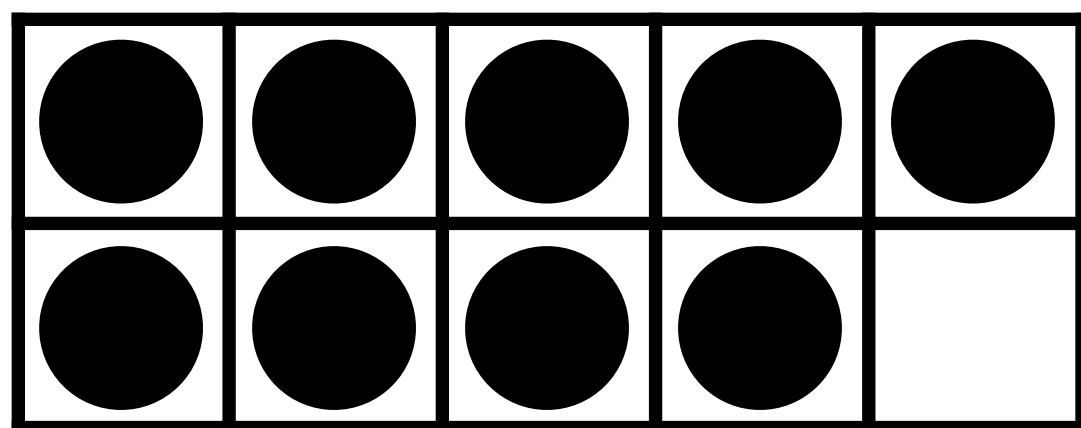
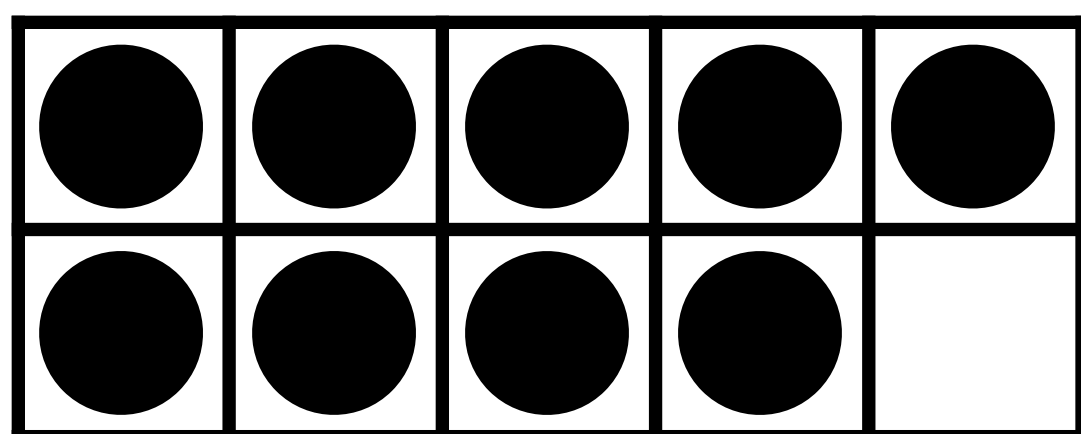
$$36 = 30 + 6$$



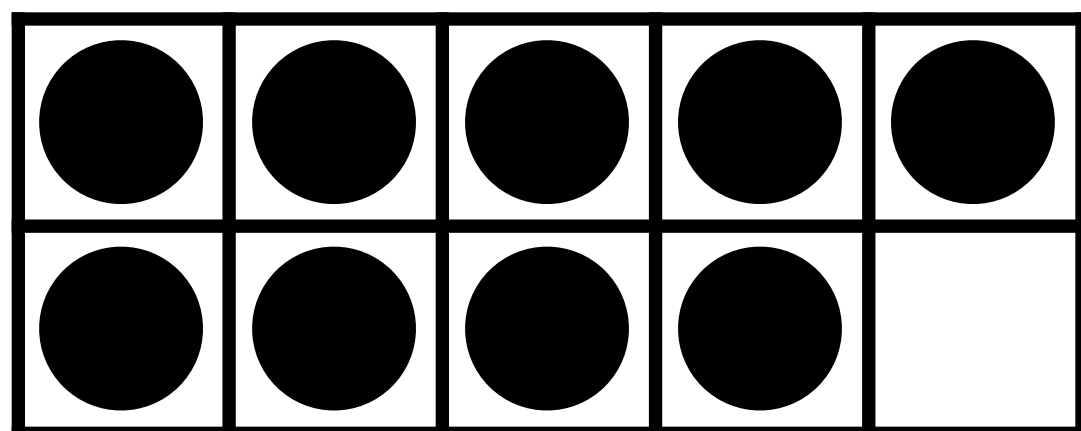
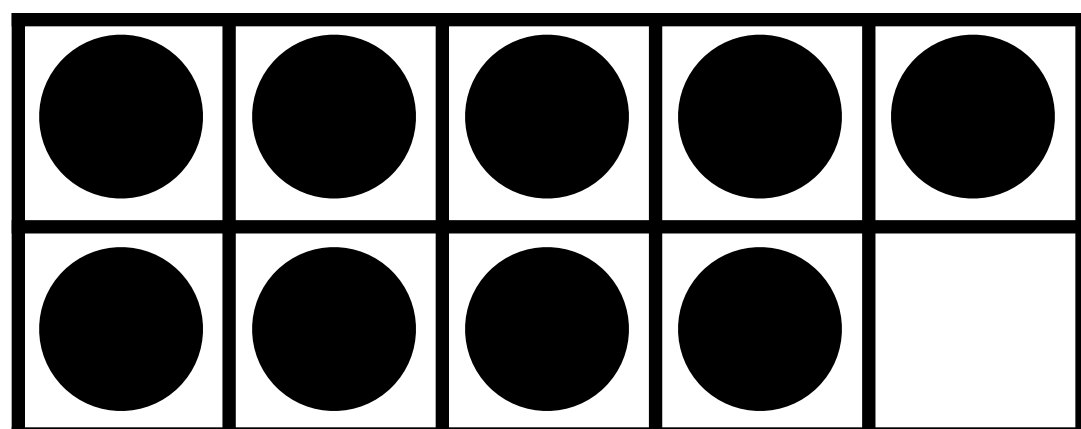
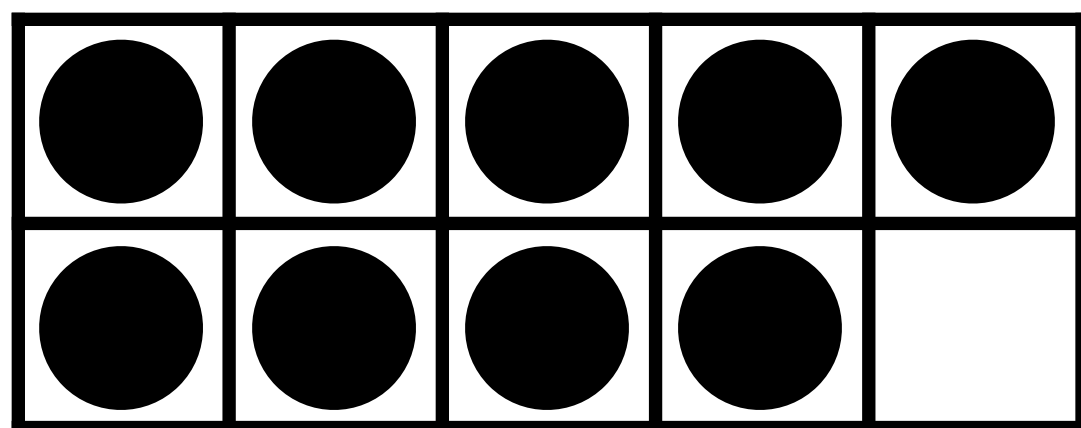
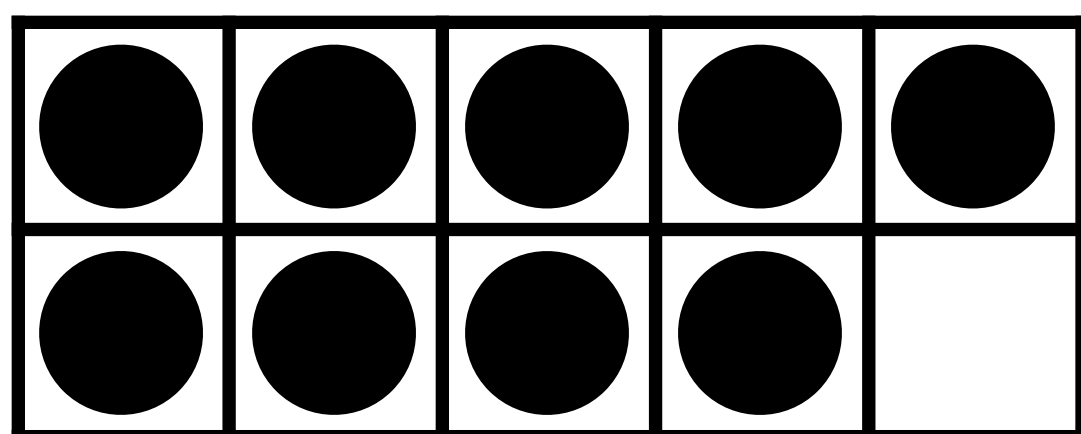
$$36 = 30 + 6$$



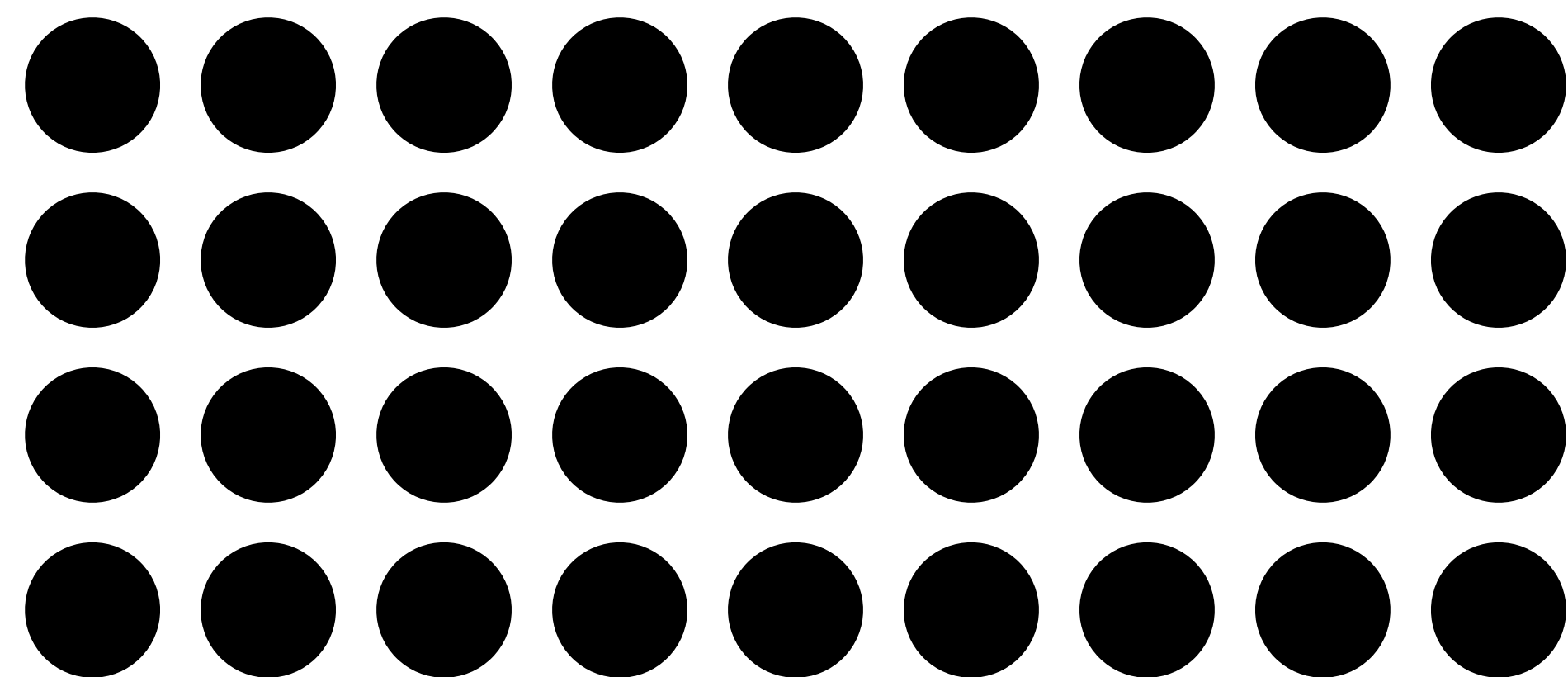
$$36 = 4 \times 9$$



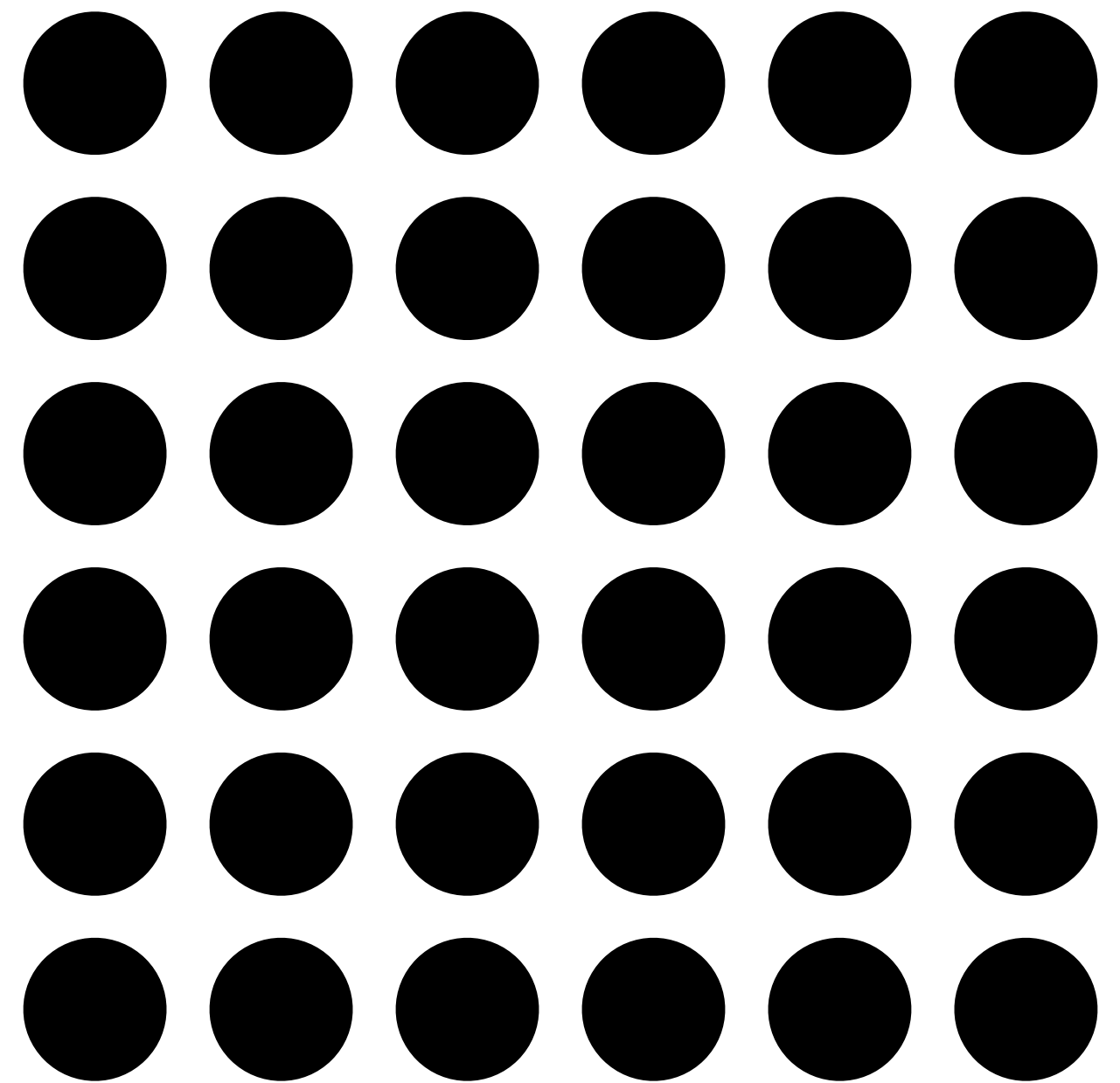
$$36 = 4 \times 9$$



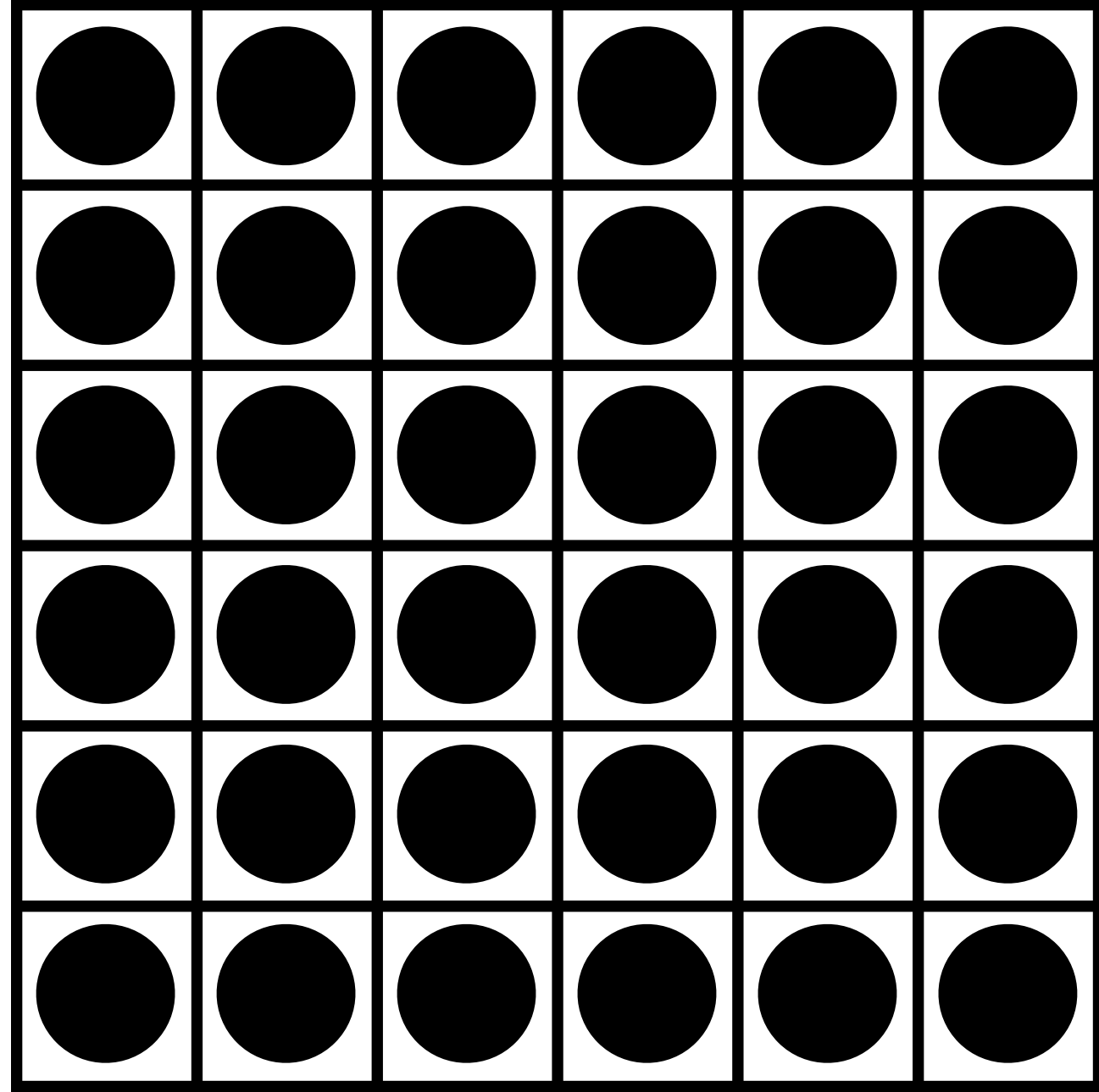
$$36 = 4 \times (10 - 1)$$



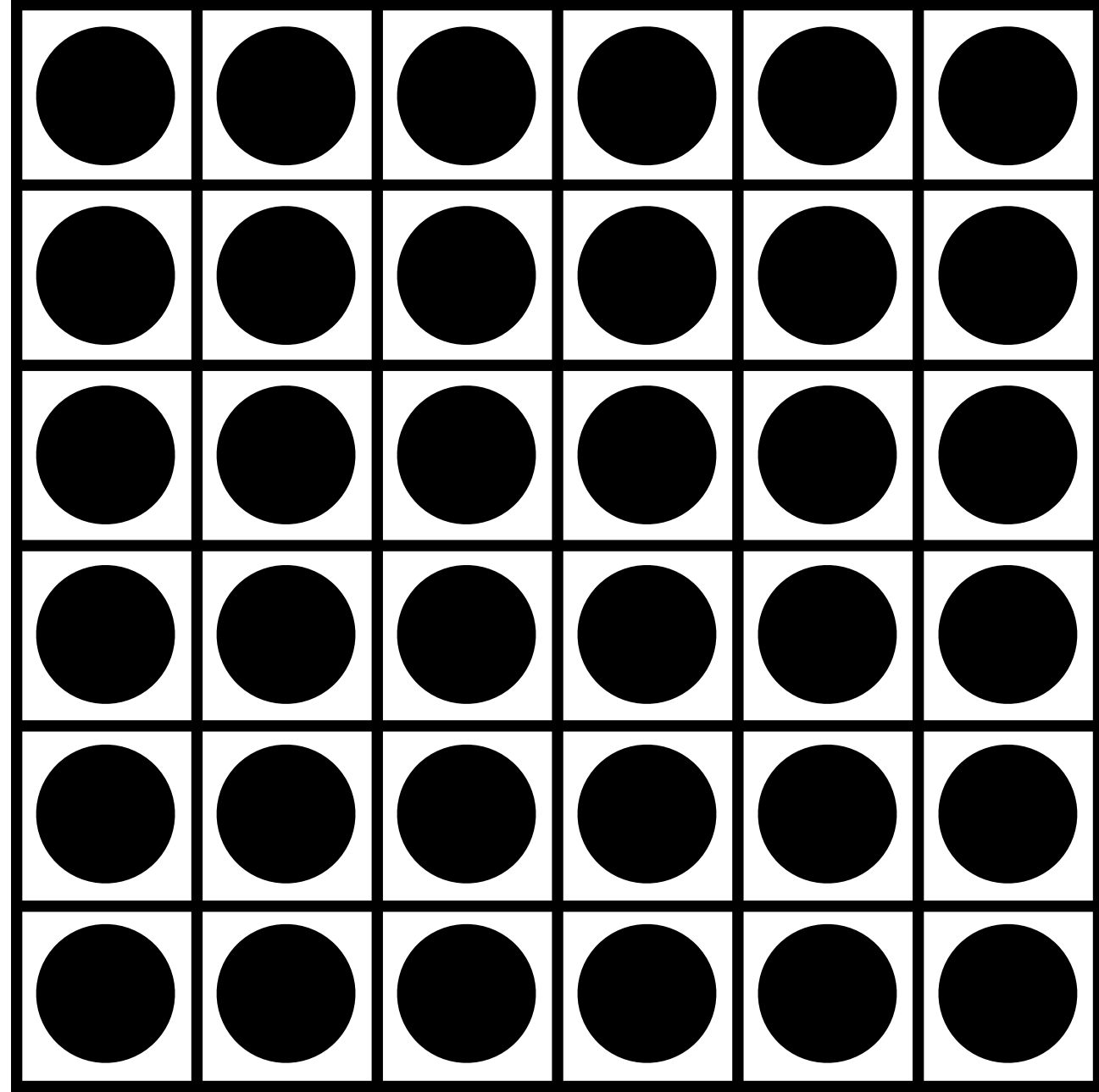
$$36 = 4 \times 9$$



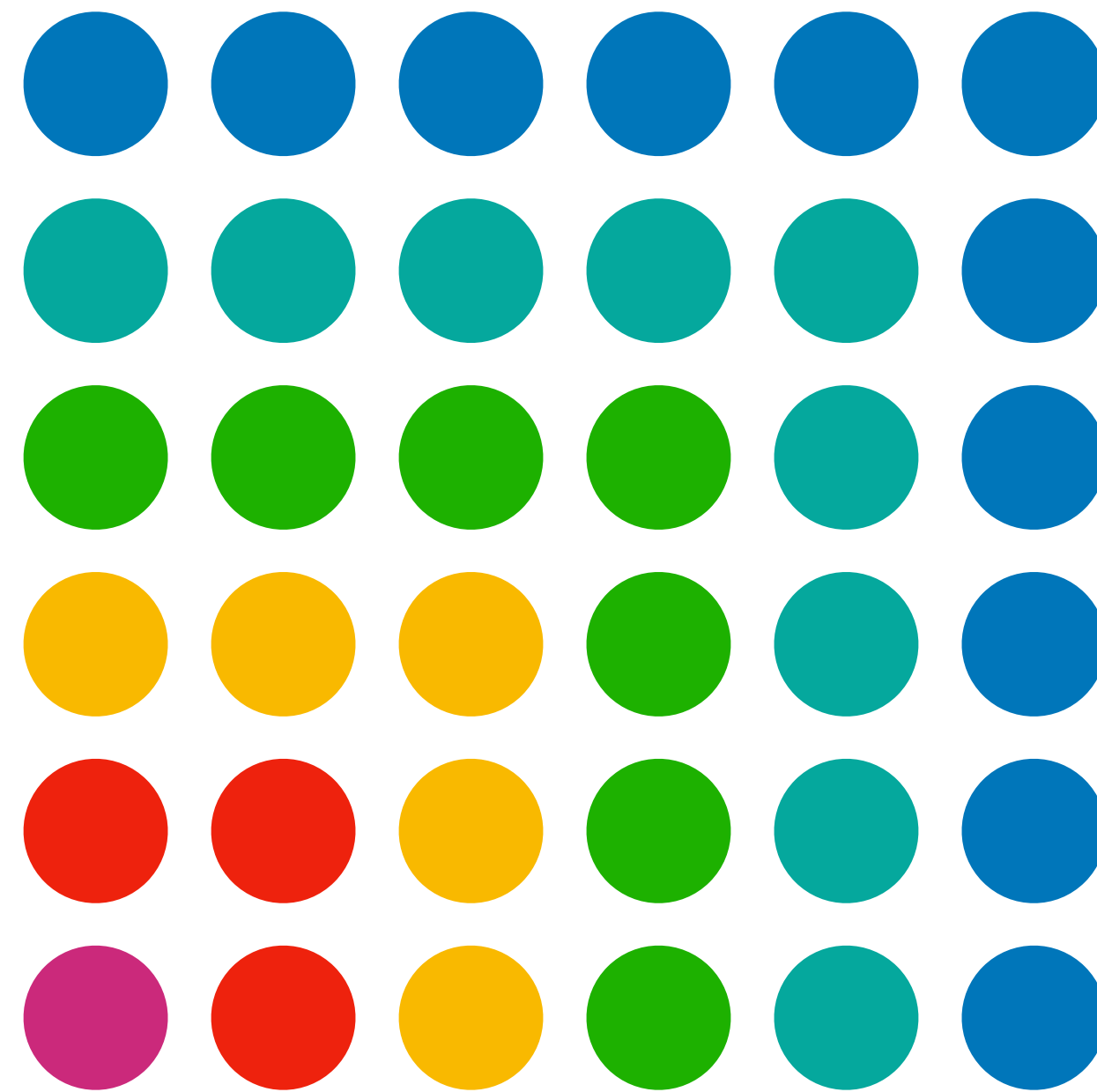
$$36 = 6 \times 6$$



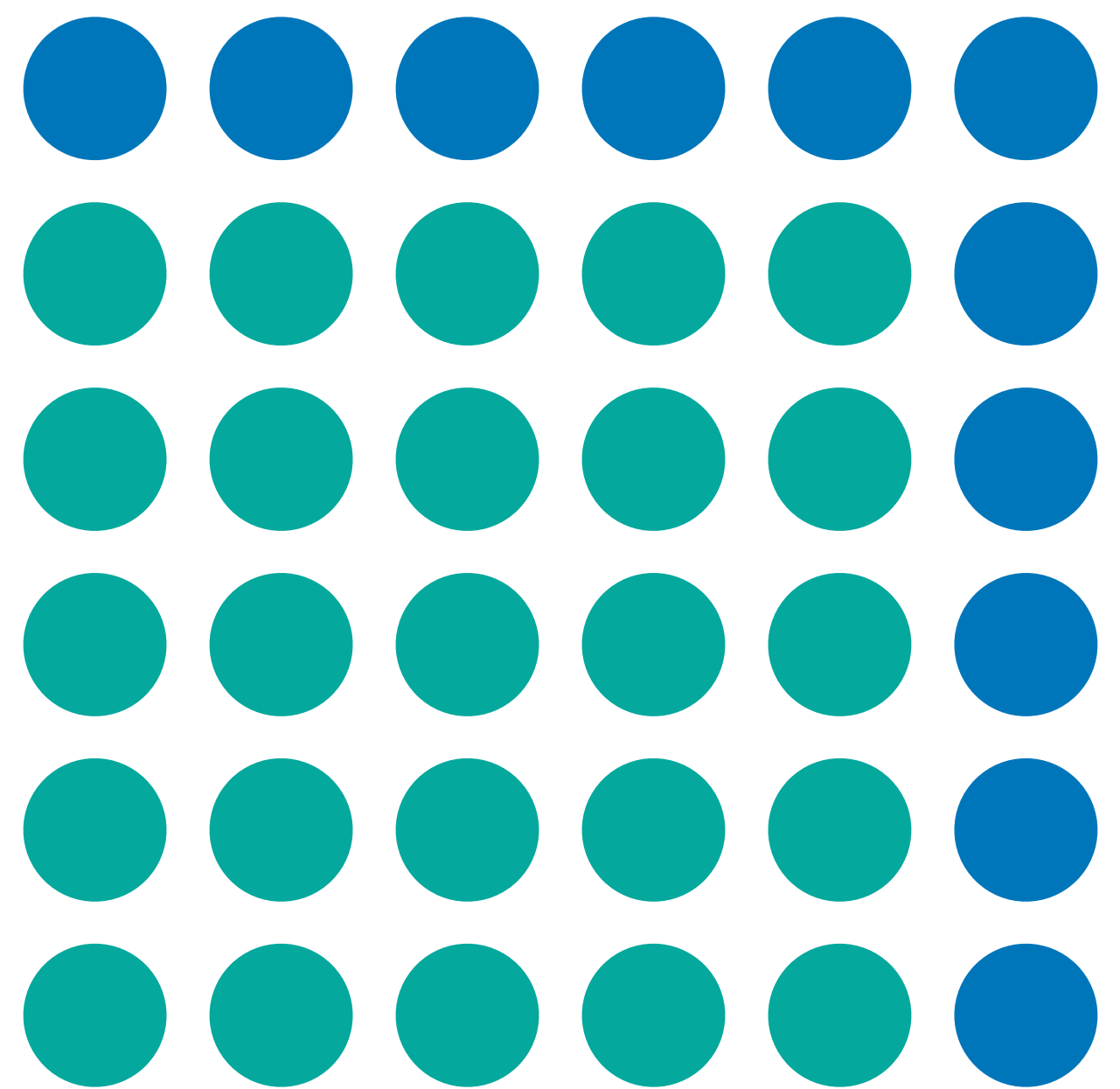
$$36 = 6^2$$



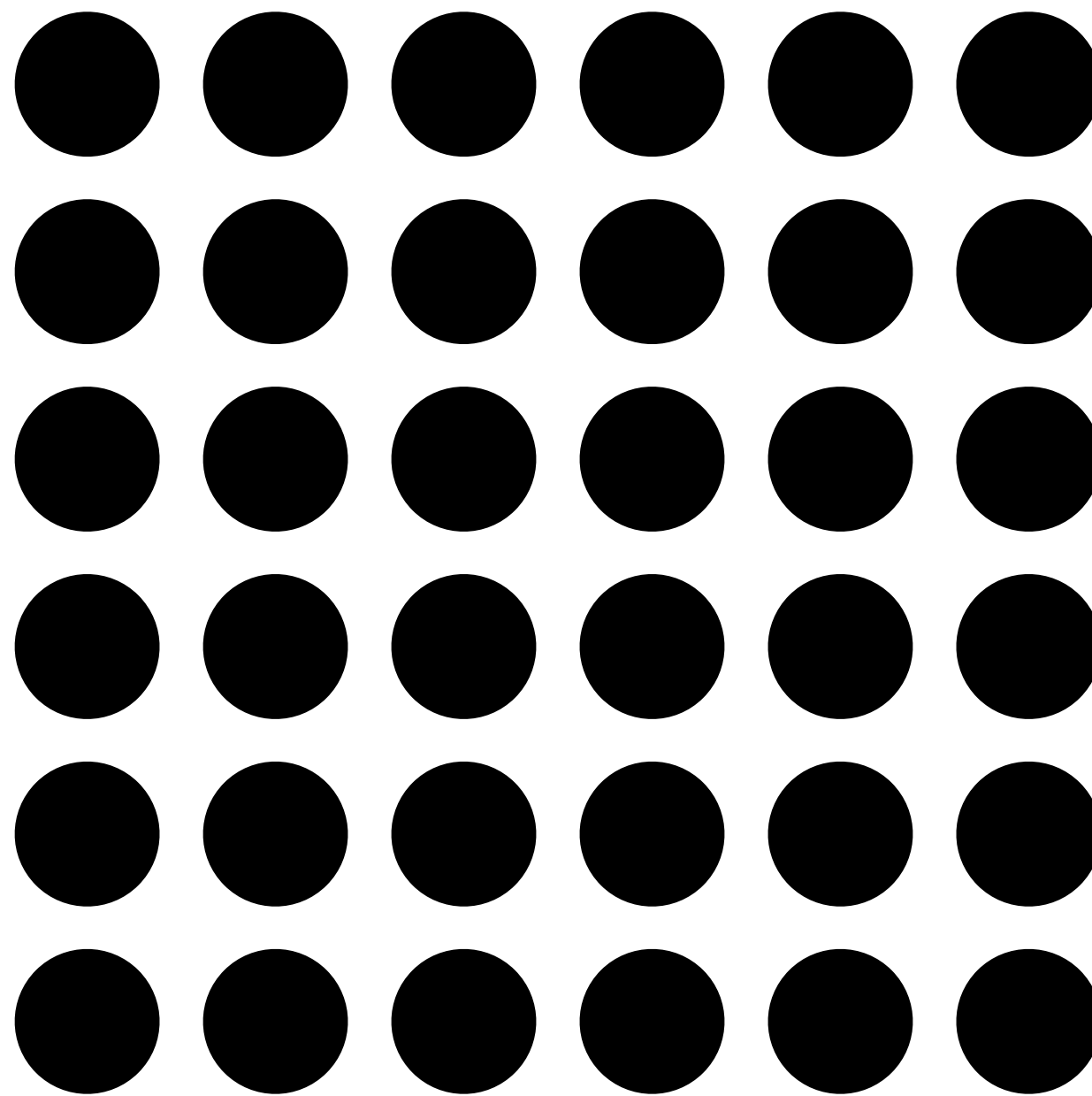
$$36 = 6^2$$



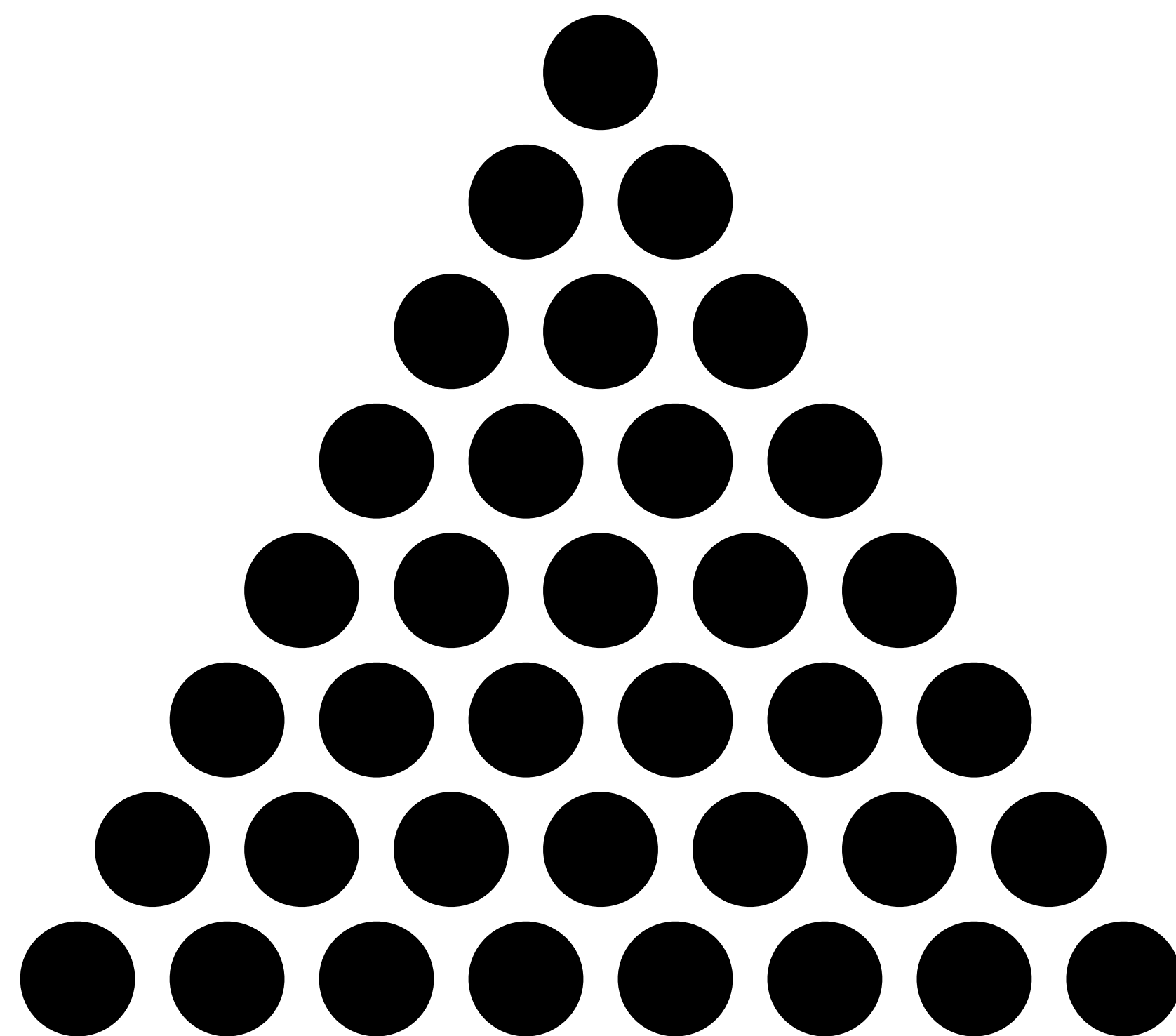
$$36 = 1 + 3 + 5 + 7 + 9 + 11$$



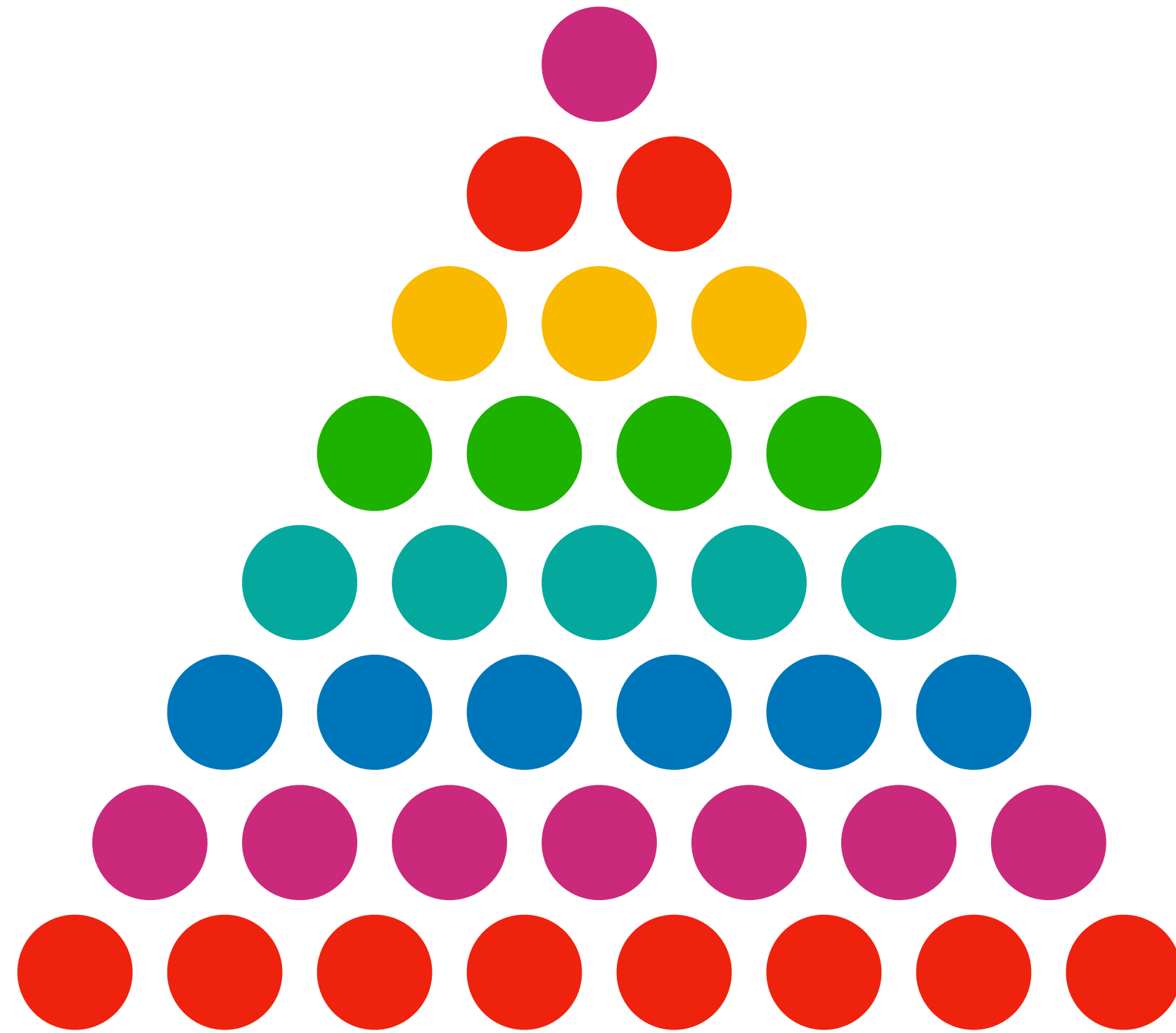
$$(11 = 6^2 - 5^2)$$



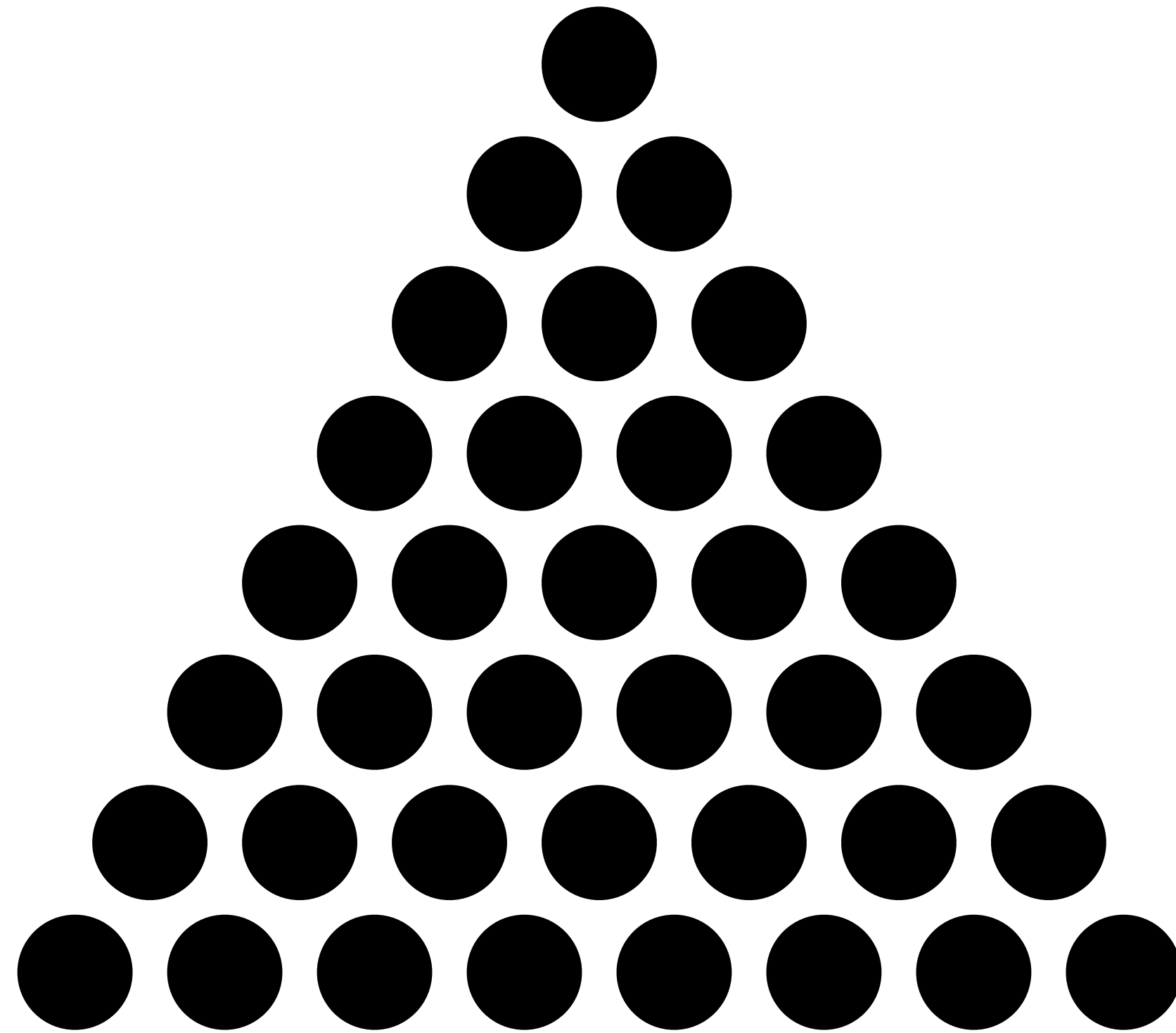
$$36 = 6^2$$



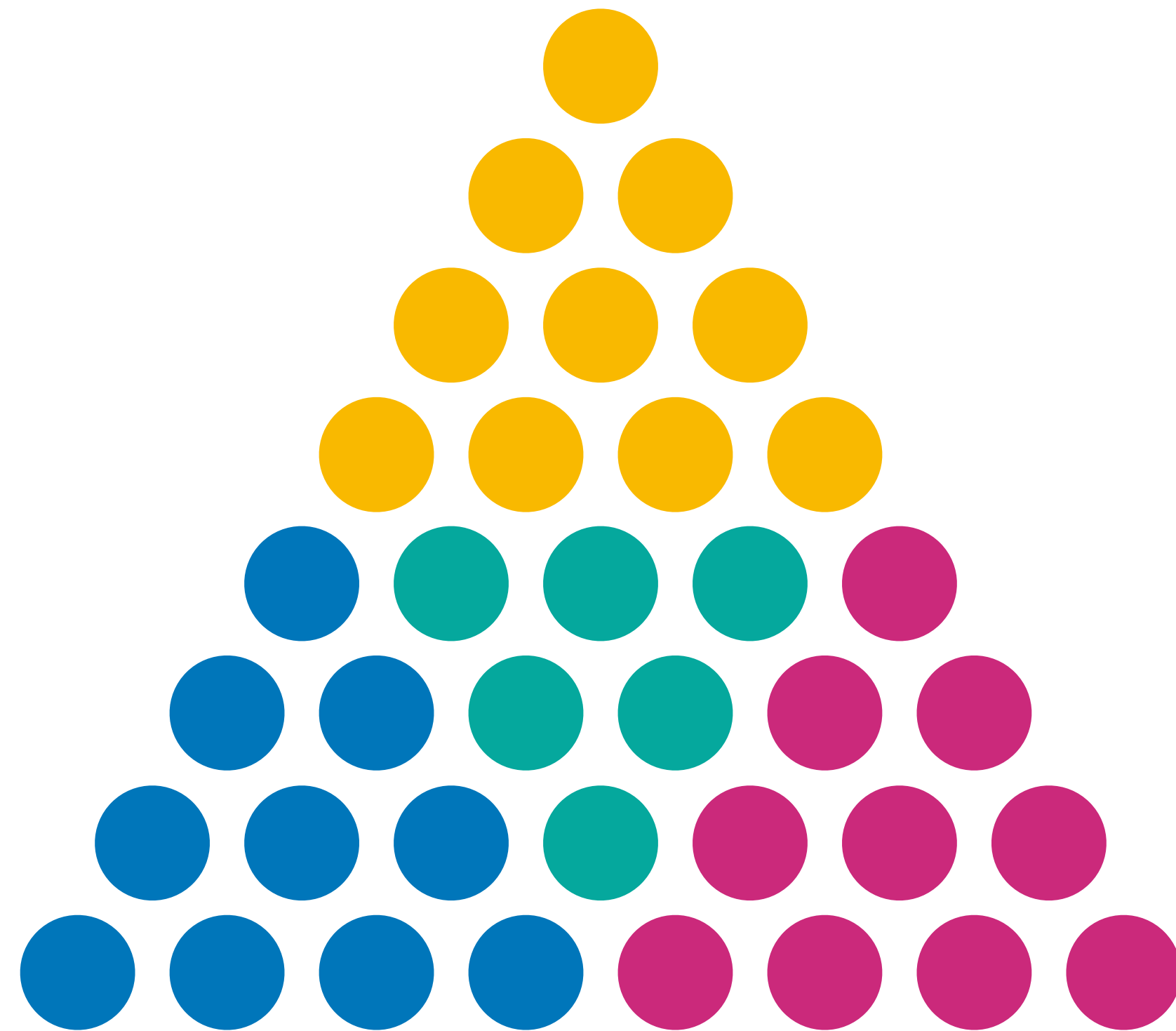
$$36 = T_8$$



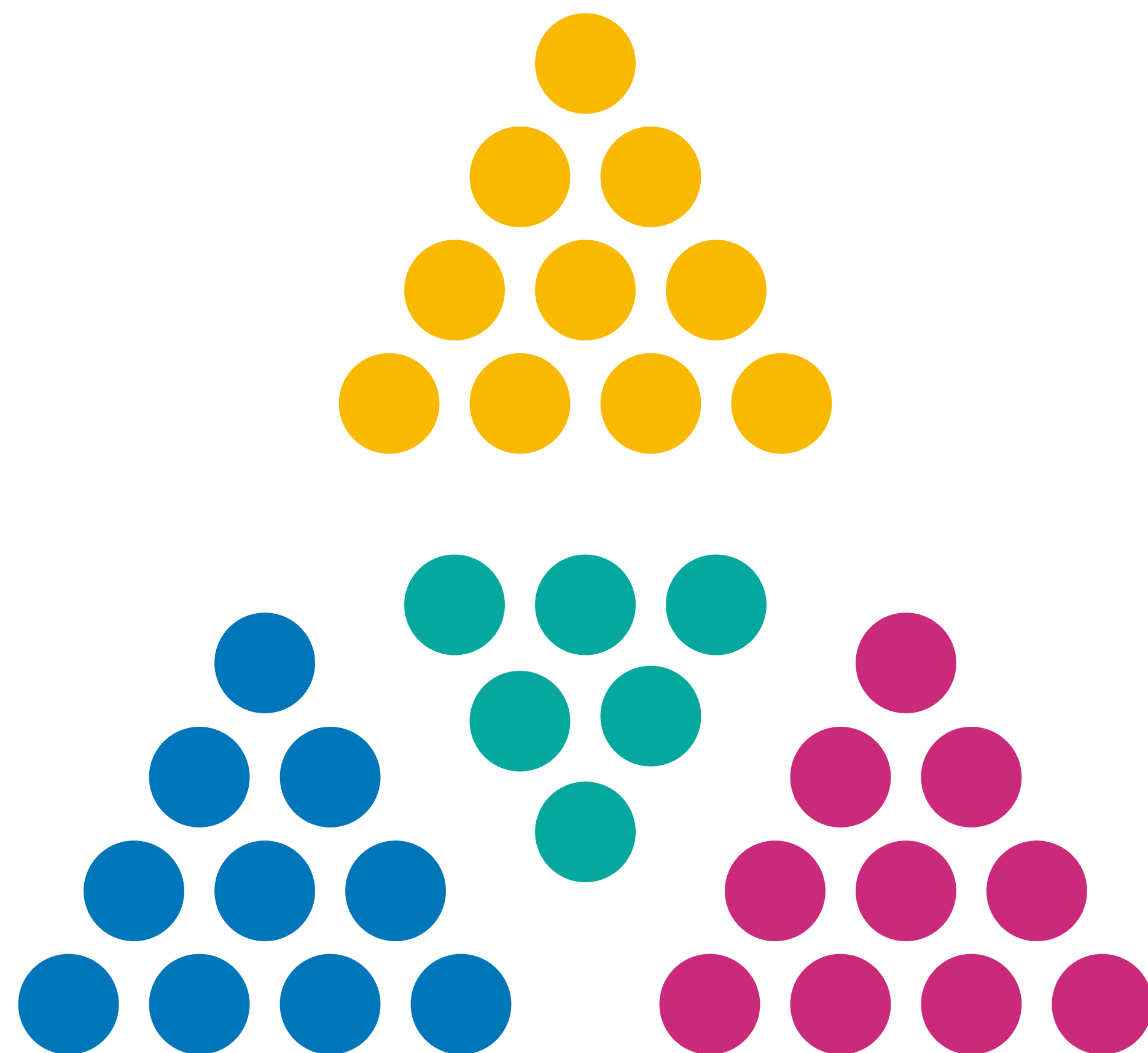
$$36 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8$$



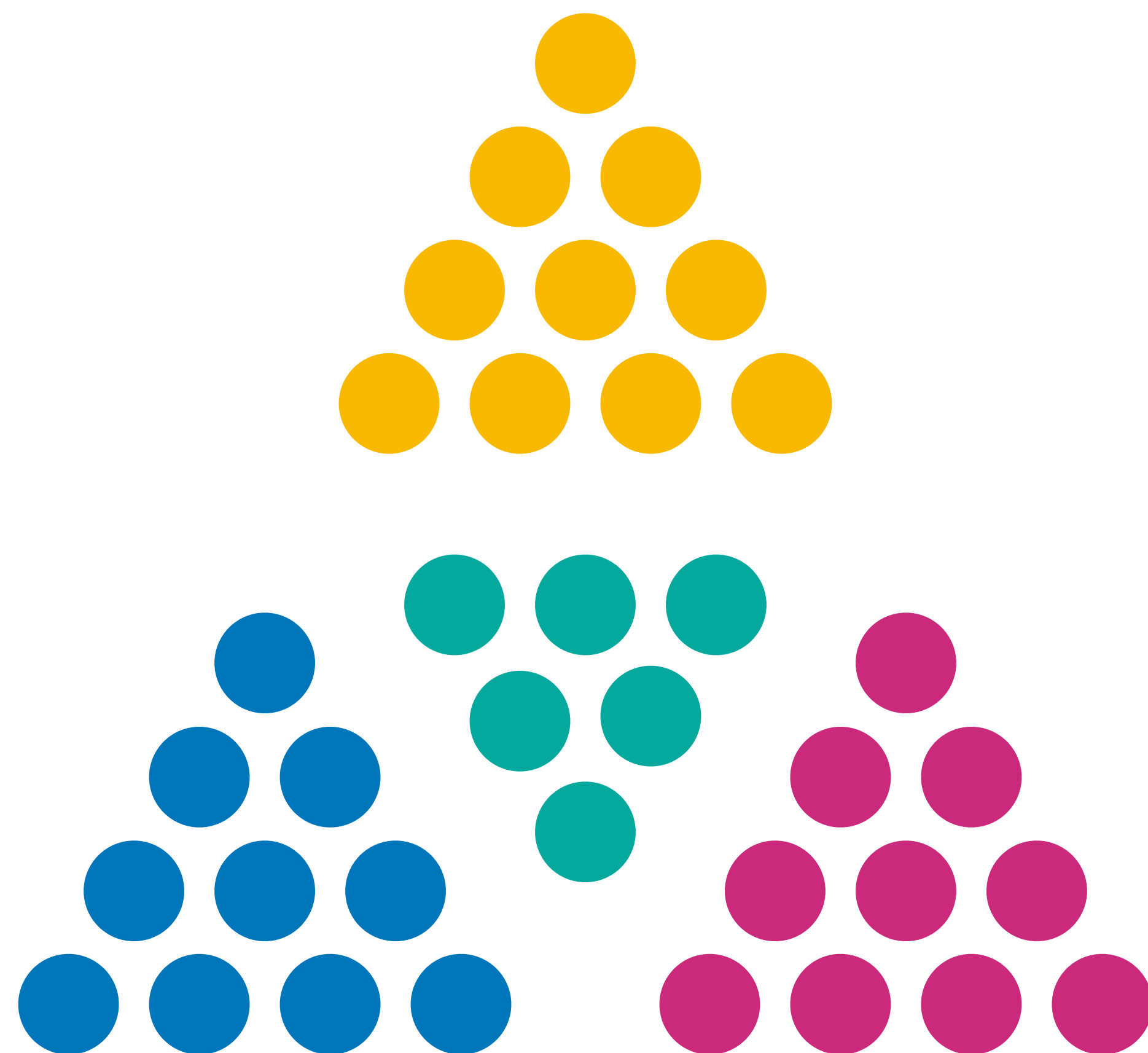
$$36 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8$$



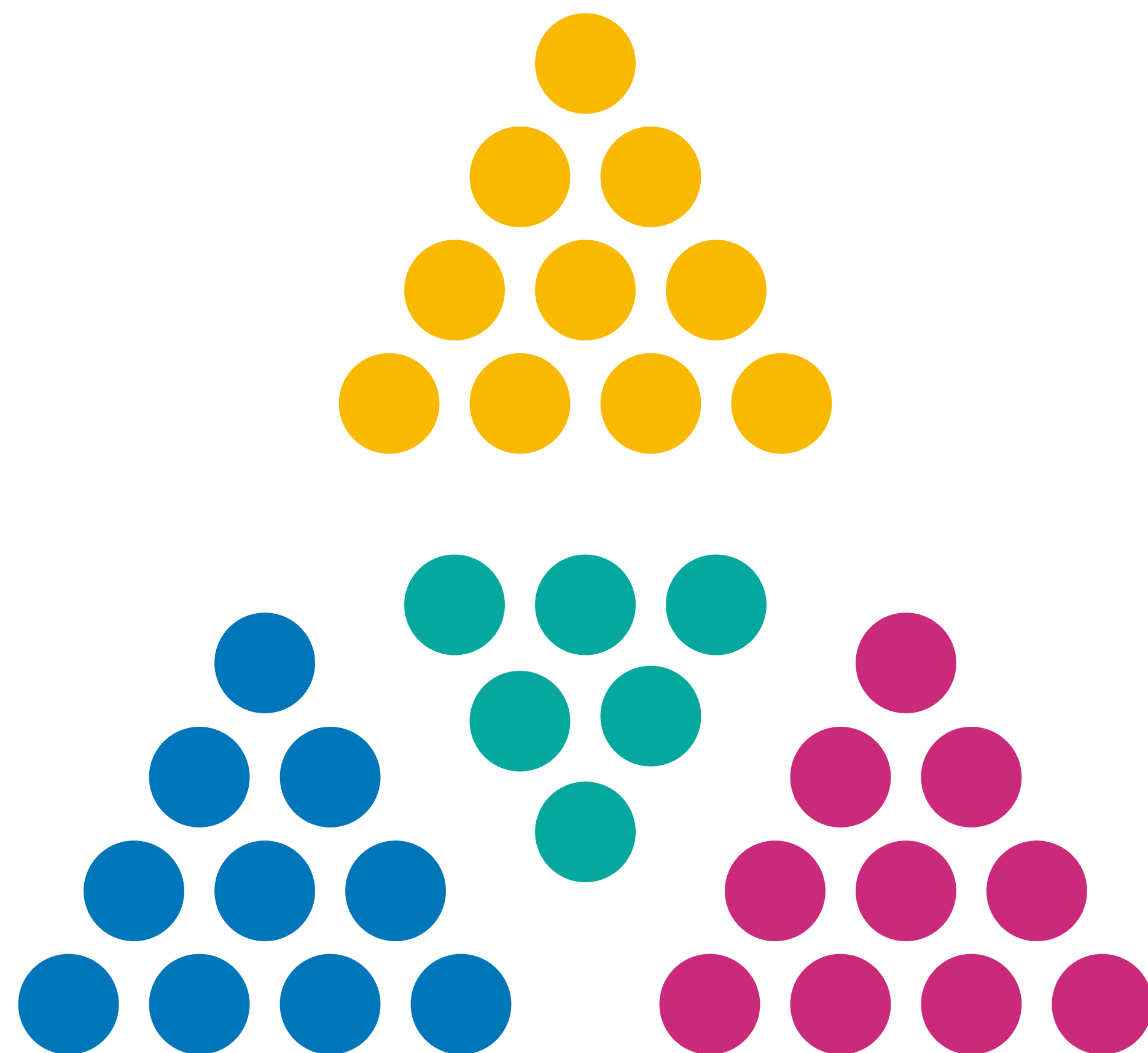
$$36 = 3 \times 10 + 6$$



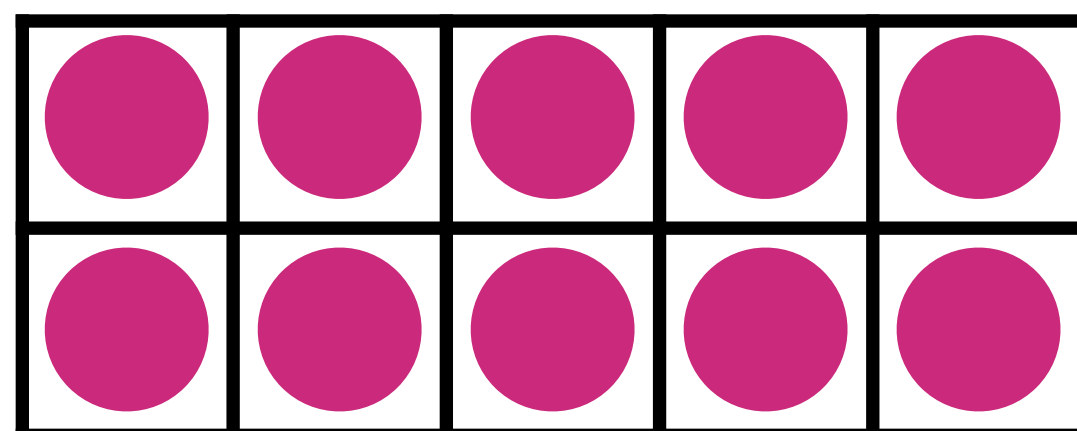
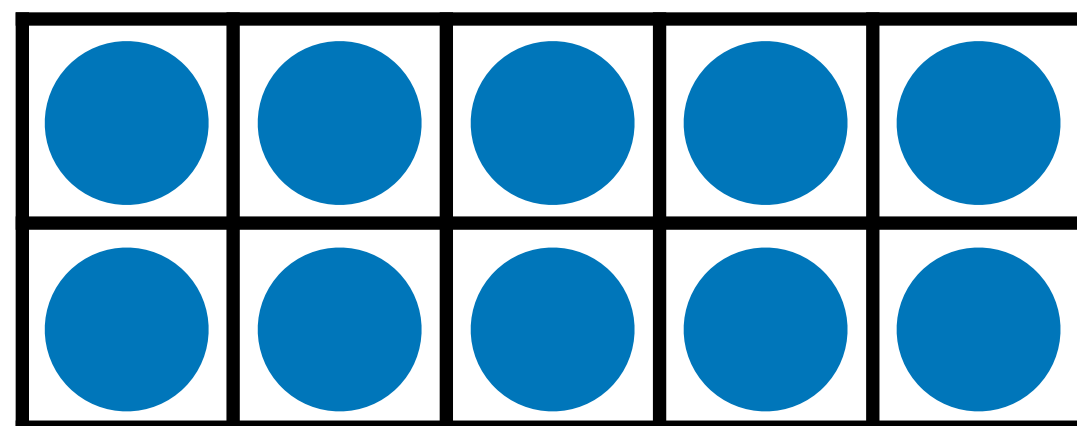
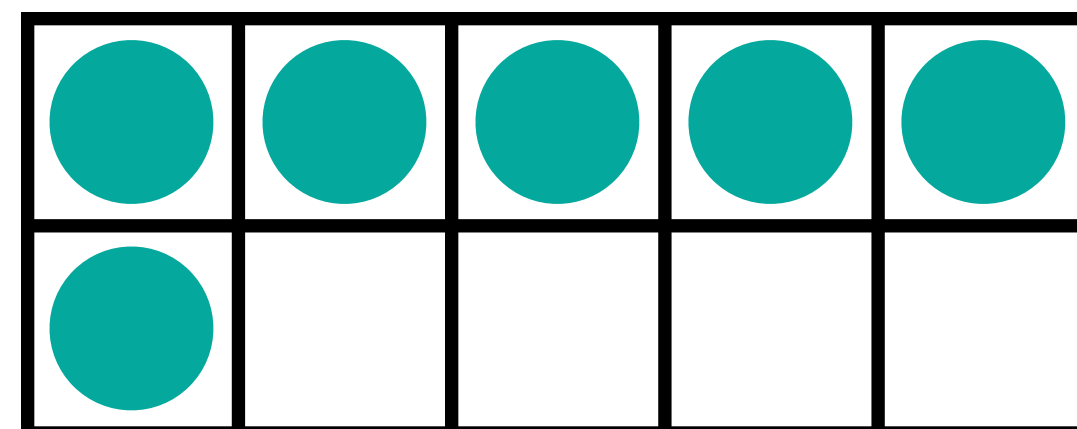
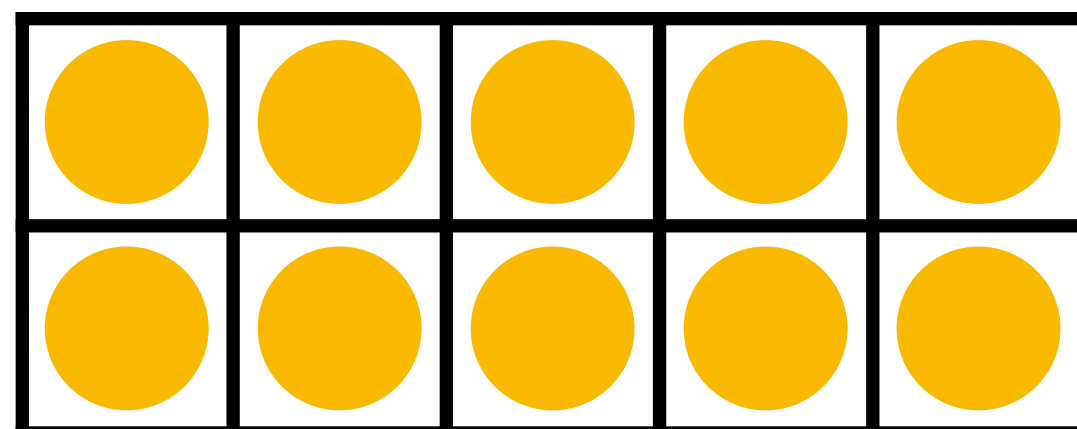
$$36 = 3 \times 10 + 6$$



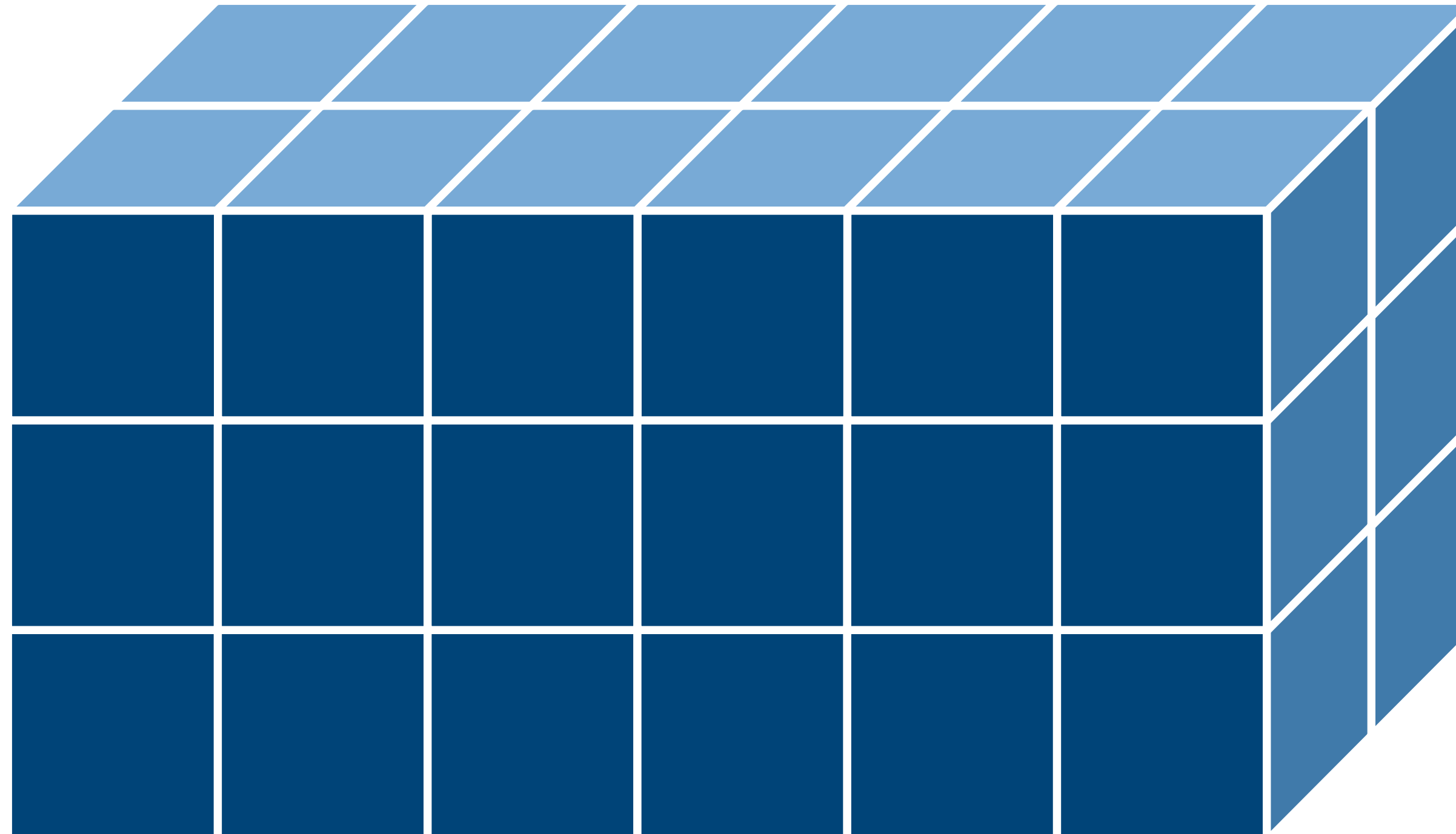
$$36 = 3 \times T_4 + T_3$$



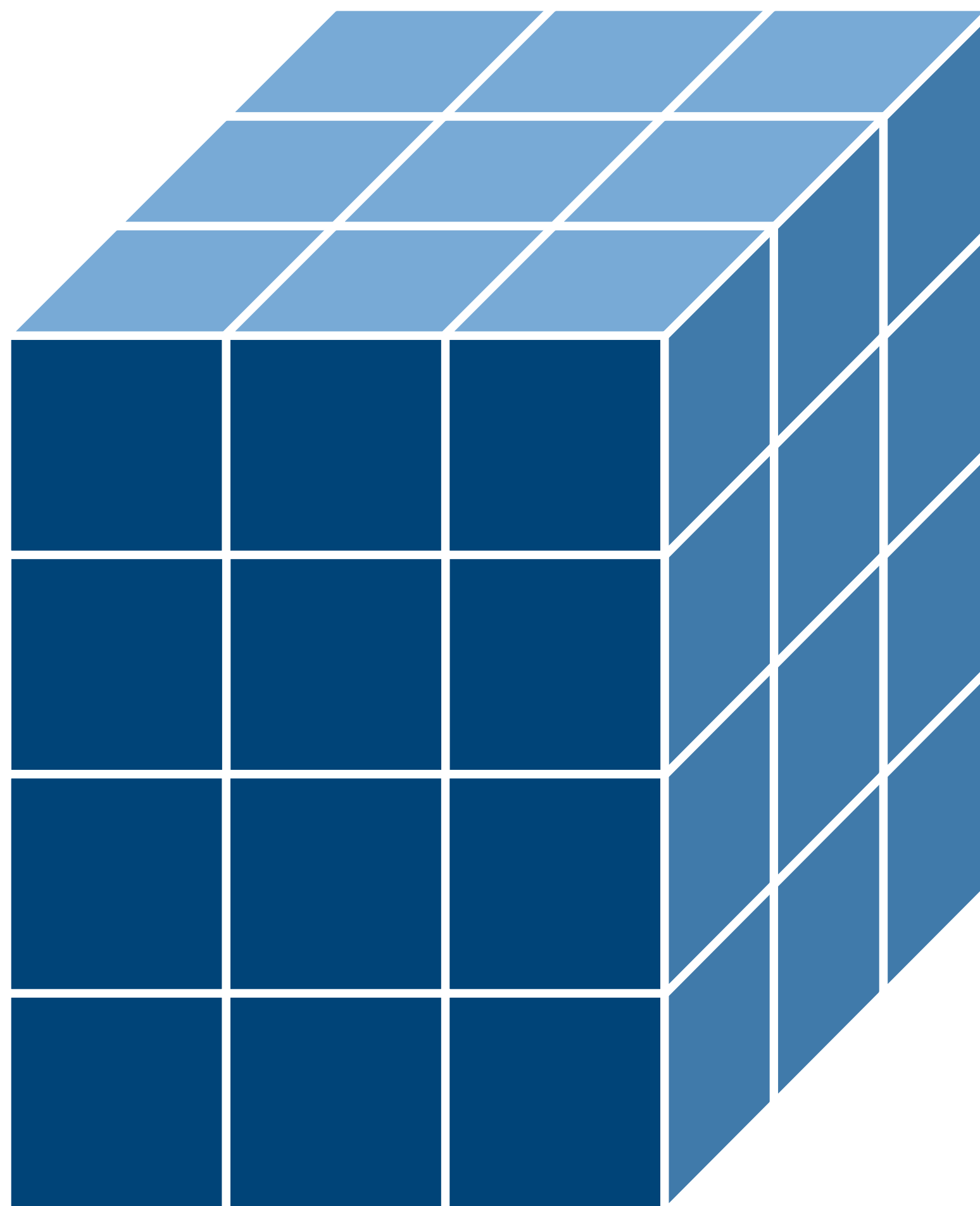
$$36 = 3 \times 10 + 6$$



$$36 = 3 \times 10 + 6$$

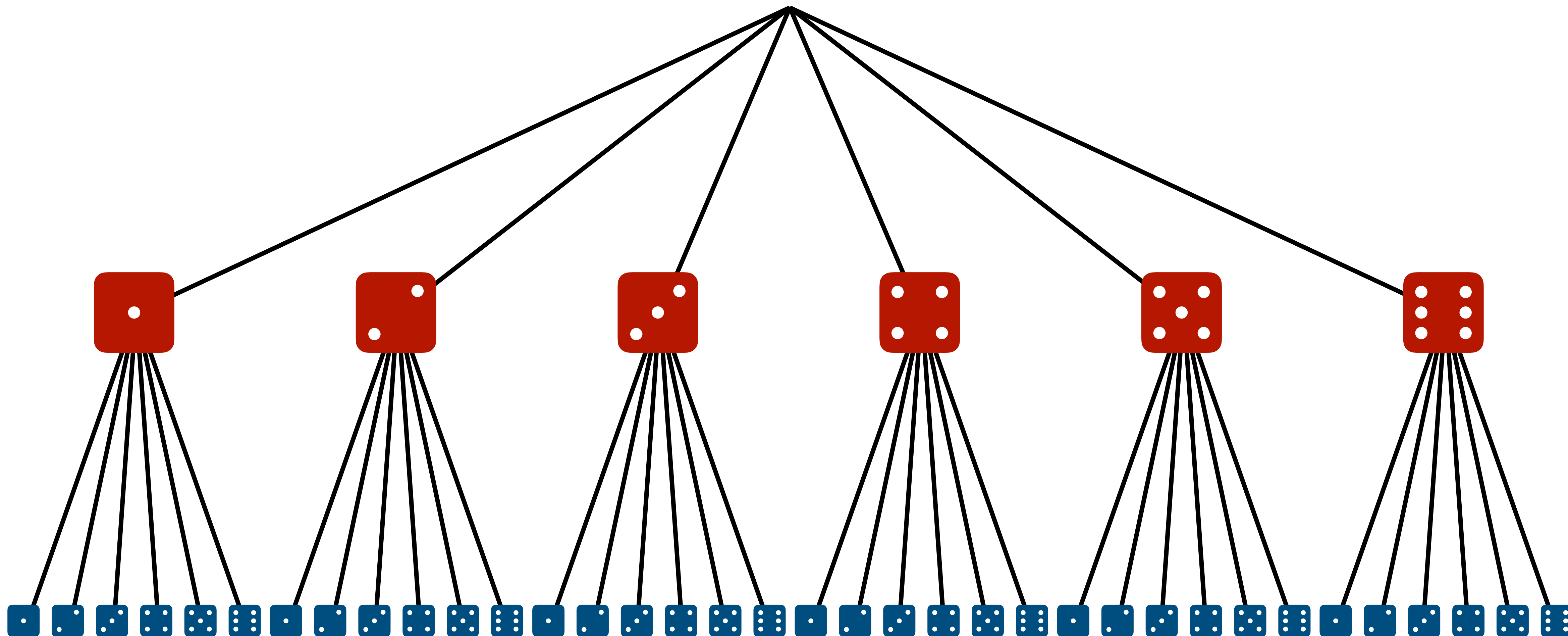


$$36 = 6 \times 2 \times 3$$

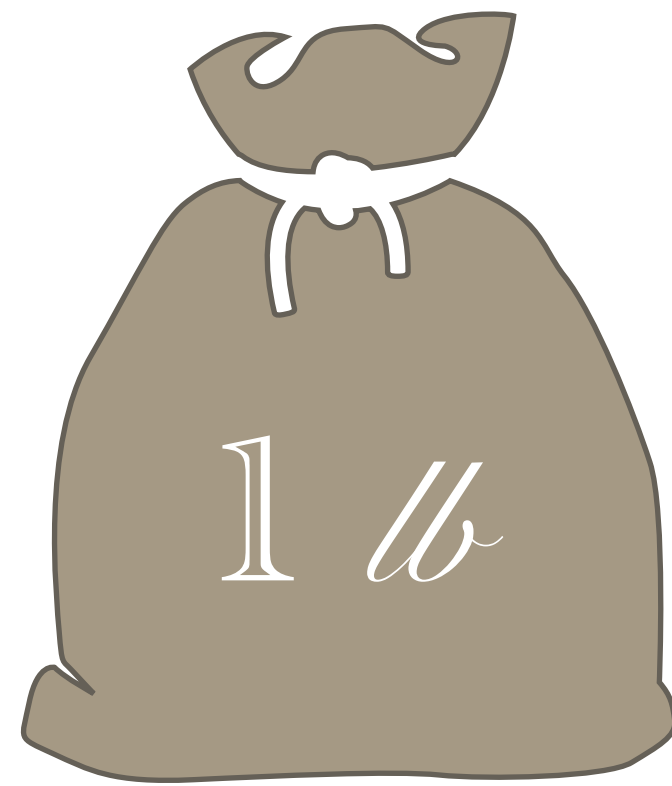


$$36 = 3 \times 3 \times 4$$



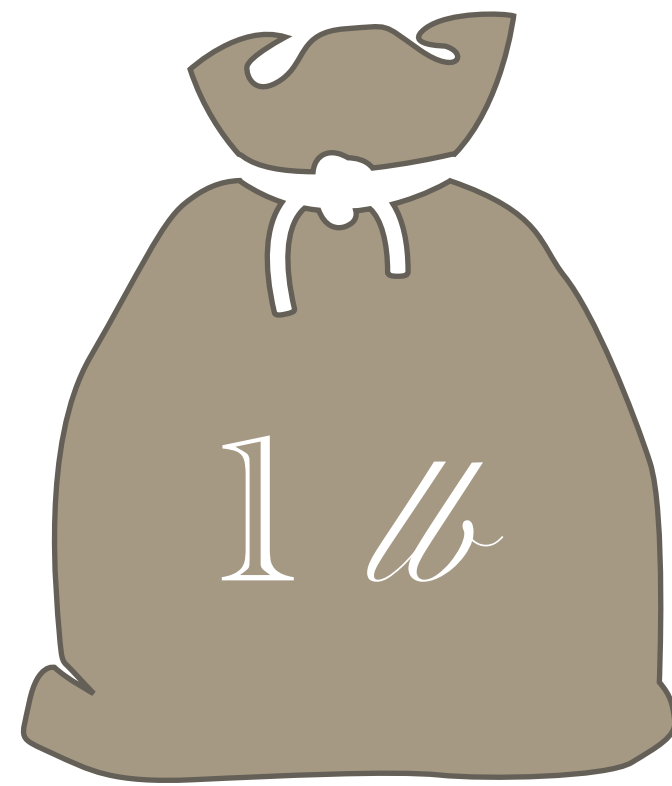


$$36 = 6 \times 6$$

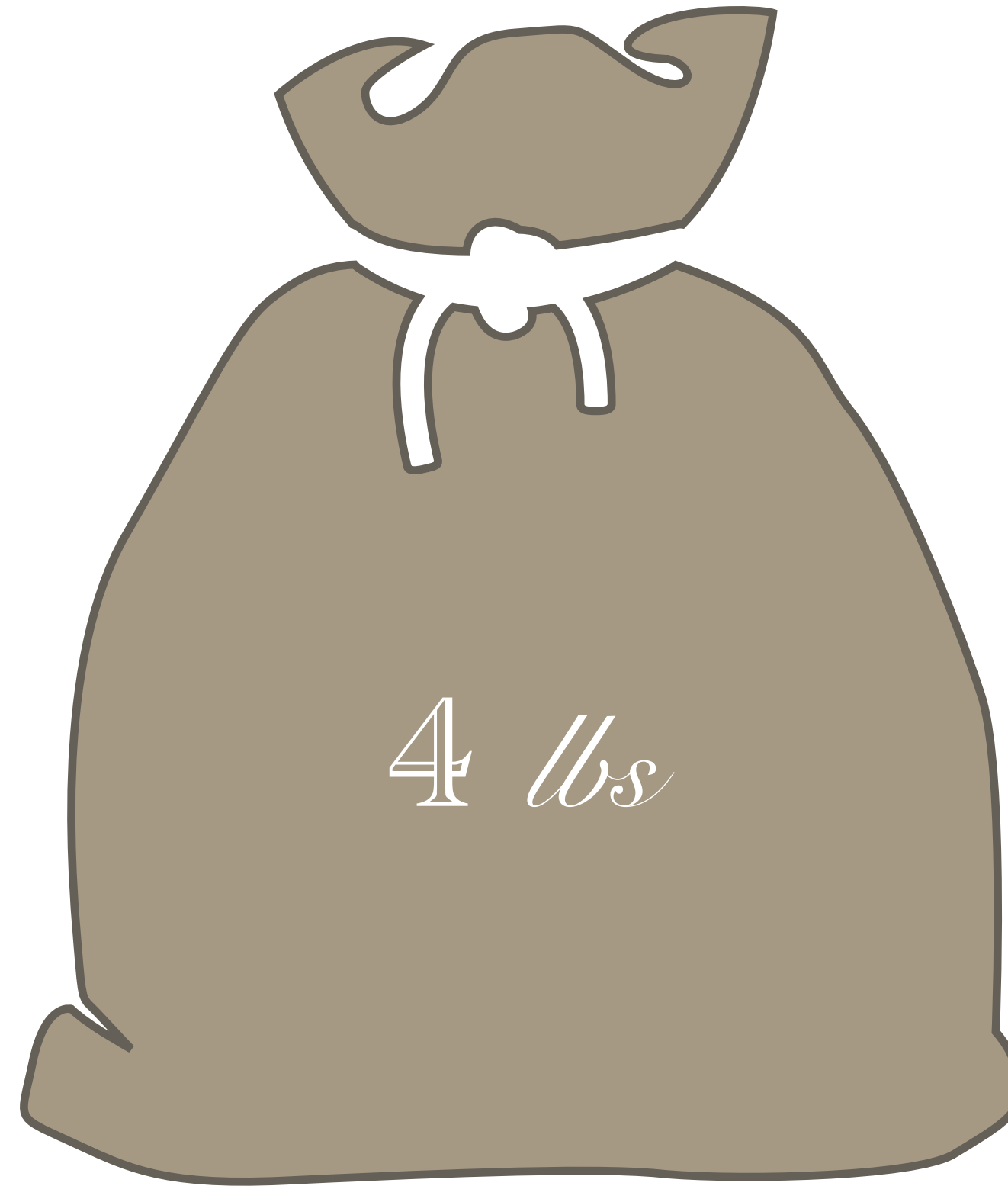


\$9

$$\$36 = 4 \text{ lbs} \times \$9/\text{lb}$$



\$9




\$36

$$\$36 = 4 \text{ lbs} \times \$9/\text{lb}$$

“Using [...] **different representations** is like examining the concept through a variety of lenses, with each lens providing a **different perspective** that makes the picture (concept) richer and deeper.”

Tripathi, 2008, p. 439

A close-up shot of Qui-Gon Jinn from Star Wars: The Phantom Menace. He has long, dark hair and a beard, and is looking intently at Anakin Skywalker, whose back is to the camera on the right. The background is dark and out of focus, showing other people in a crowd.

Your
focus
determines
your
reality.

—Qui-Gon Jinn

A speech bubble with a black background filled with small white stars, resembling a night sky. The bubble has a white outline and a pointed tail at the bottom left. Inside the bubble, the text "What is multiplication?" and "What does it **look** like?" is written in a white, italicized serif font.

What is multiplication?
*What does it **look** like ?*



Counting Collections



Counting Collections

Name Sarah

Date J. 18

Counting Collections

My Estimate Range 40-45

Actual Count 40

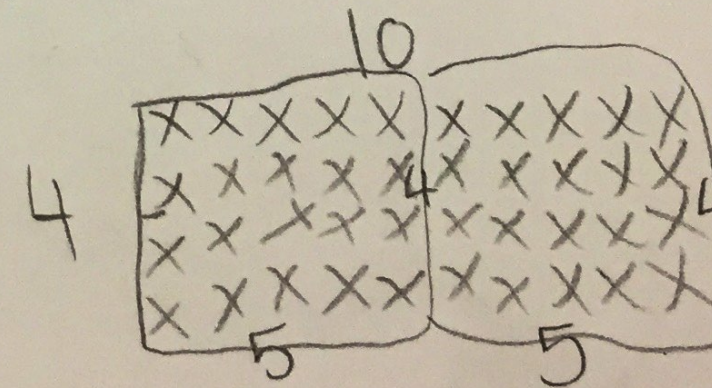
What did you count today? daisies

Show and explain the different ways you counted your collections below!

$\begin{array}{cc} \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \\ \times \times & \times \times \end{array}$
 $(2 \times 10) + (2 \times 10)$
 $4 \times 10 = 40$

$\begin{array}{ccc} \times \times & \times \times & \times \times \\ \times \times & \times \times & \times \times \\ \times \times & \times \times & \times \times \\ \times \times & \times \times & \times \times \\ \times \times & \times \times & \times \times \\ \times \times & \times \times & \times \times \\ \times \times \times & \times \times \times & \times \times \times \end{array}$
 $(3 \times 13) + 1 = 40$
3 is not a factor

Factor
1, 40, 2, 20
4, 10, 5, 8



Counting Collections

“Using [...] **different representations** is like examining the concept through a variety of lenses, with each lens providing a **different perspective** that makes the picture (concept) richer and deeper.”

Tripathi, 2008, p. 439

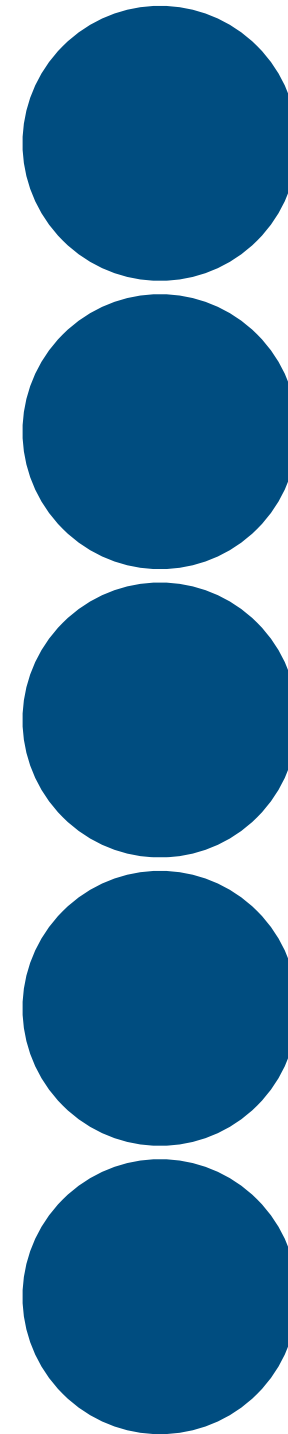
Different representations can reveal the same mathematical idea.

If you live
long enough, you
learn to **see**
the *same eyes*
in *different* people.

—Maz Kanata

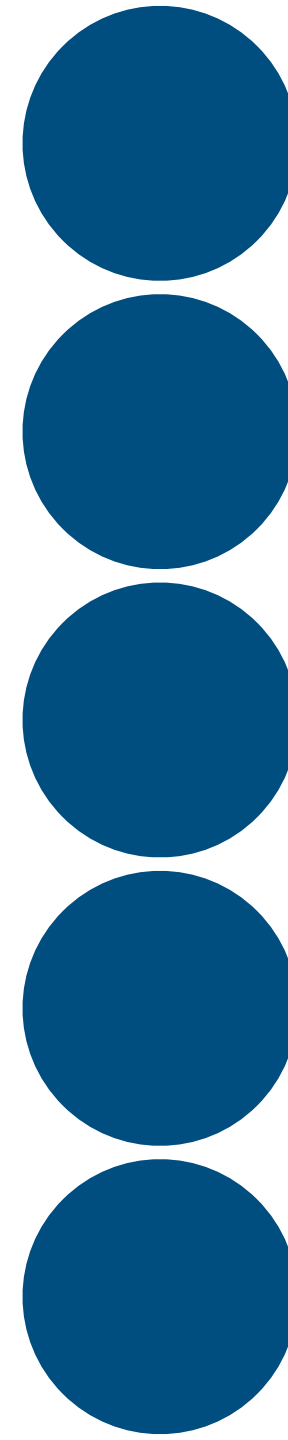


Visual Pattern



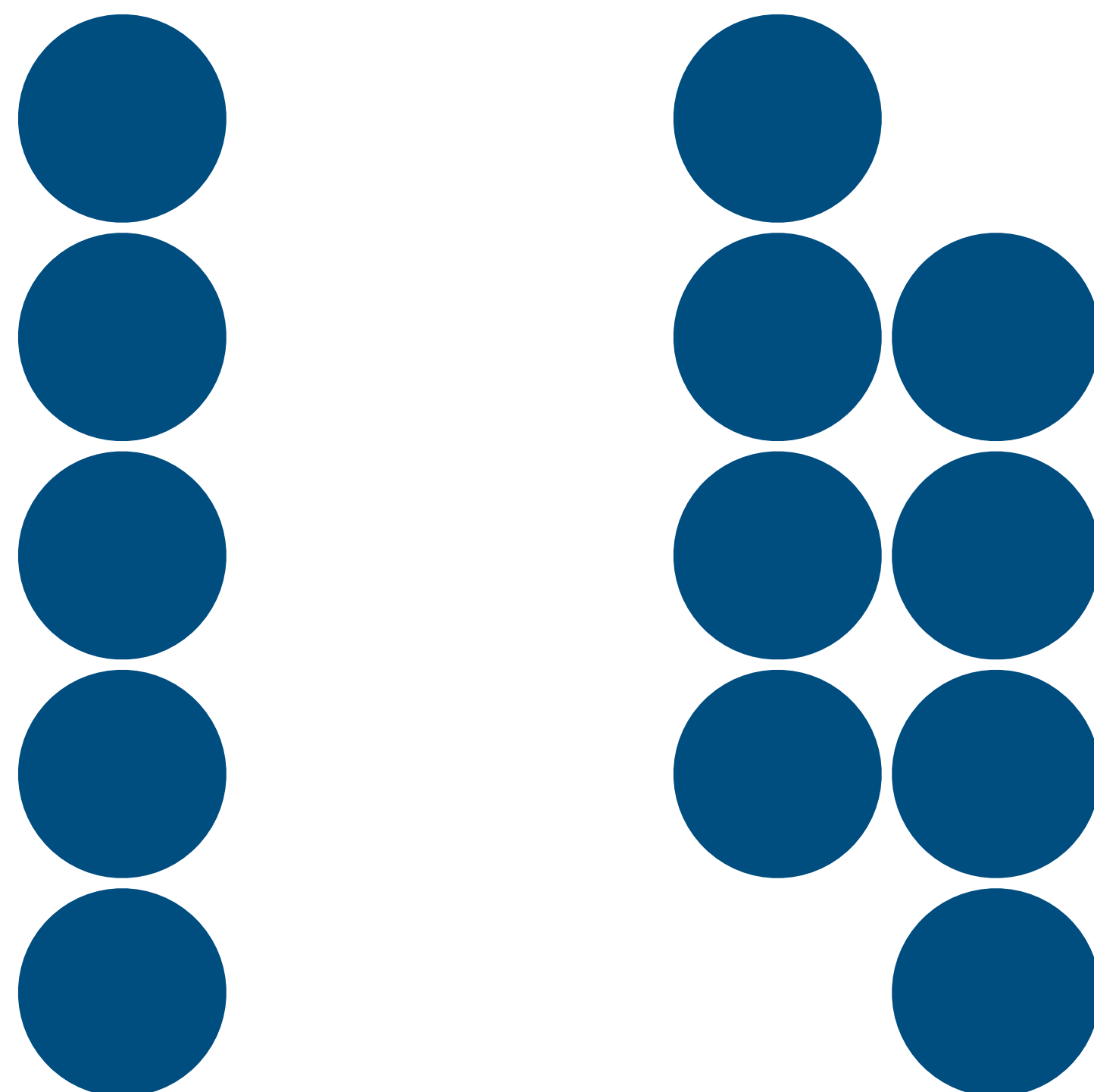
What comes *next*?

Visual Pattern



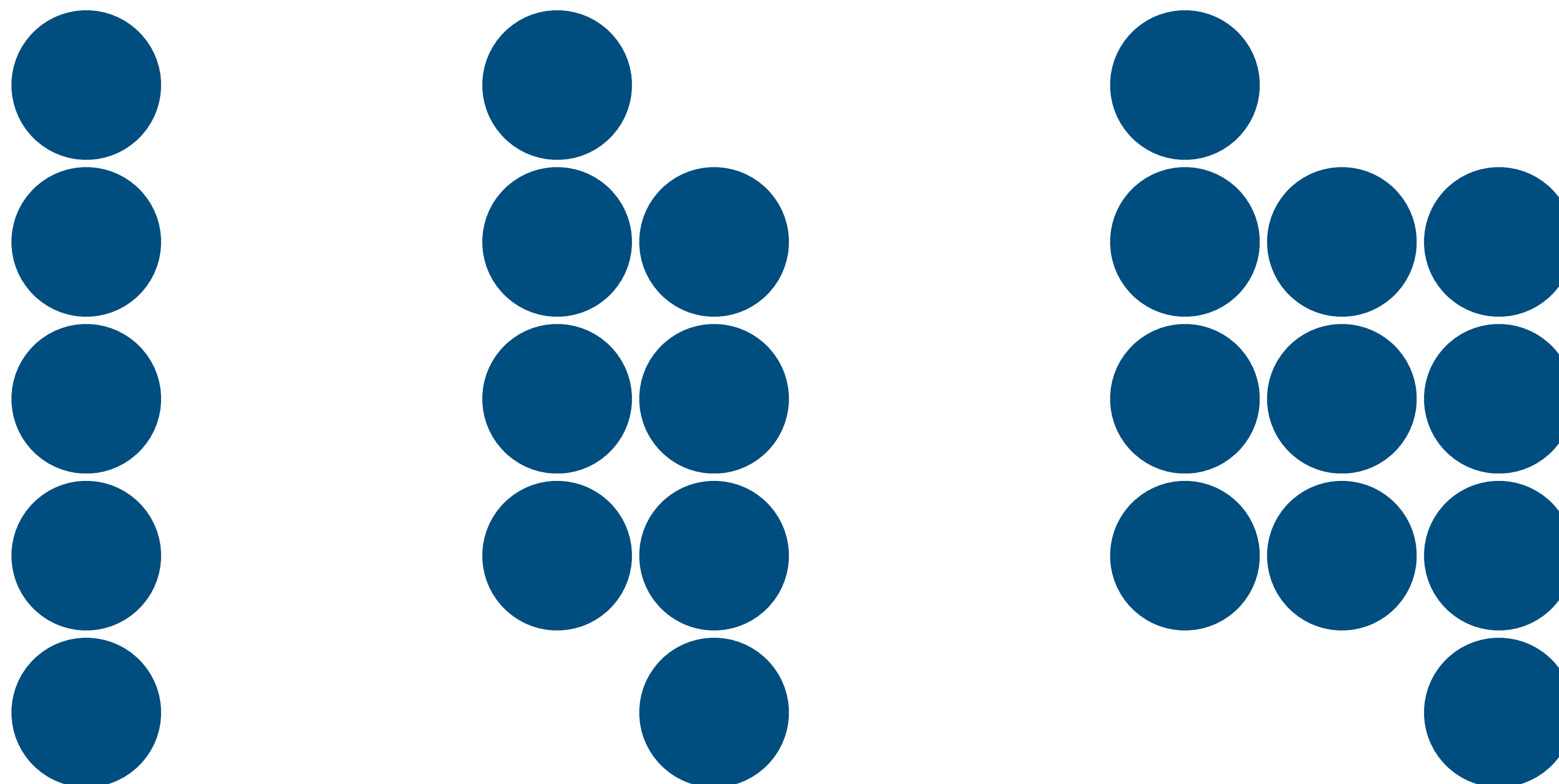
What *else*?

Visual Pattern



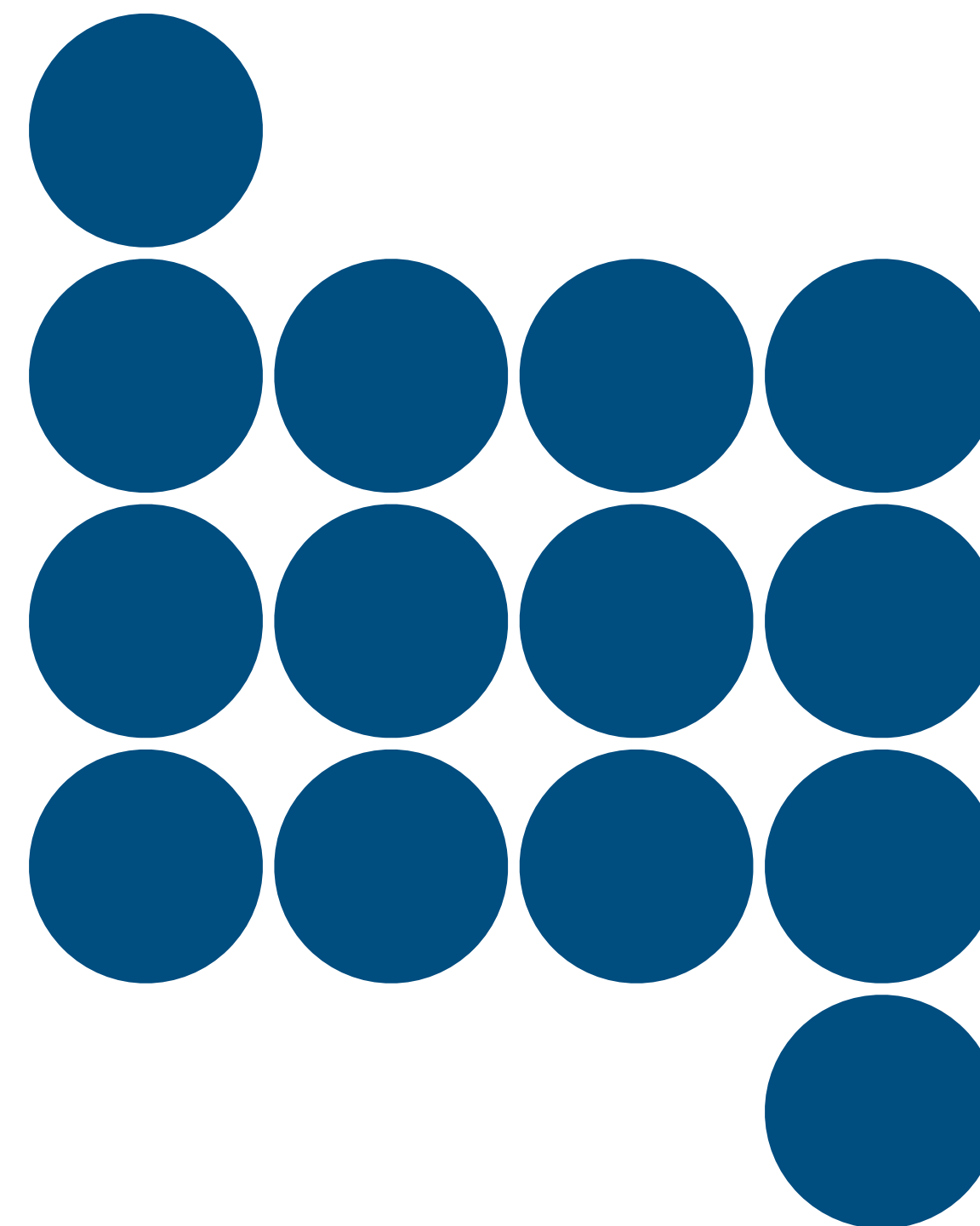
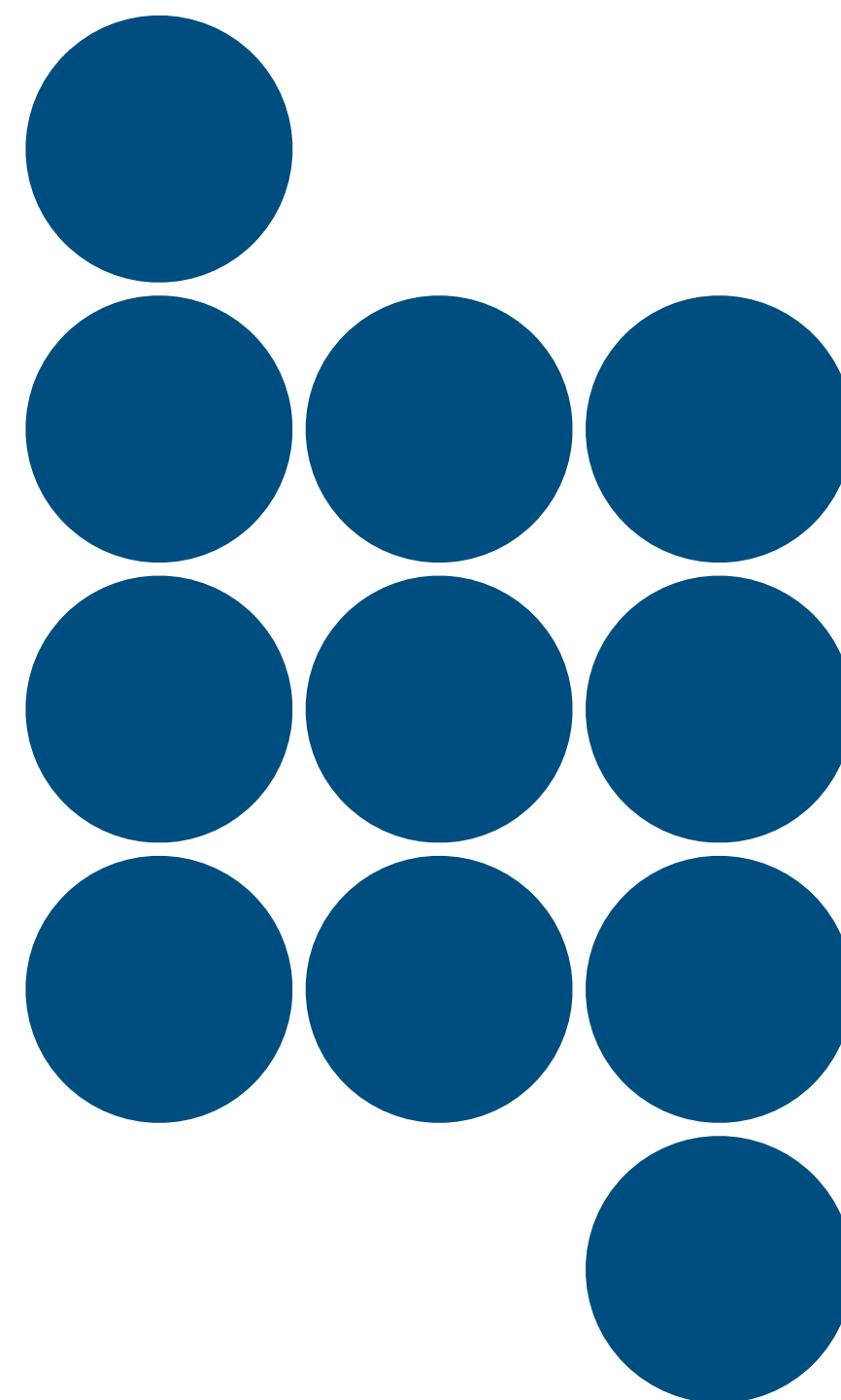
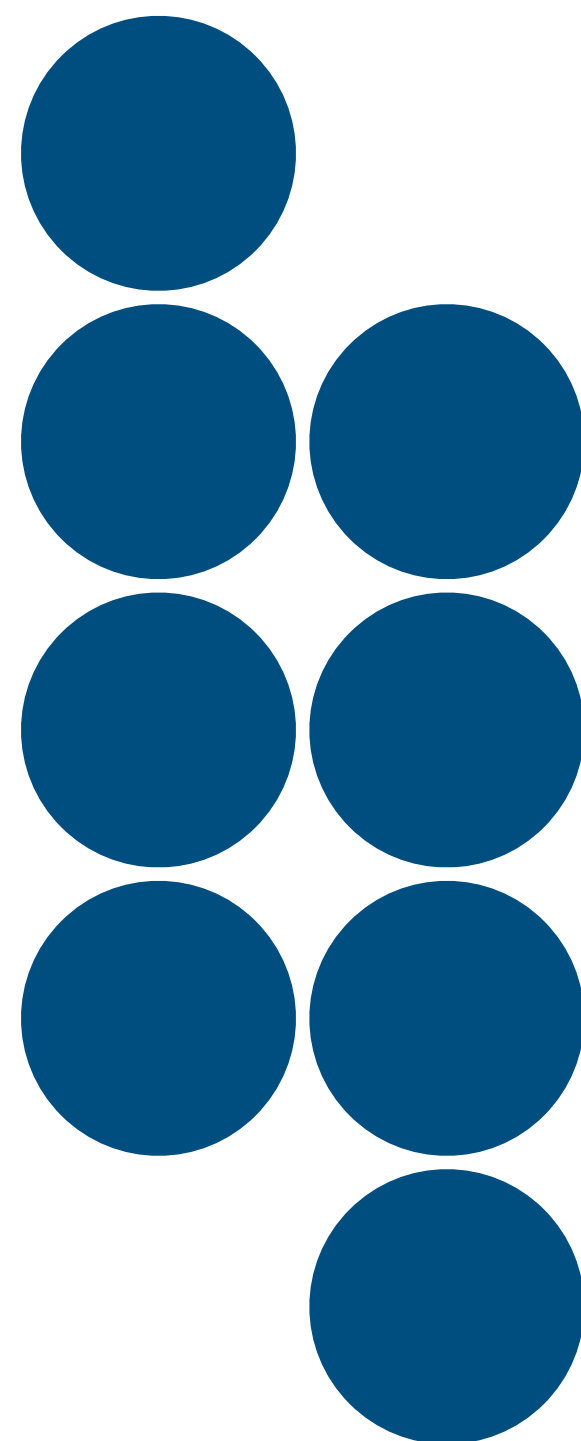
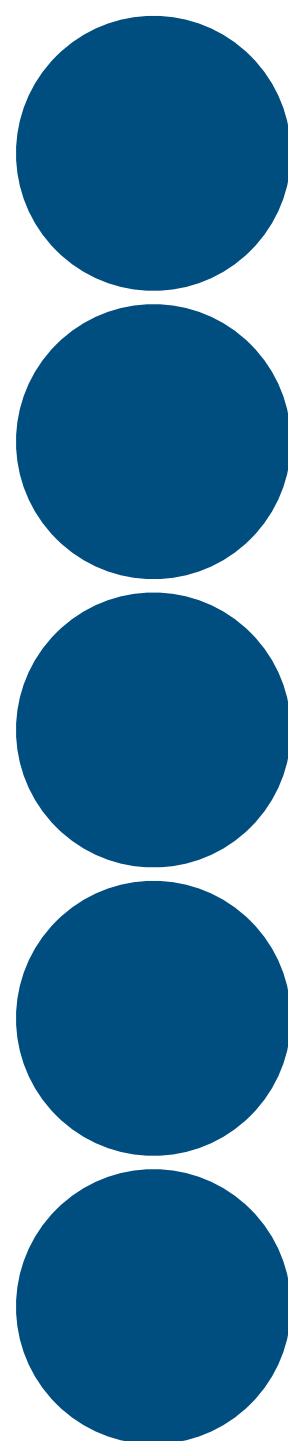
What comes *next*?

Visual Pattern

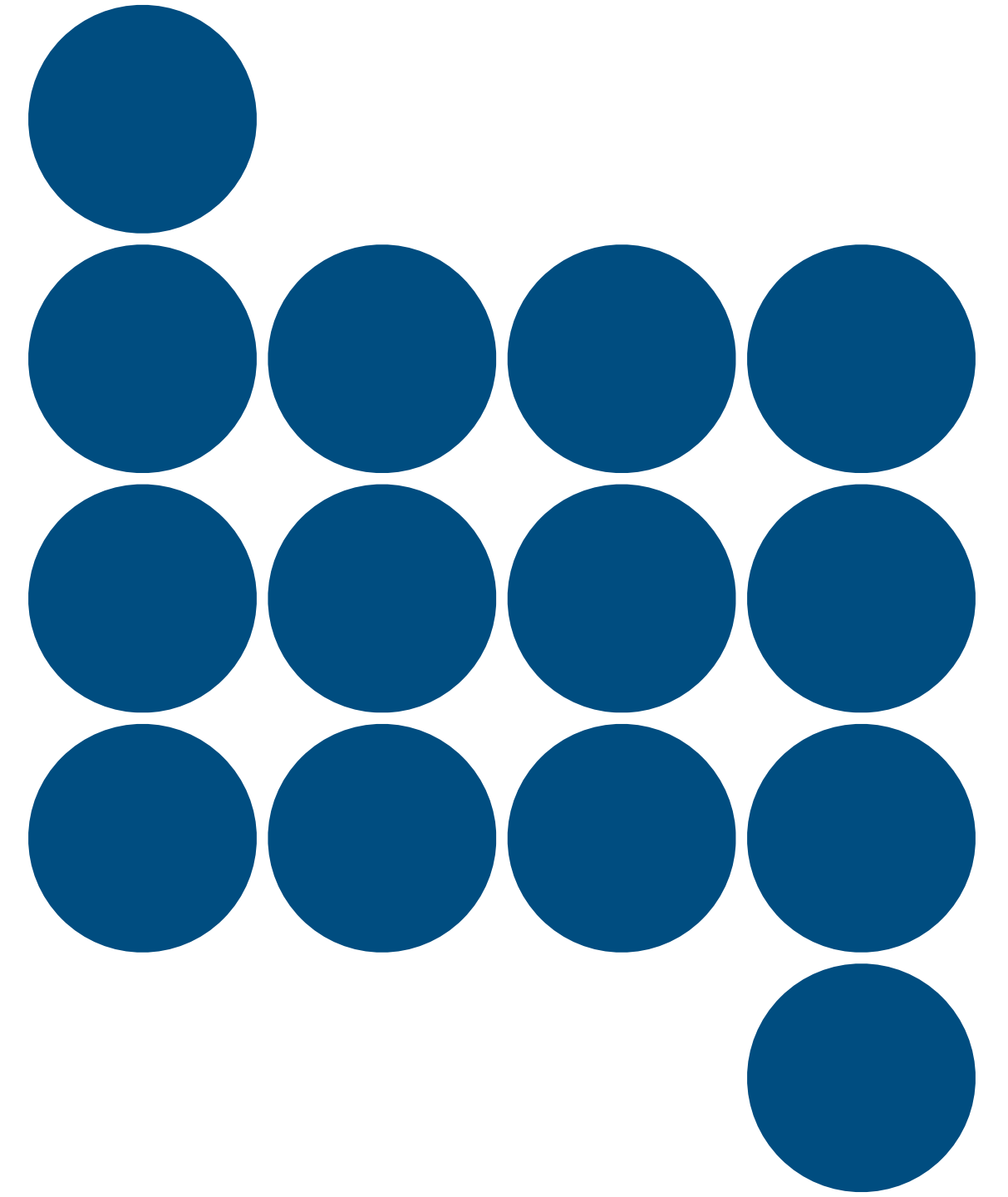
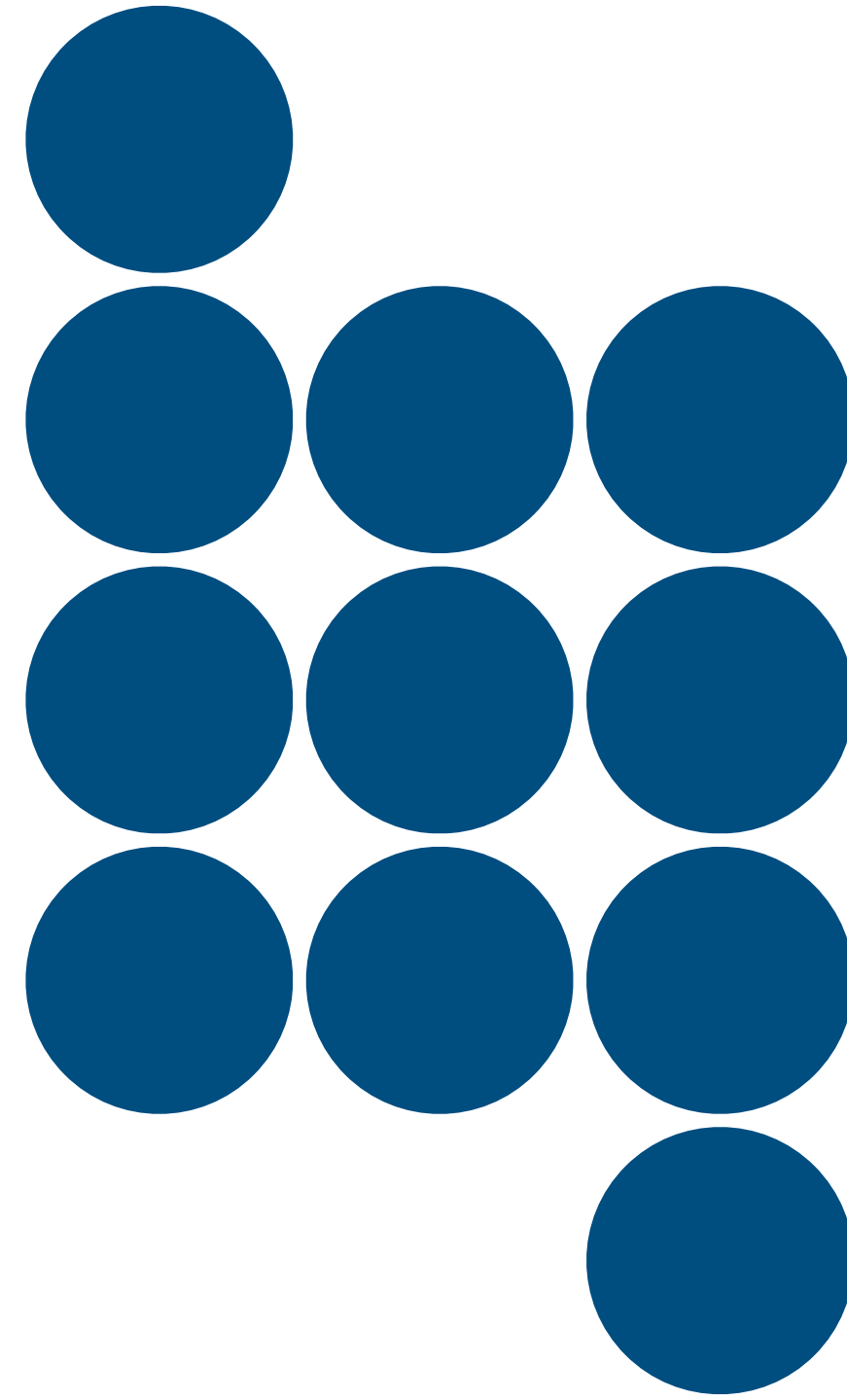
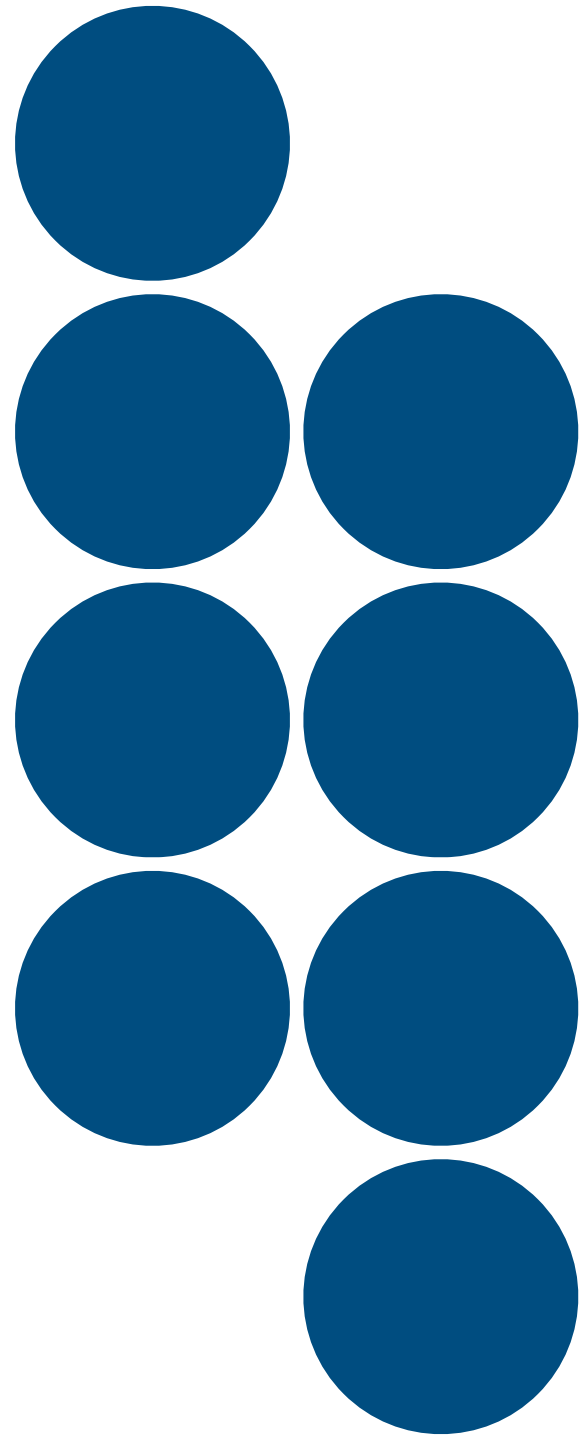
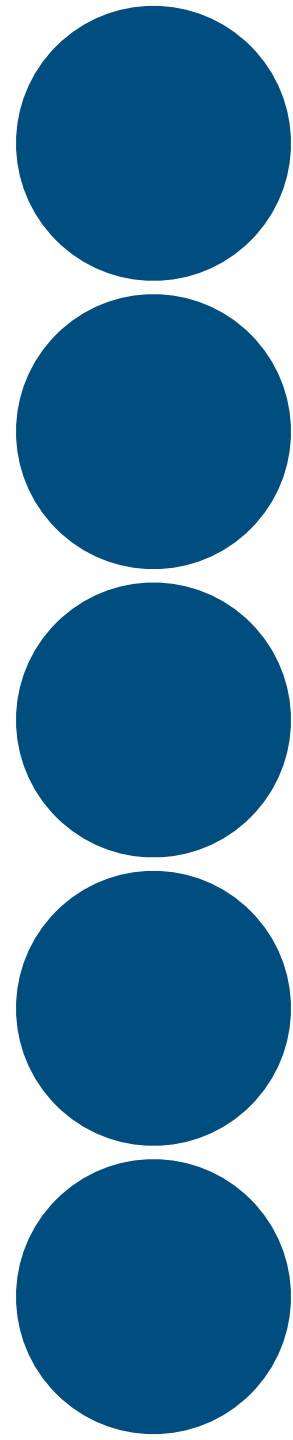


What comes *next*?

Visual Pattern

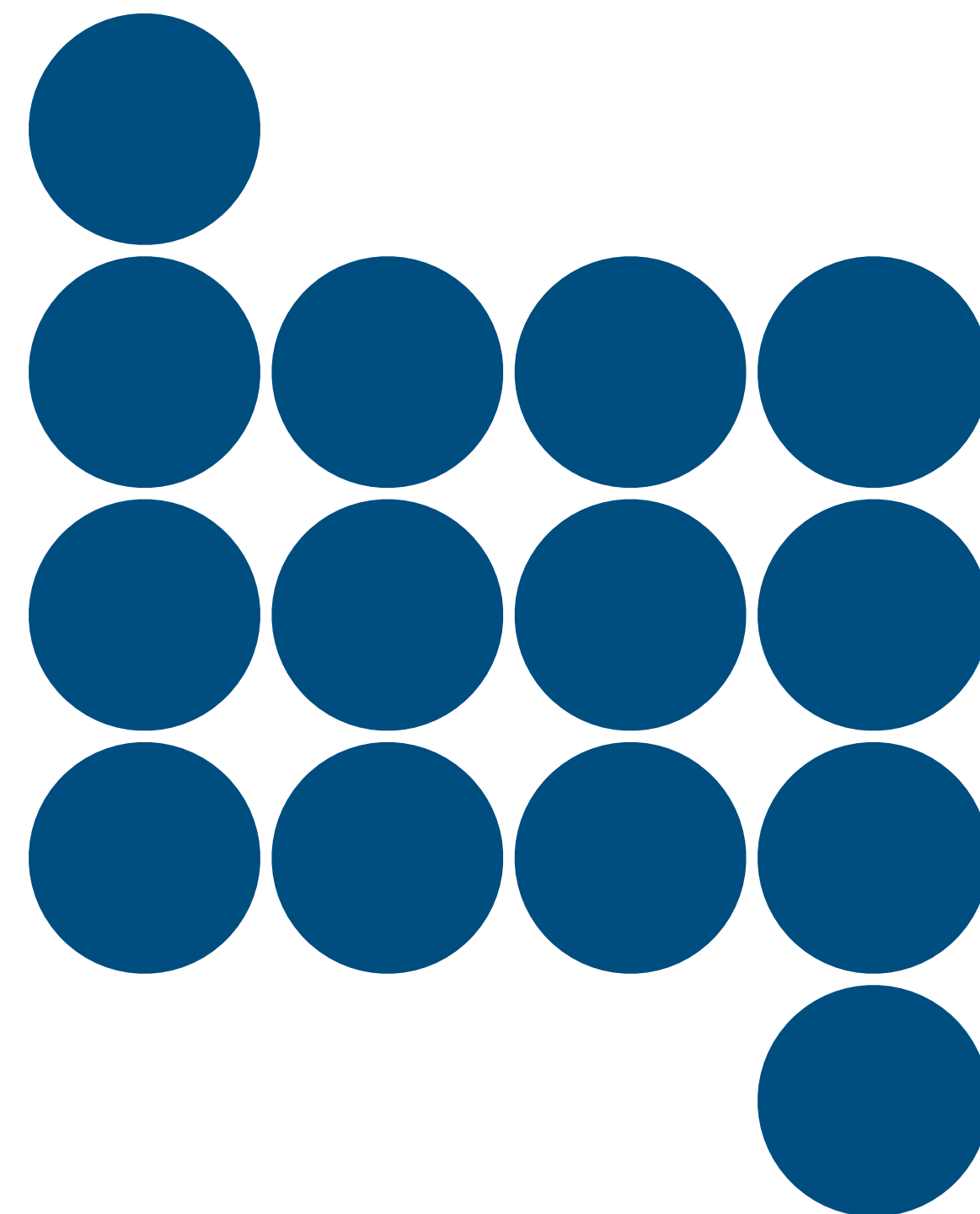
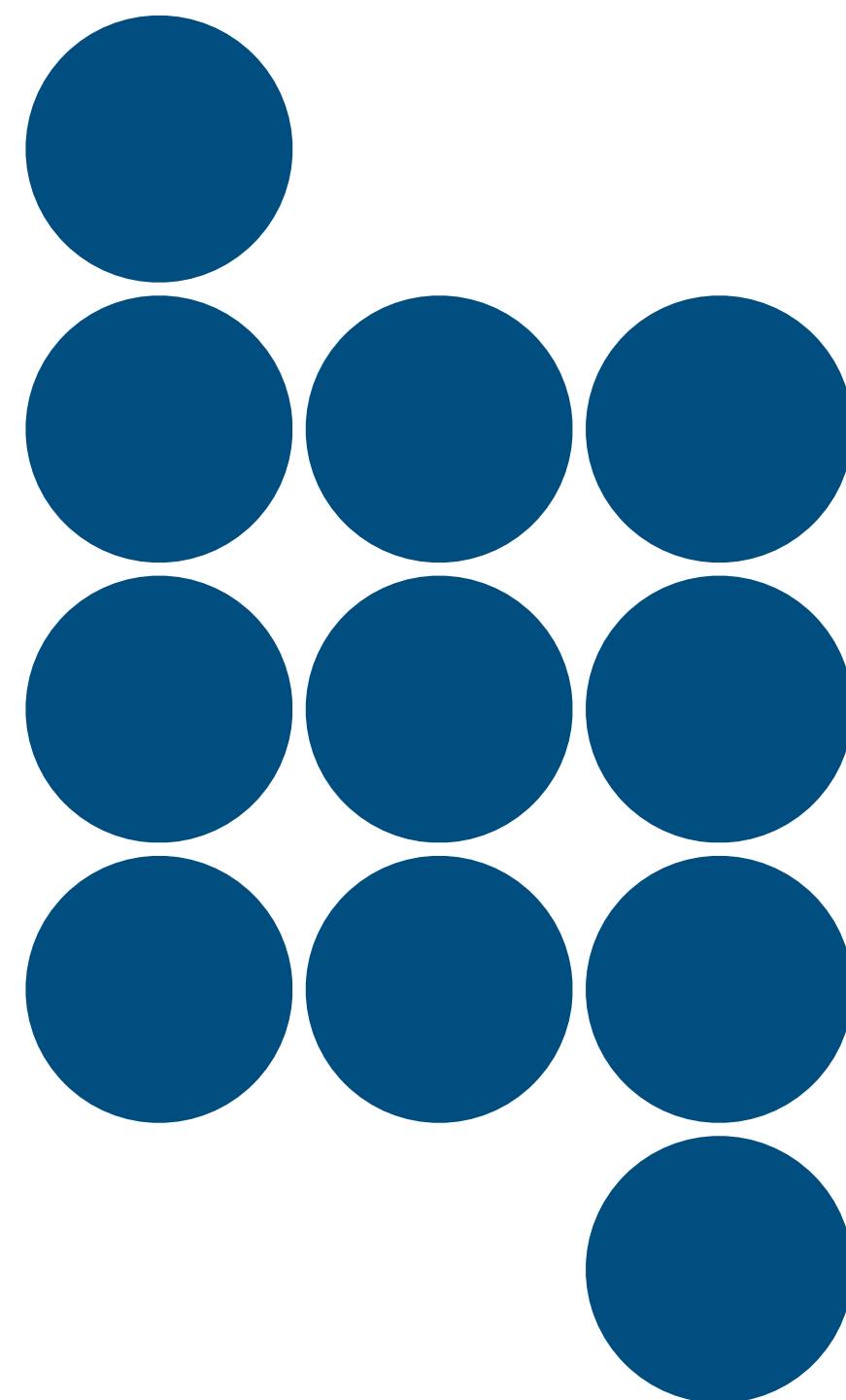
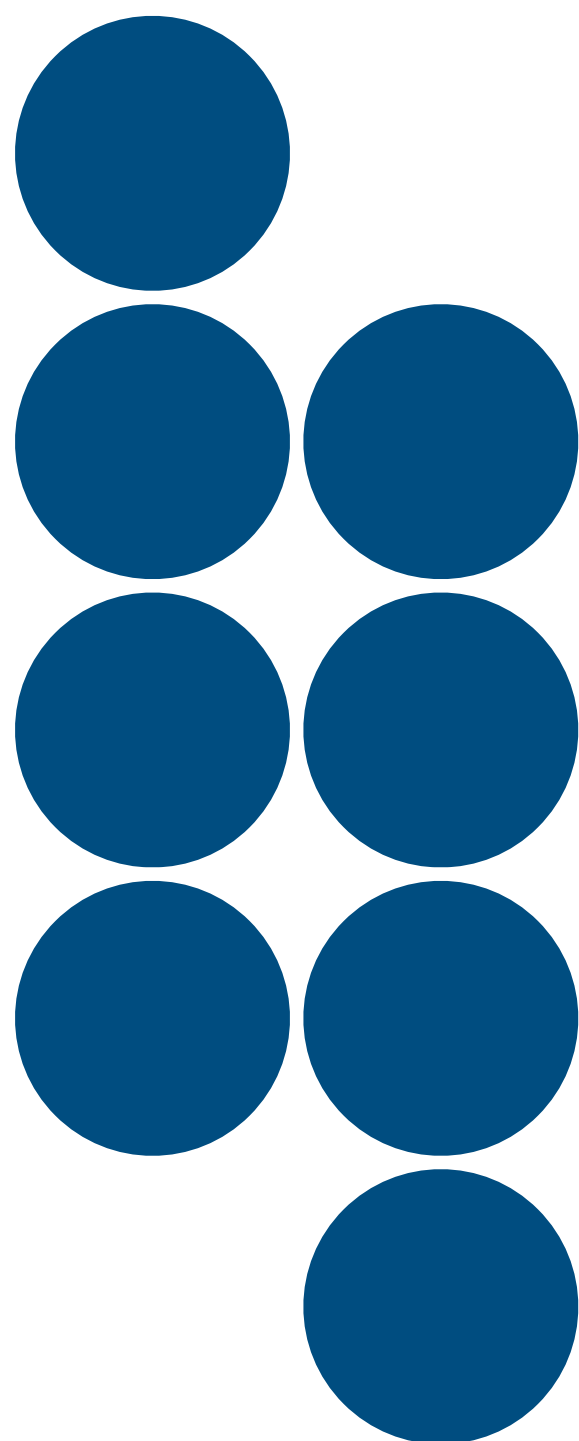
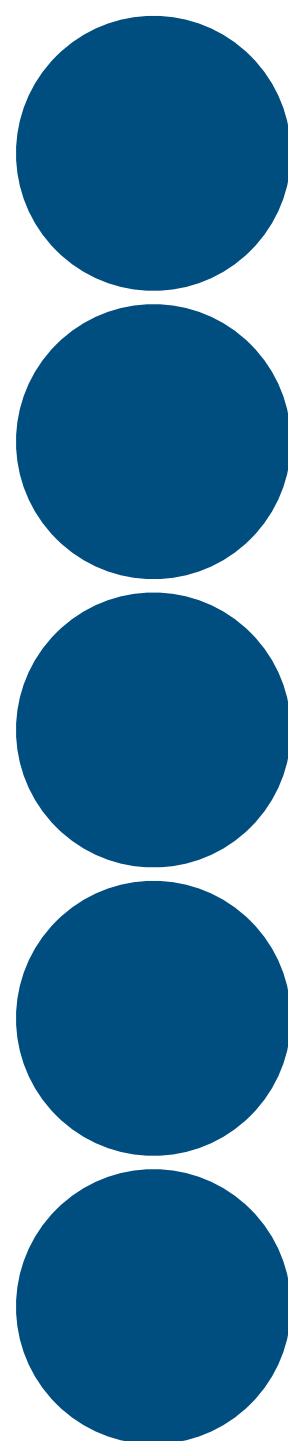


Visual Pattern



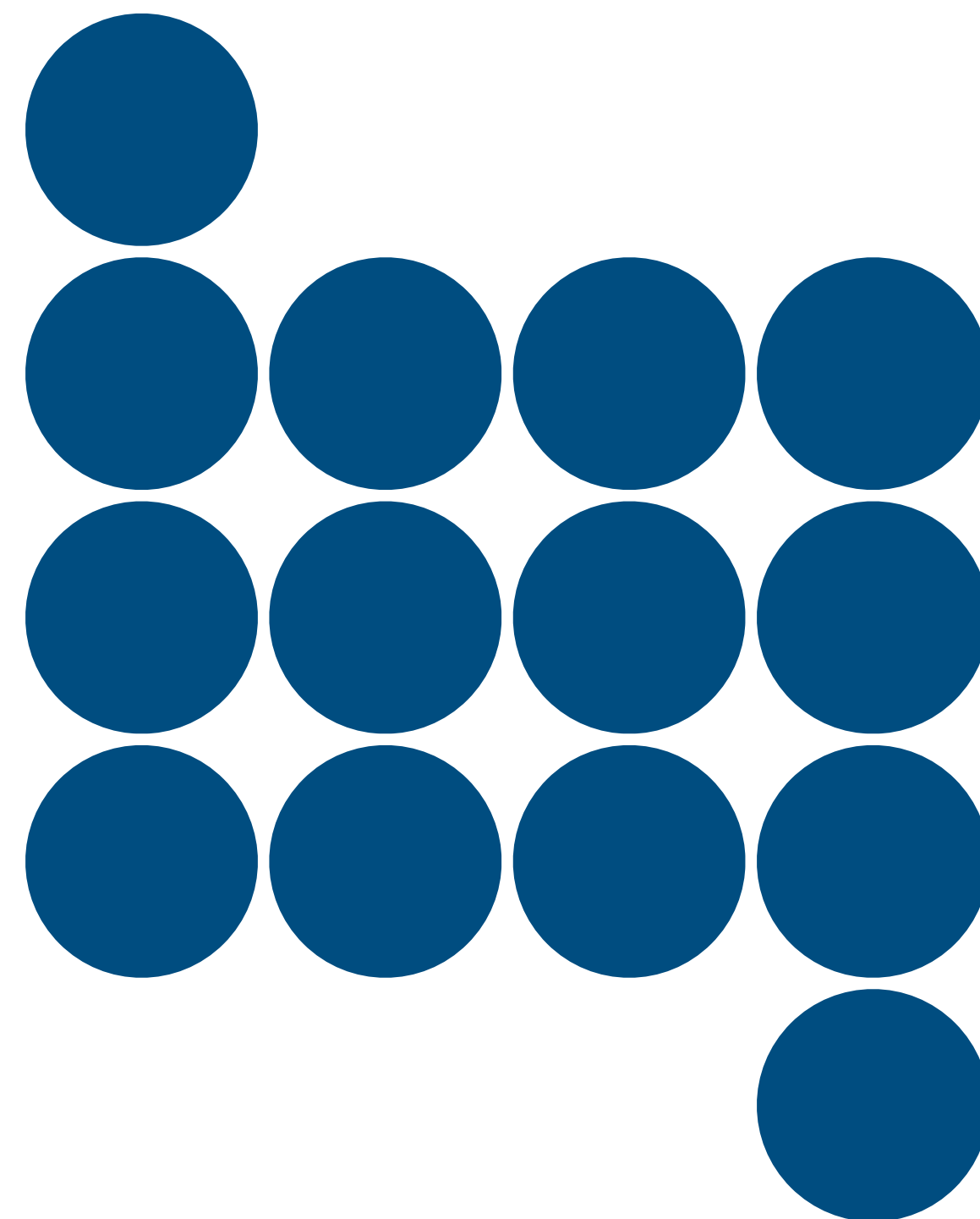
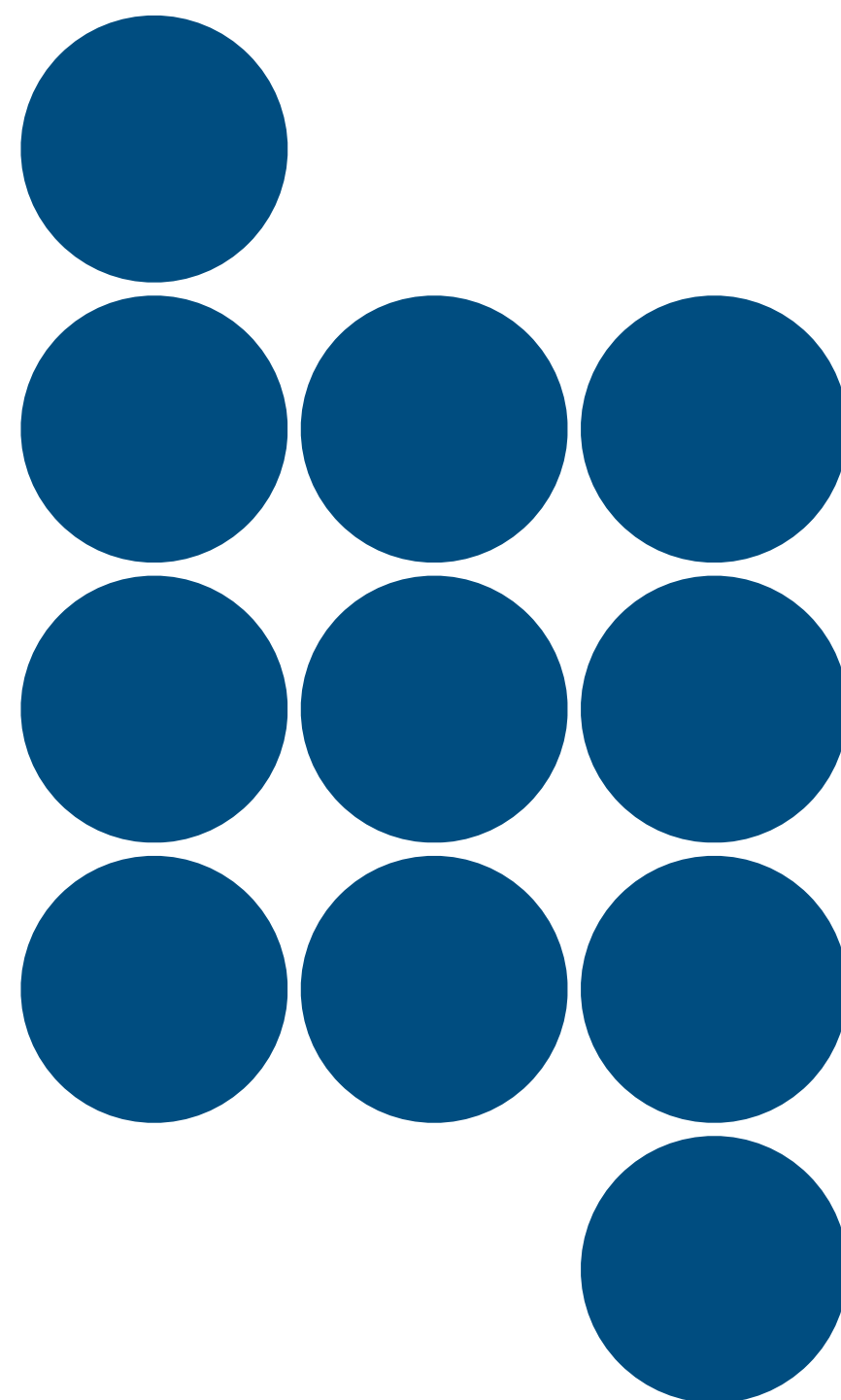
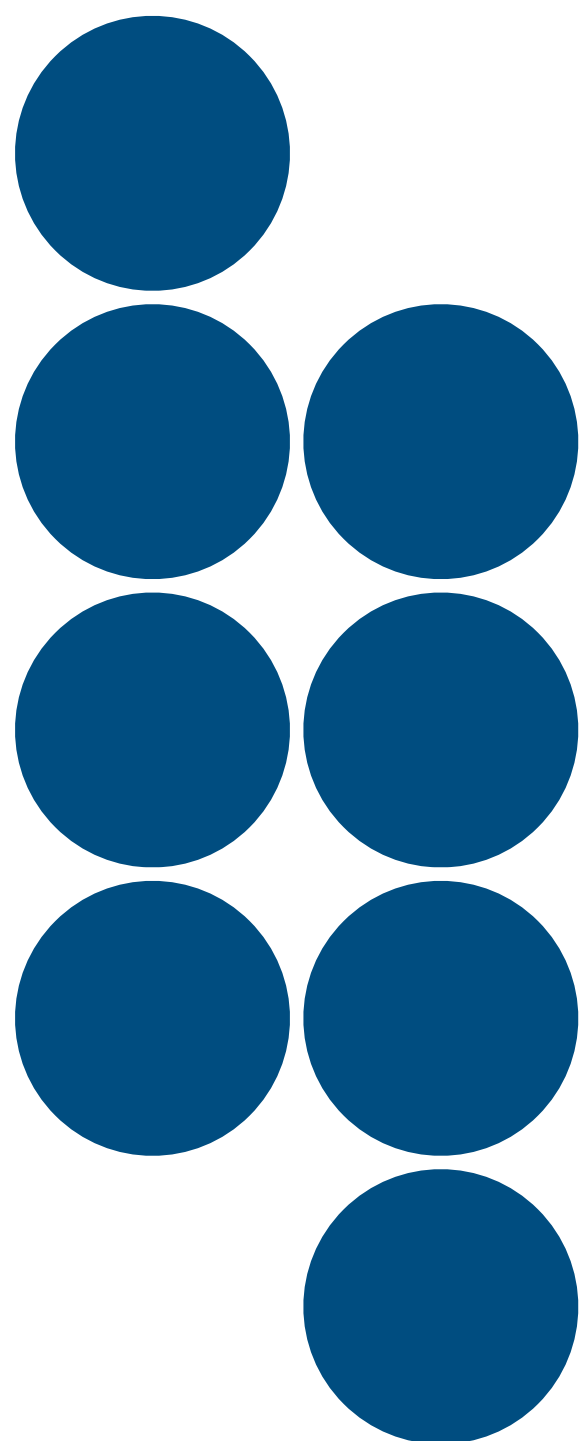
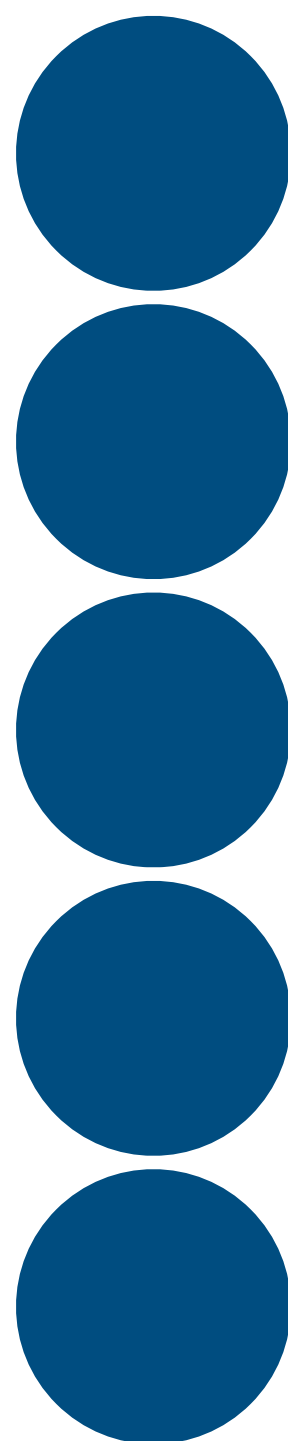
How many in Figure 10?

Visual Pattern



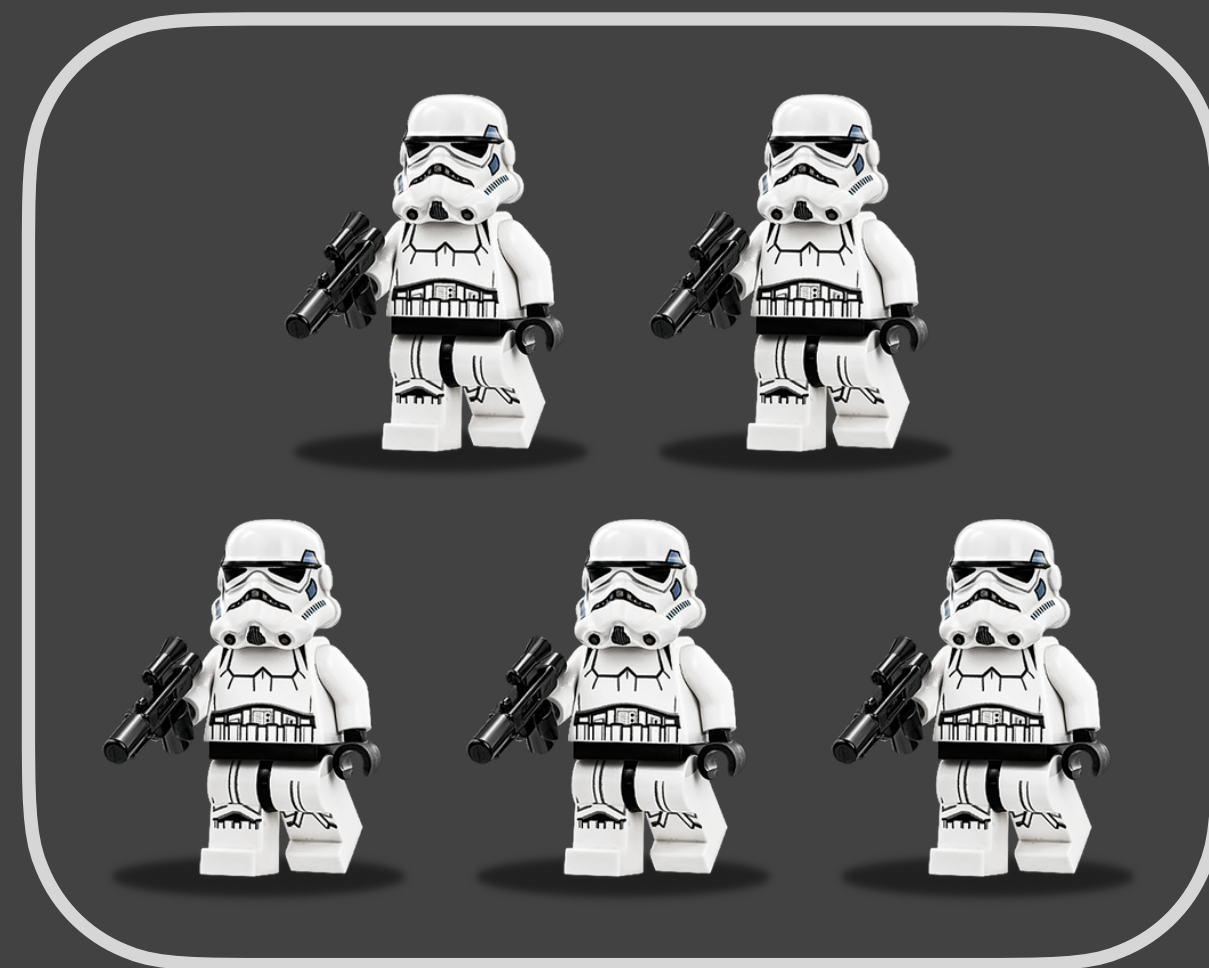
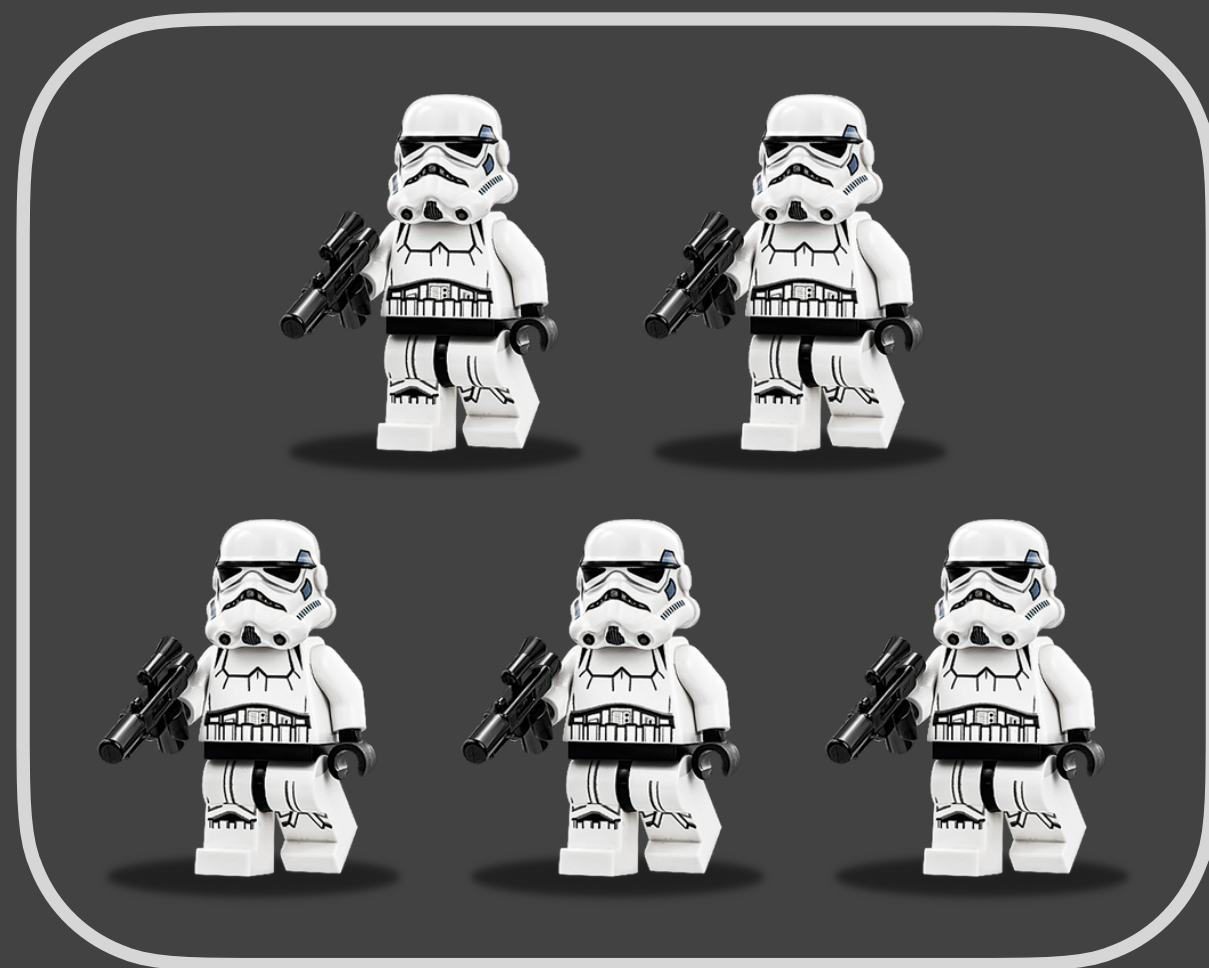
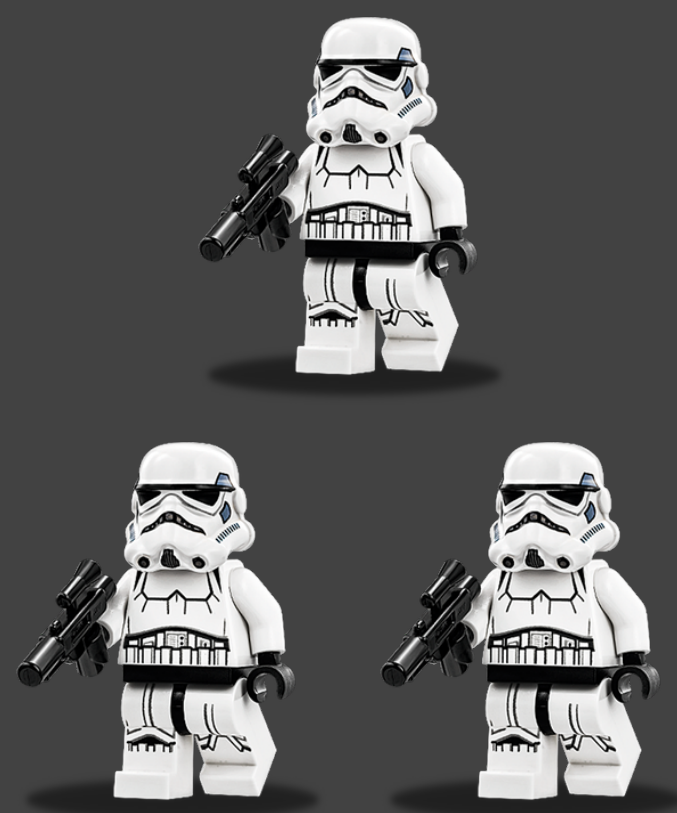
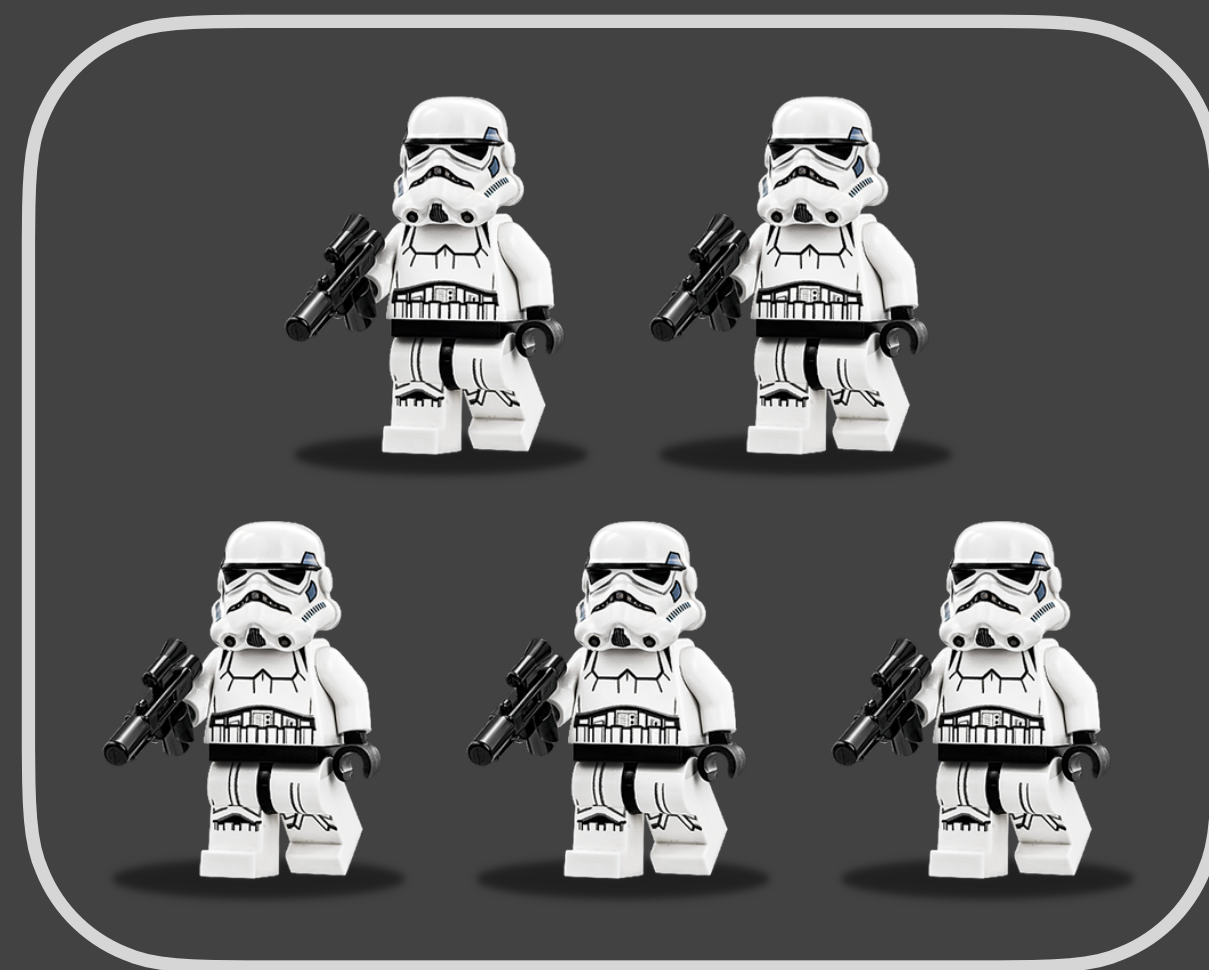
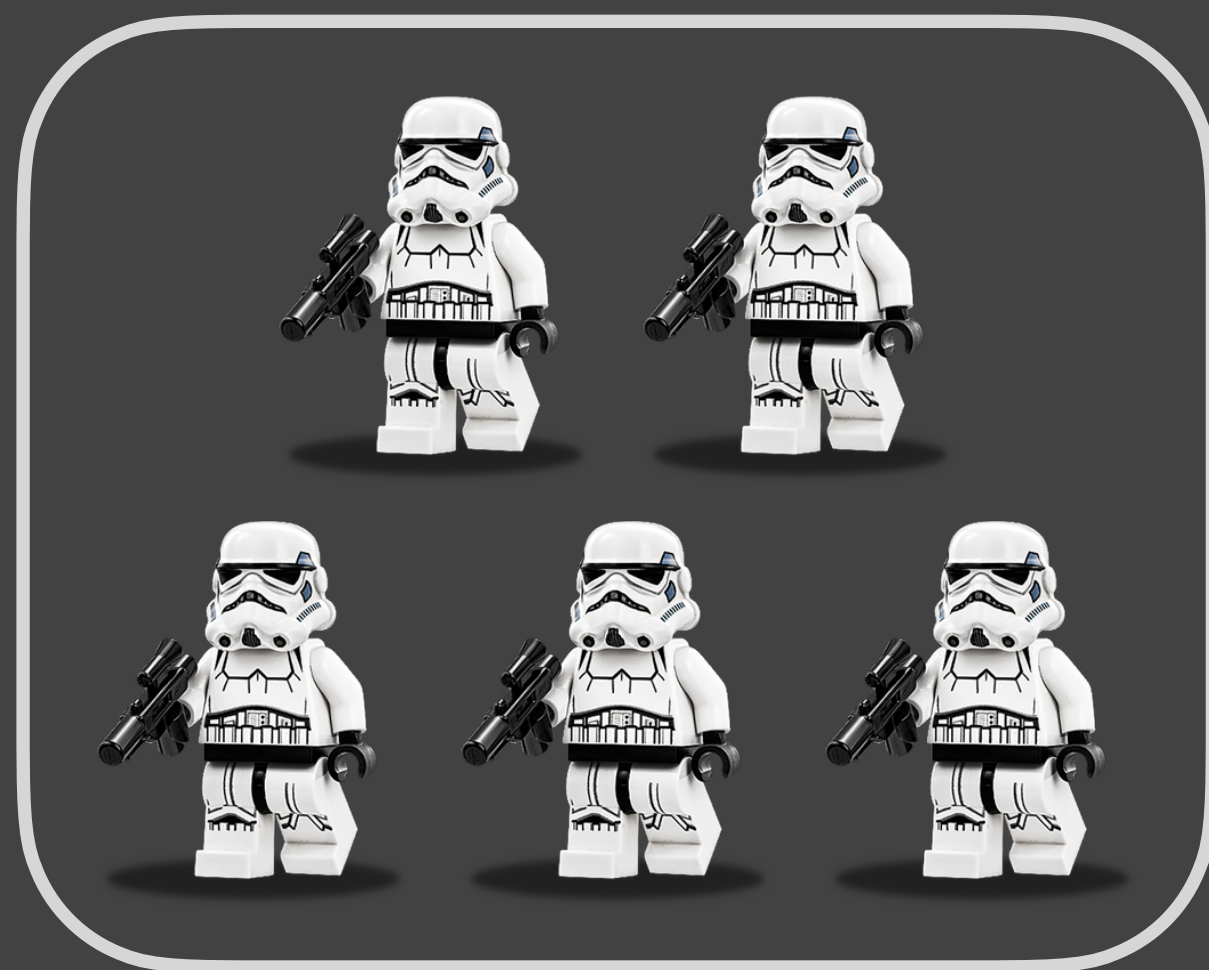
How many in Figure n ?

Visual Pattern



How do you **see** it?

Different representations can reveal the same mathematical idea.



$$3 + 4 \times 5$$



$$3 + 4 \times 5$$



$$5 + 3 \times 6$$



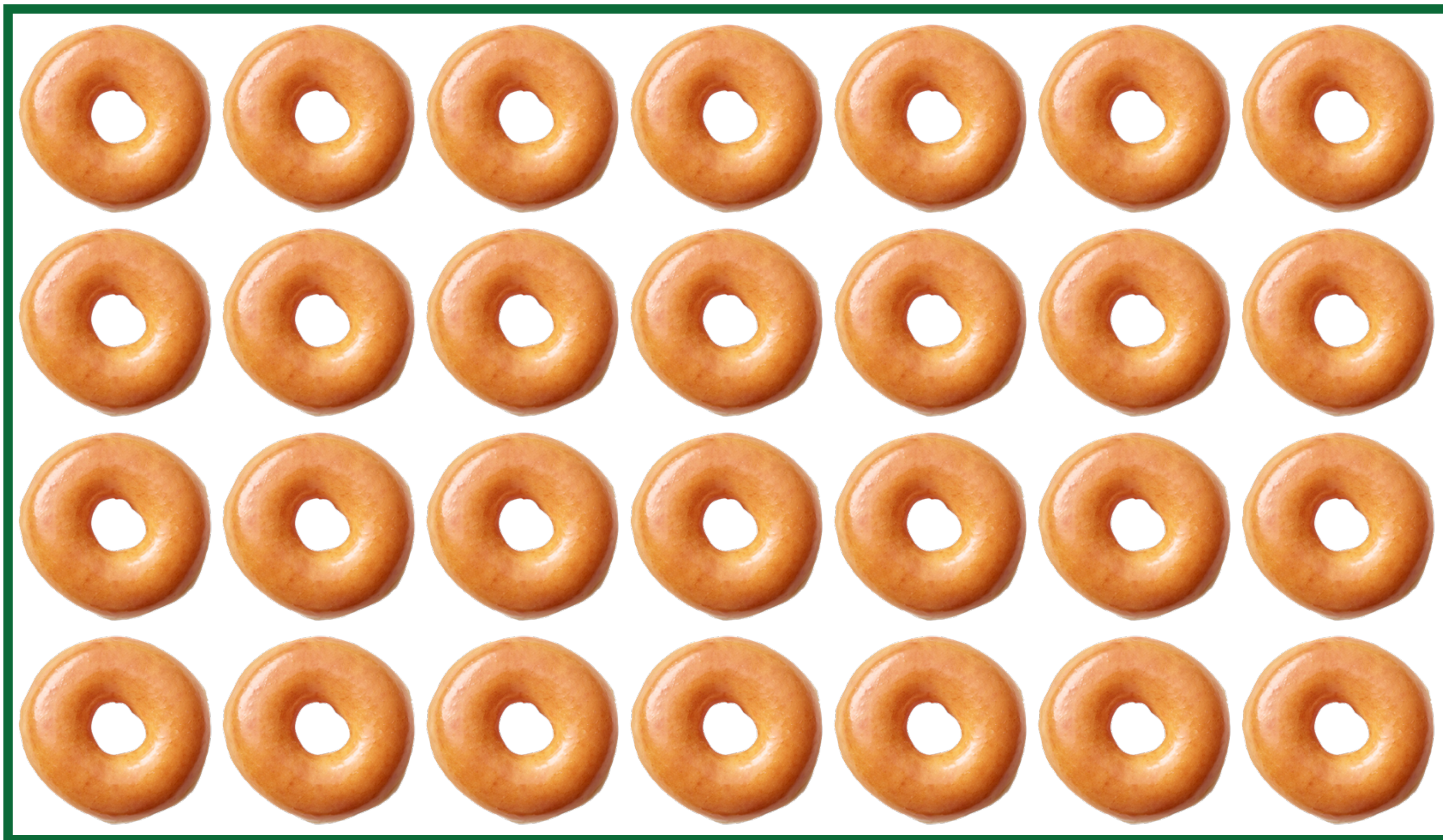
$$4 \times 6 - 1$$

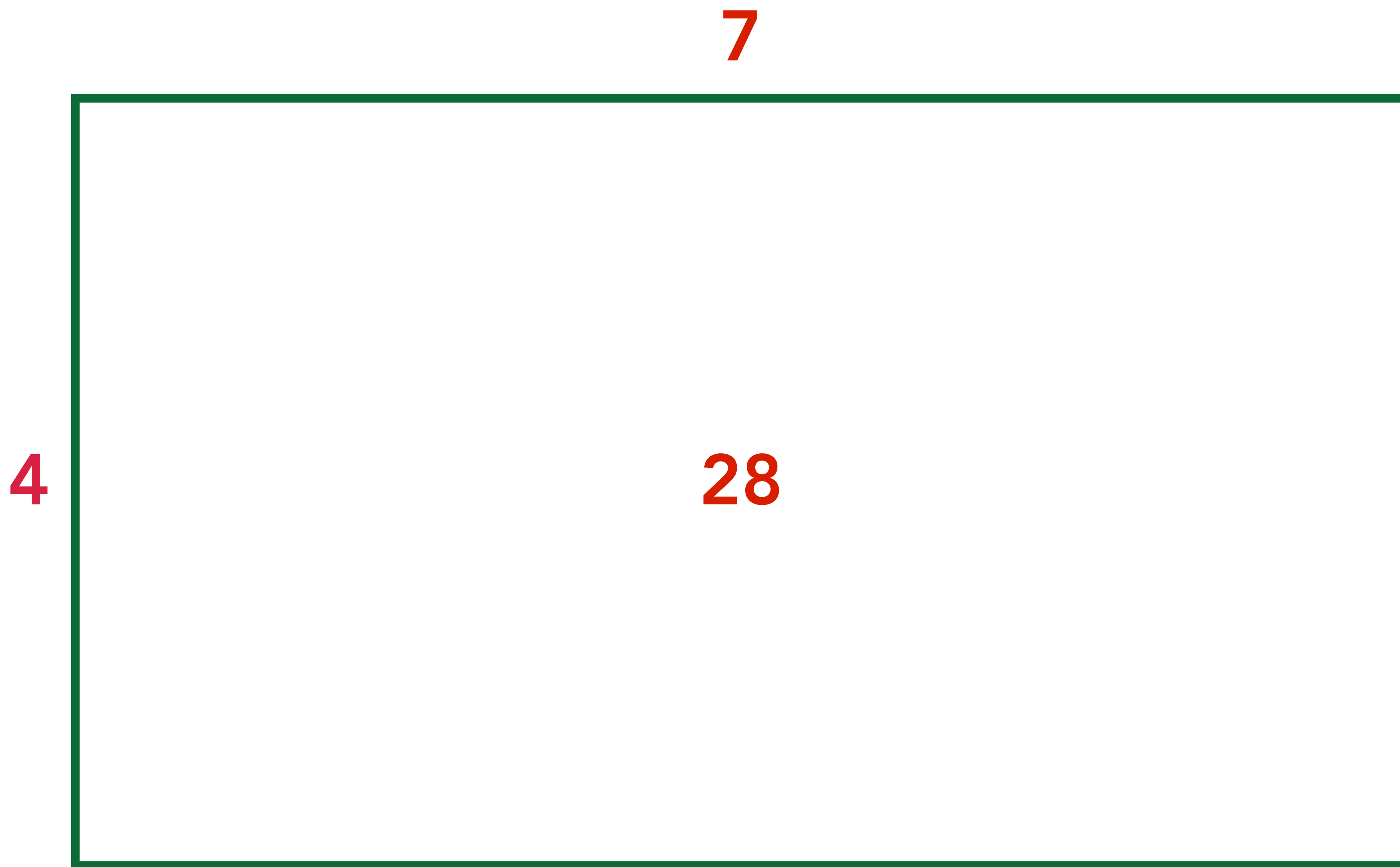
Different representations can reveal the same mathematical idea.



7

4



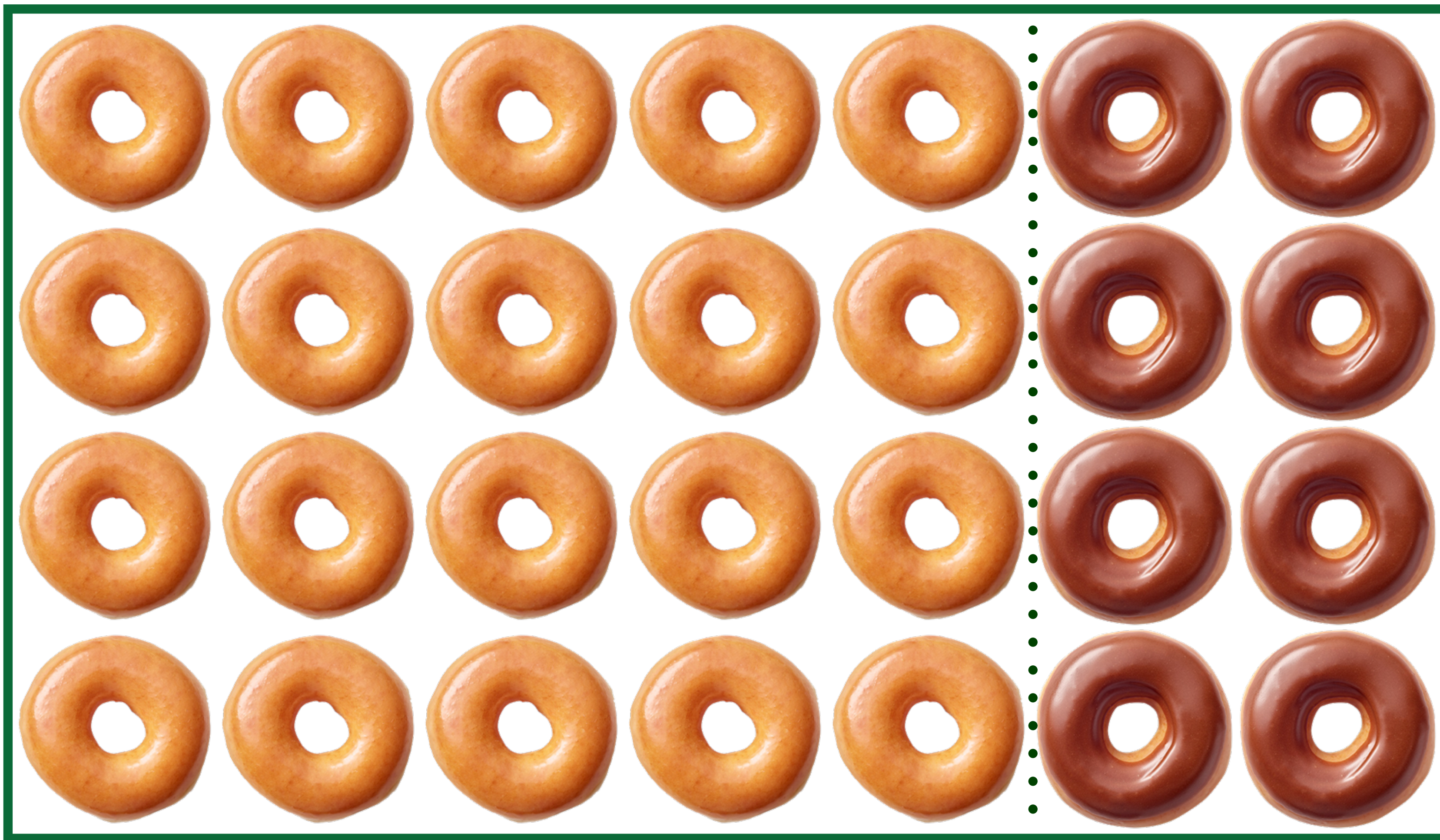


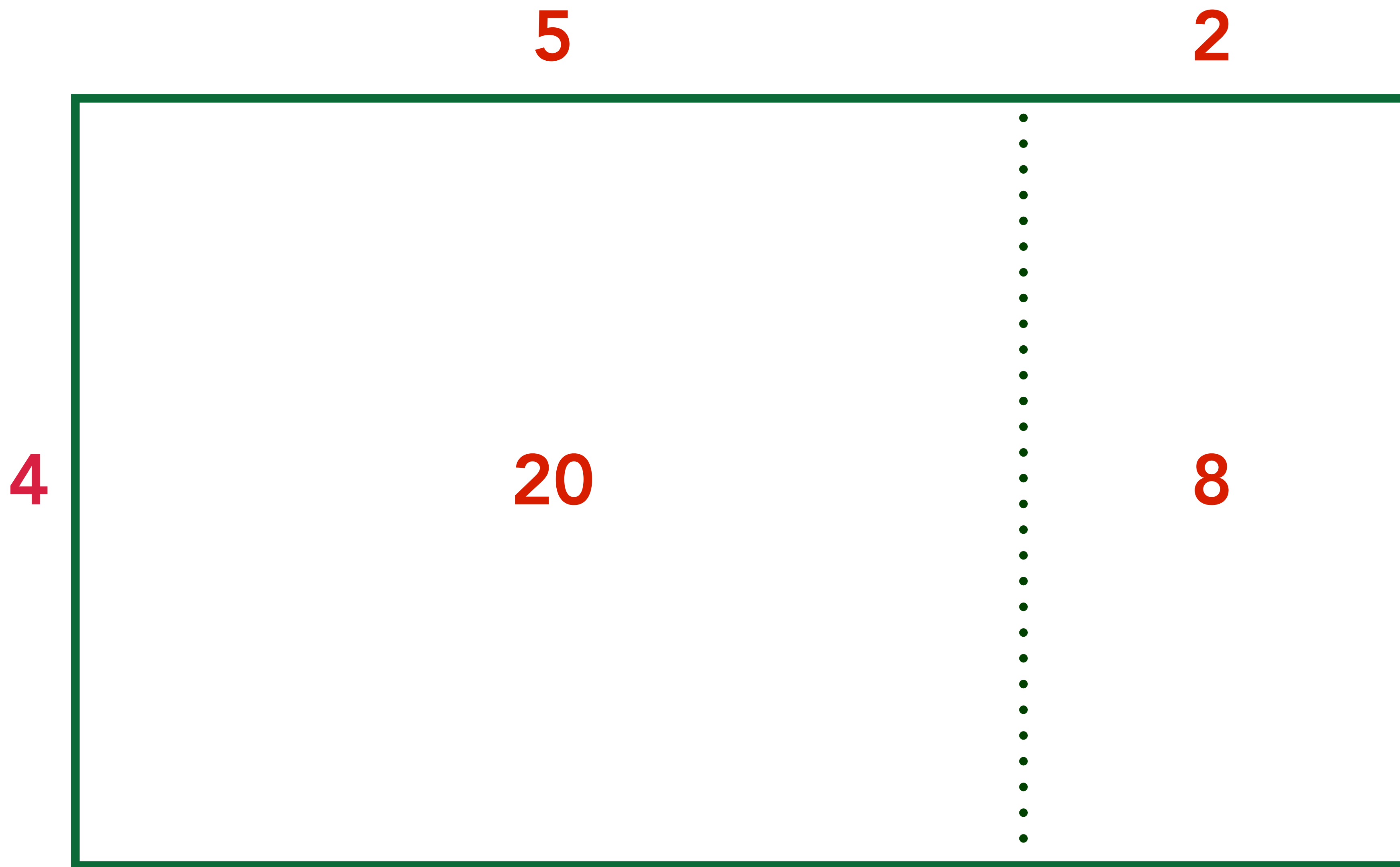


5

2

4

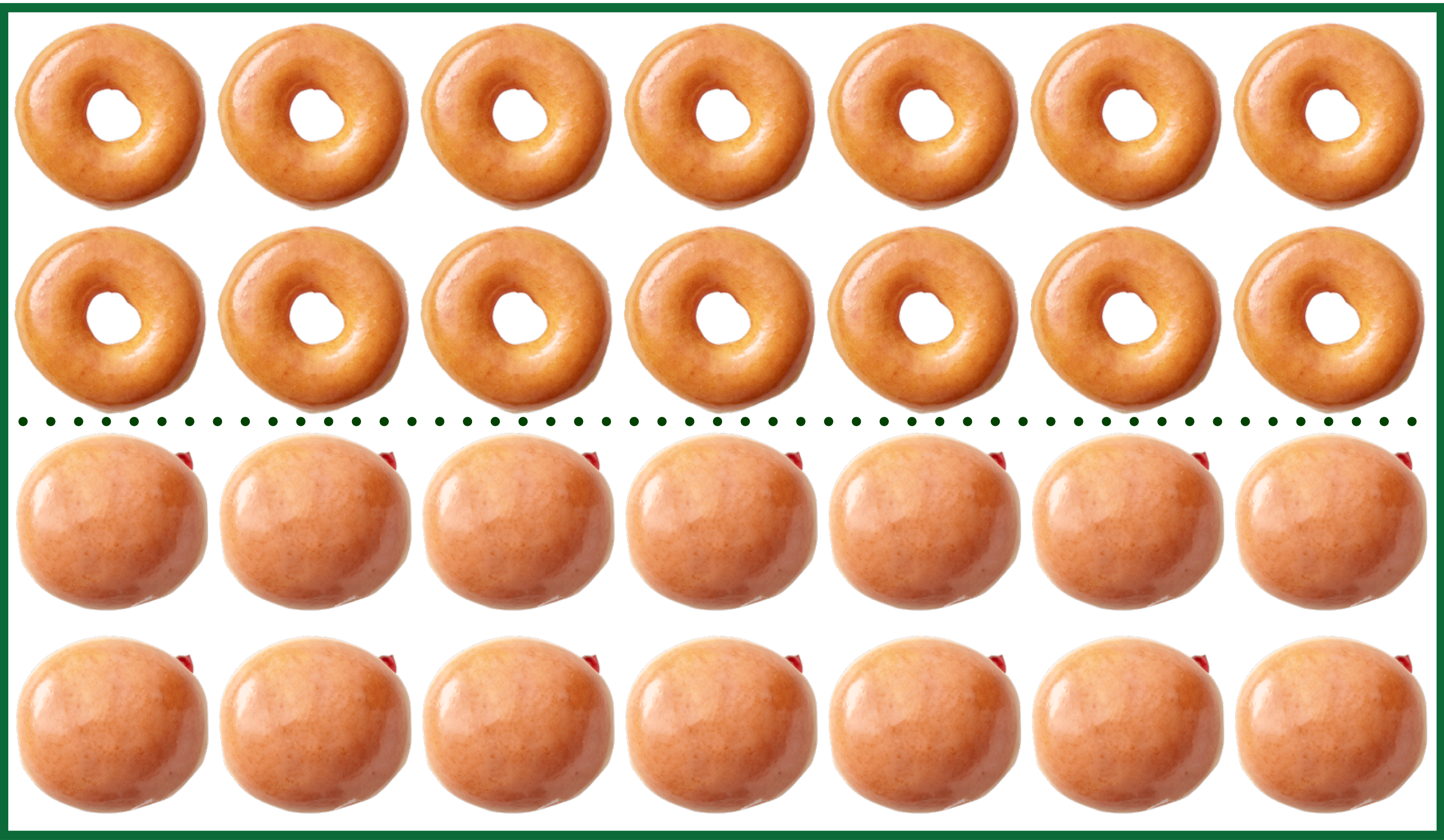




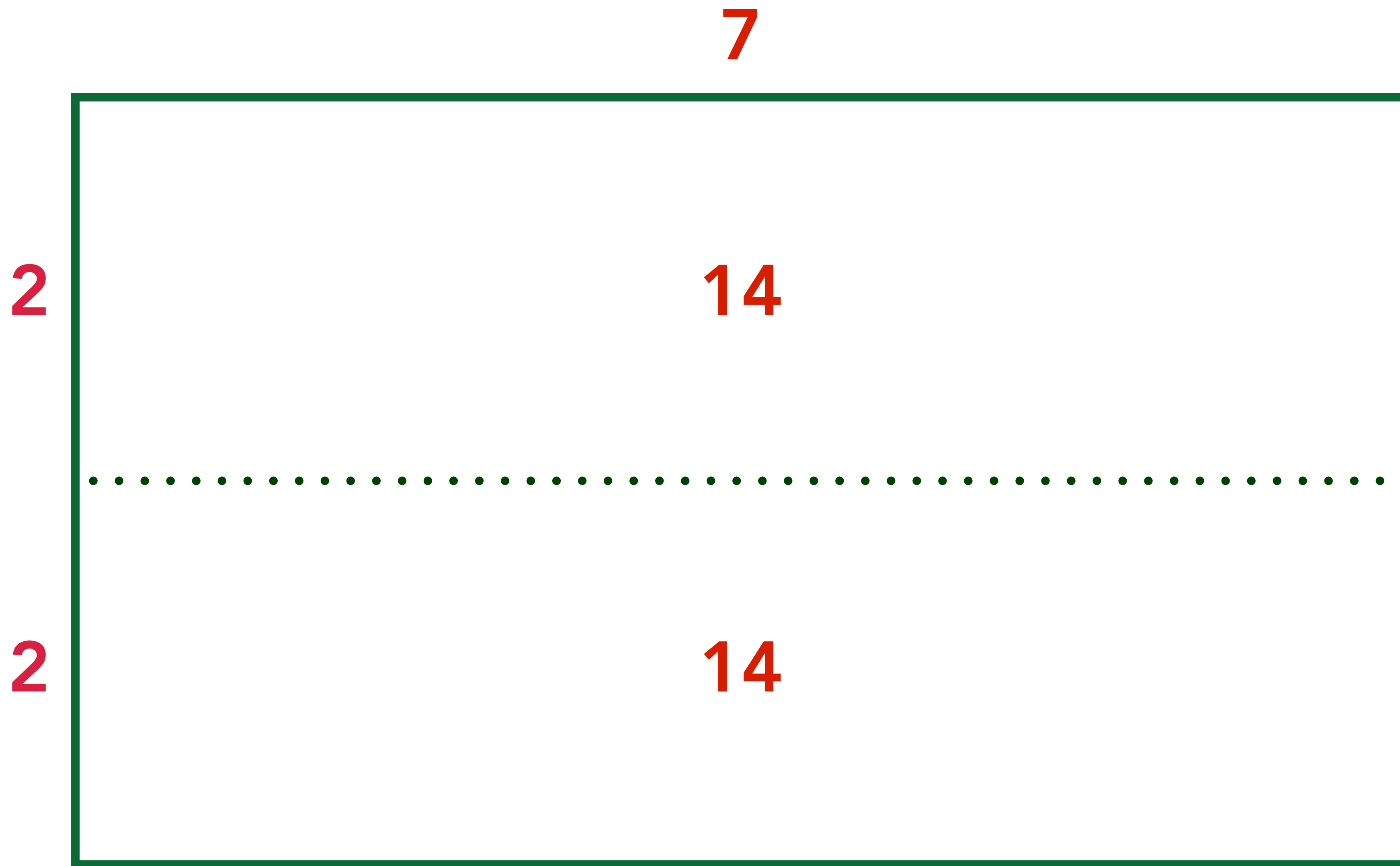


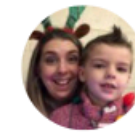
7

2



2





Colleen Williams
@SubitizeThis

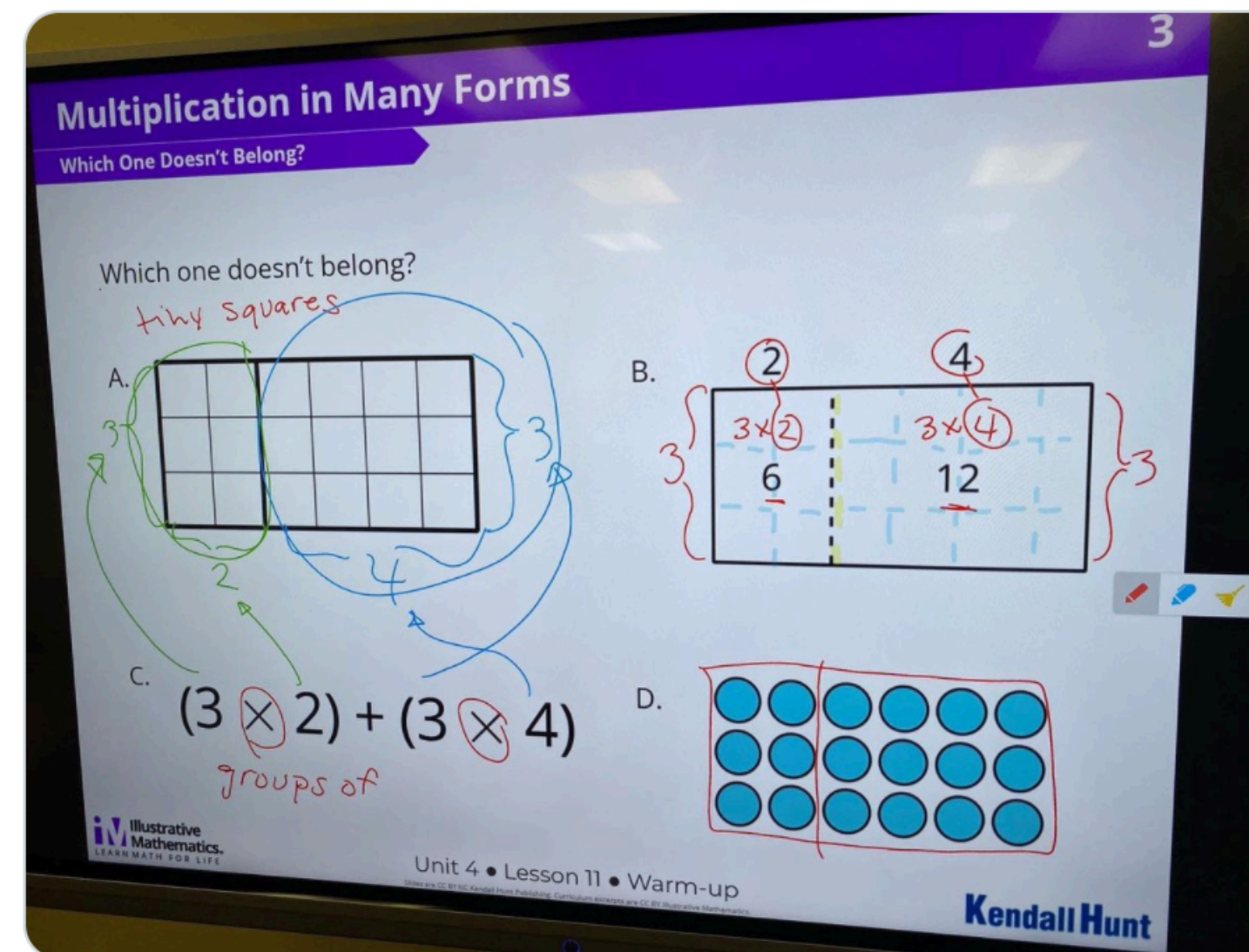


Me: Fielding student responses and explanations about which one doesn't belong.

Student, blurting, suddenly thunderstruck: "They all belong because they all represent the same thing!"

The rest of the class: *collective gasp of realization, excited chatter*

I love to see it.



Illustrative Math and Emerson Elementary School

5:52 PM · Jan 25, 2022 · Twitter for iPhone

7 Retweets 55 Likes

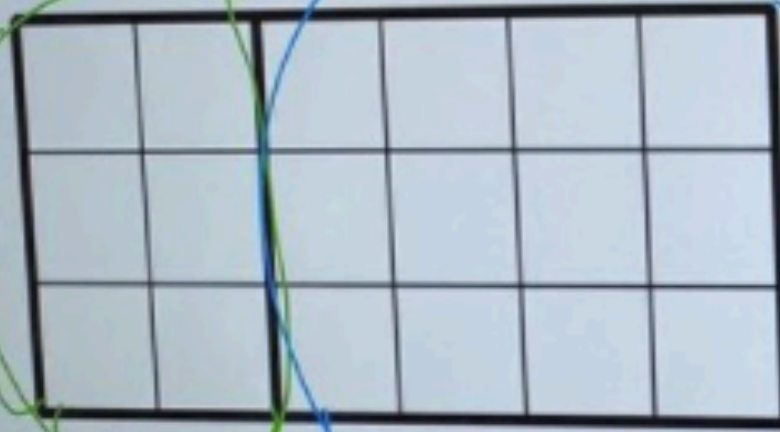
Multiplication in Many Forms

Which One Doesn't Belong?

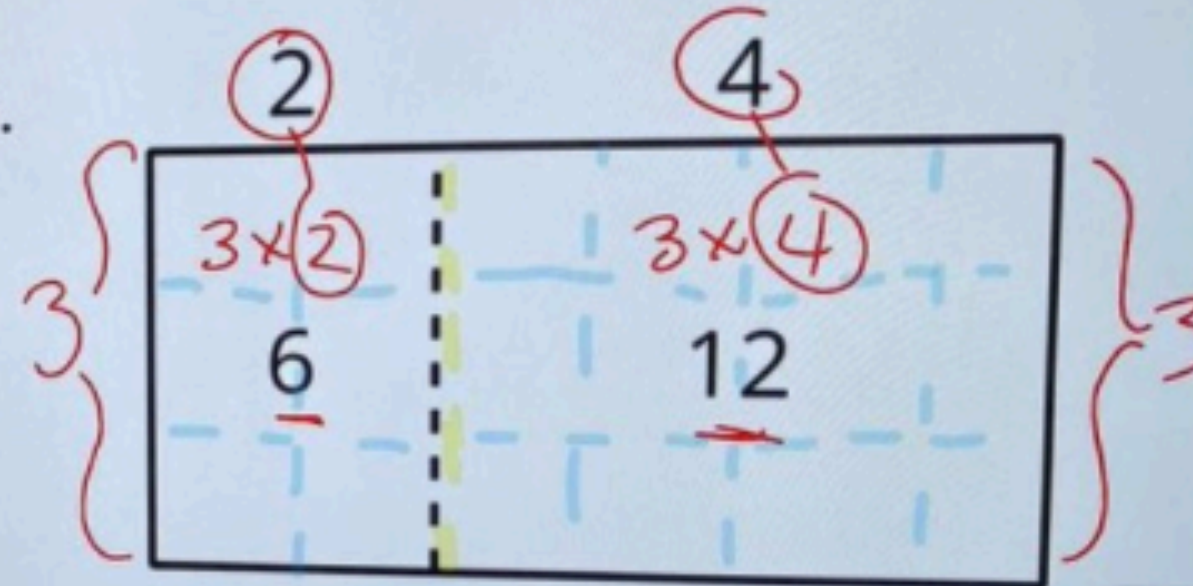
Which one doesn't belong?

tiny squares

A.



B.

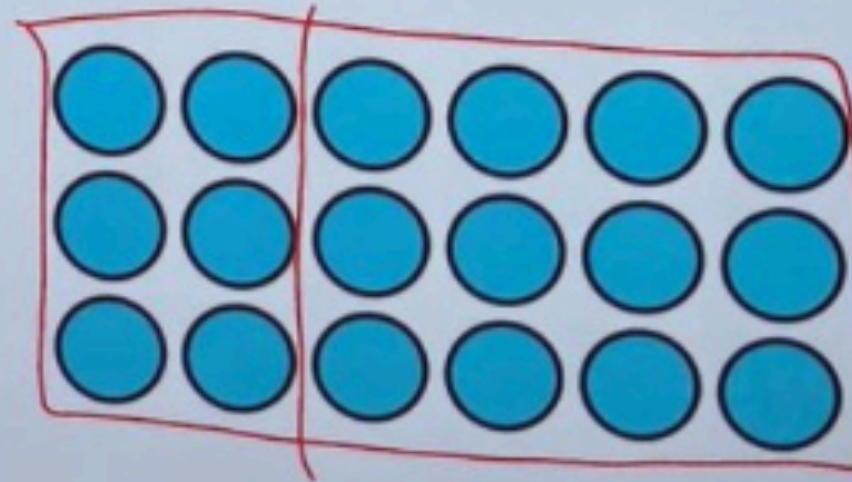


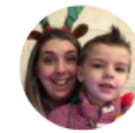
C.

$$(3 \times 2) + (3 \times 4)$$

groups of

D.





Colleen Williams
@SubitizeThis

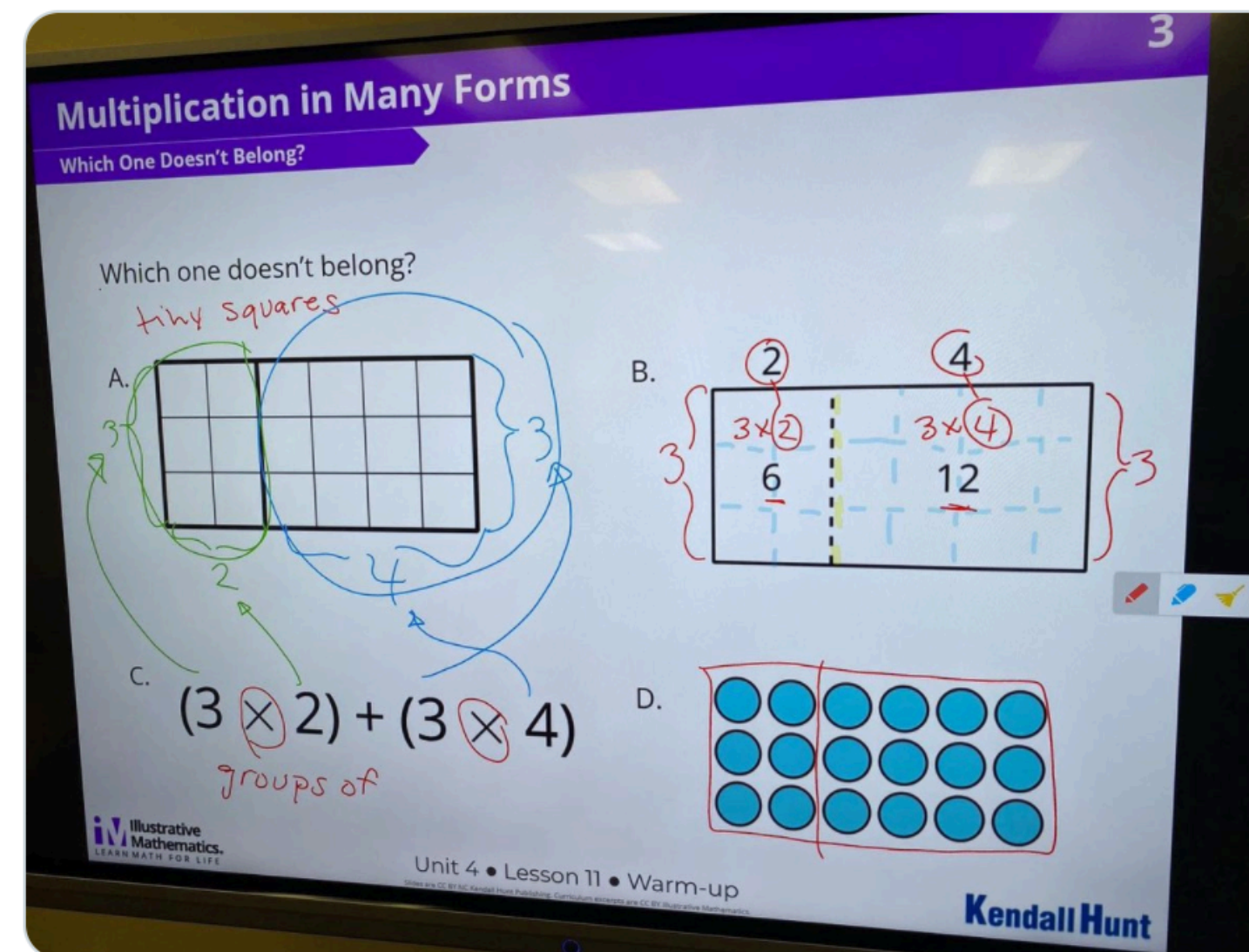


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Colleen Williams

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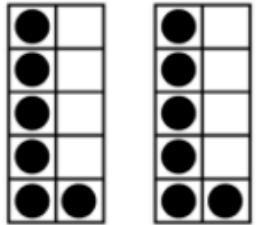
<https://mathvisuals.wordpress.com/>
<https://berkeleyeverett.com/>

Math Flips are flashcards with a problem on the front and a similar problem on the back (instead of a problem and an answer) to encourage relational thinking rather than answer-getting.

Math Flips

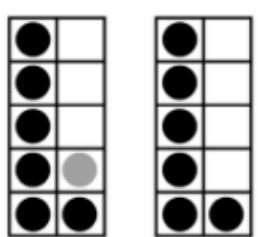
How many?
How do you know?

A



How many now?
How do you know?

B



Counting, Place Value

Counting by 1

Counting by 10, 5, 2, and 25

Counting Above 100

Place Value Concepts

Fractions

Math Flips

Multiplication, Division

How many do you **see**?



How do you see them?

NUMBER TALK IMAGES

ACCUEIL | HOME


POINTS | DOTS

PHOTOS

SUITES | STRINGS

ÉLÈVES | STUDENTS

MORE...



Un projet collaboratif qui a pour but de recueillir des images intéressantes qui peuvent servir comme point de départ pour des jasettes mathématiques au sujet des nombres.

A collaborative project dedicated to gathering interesting images to be used as a launching point for Number Talks.

En vedette / Featured...

Custom Number Talk Images

<http://ntimages.weebly.com/>

Different representations can reveal the same mathematical idea.

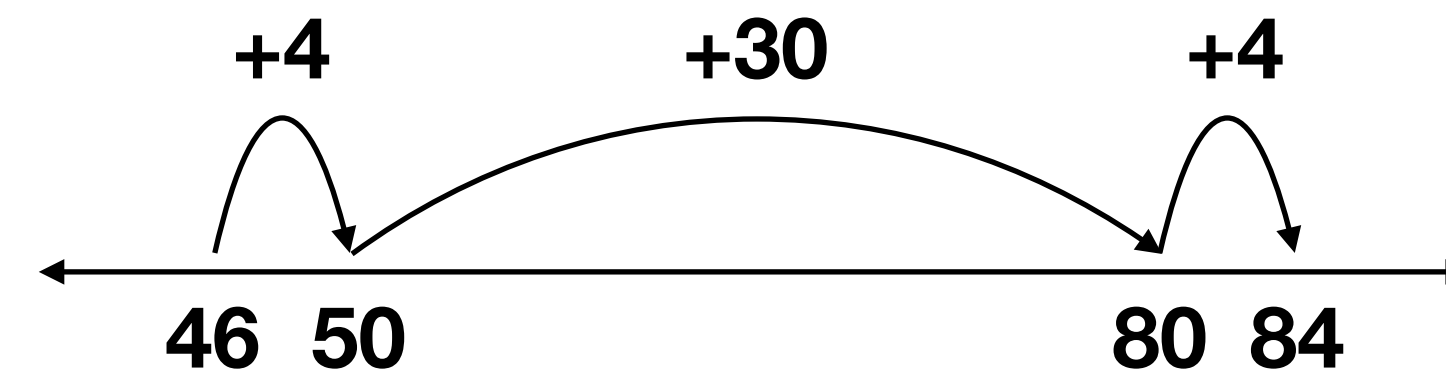
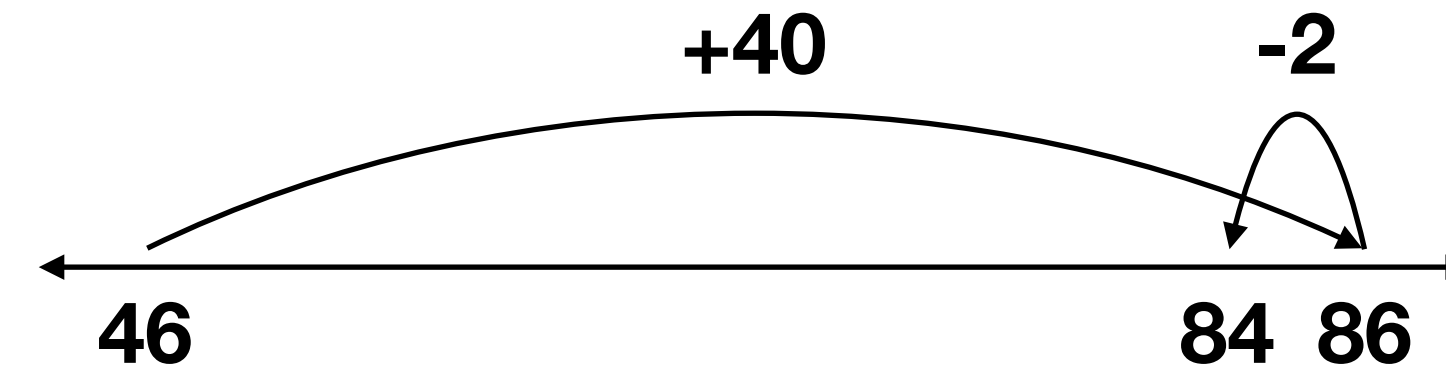
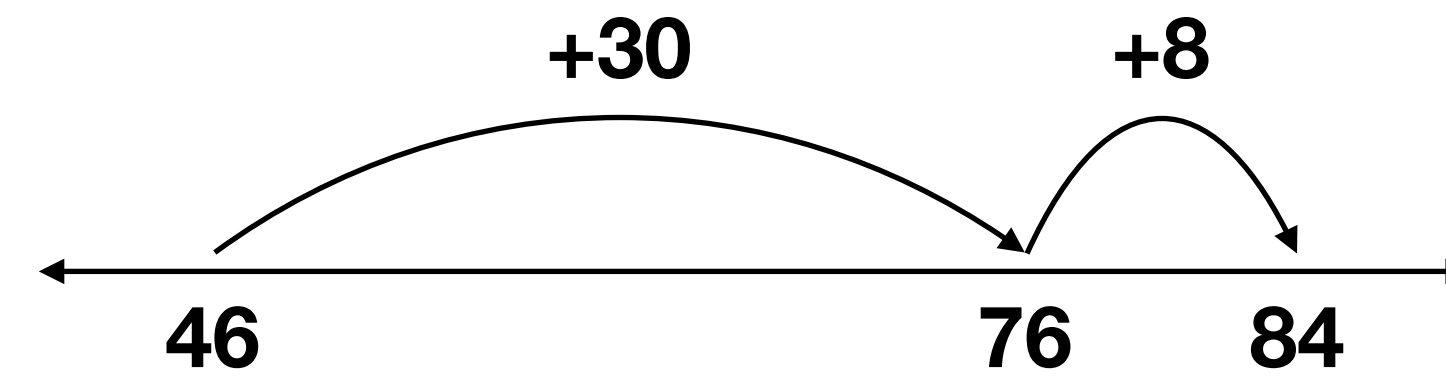
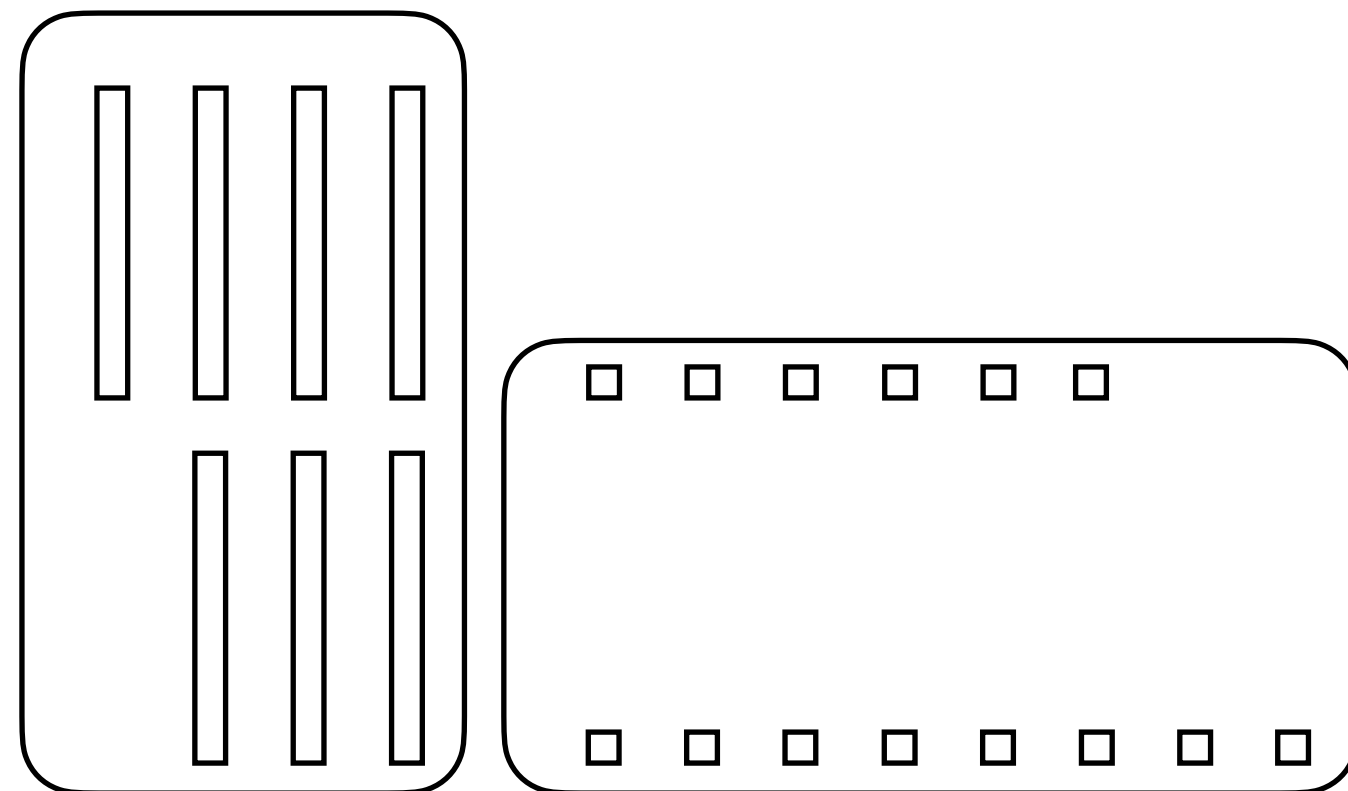
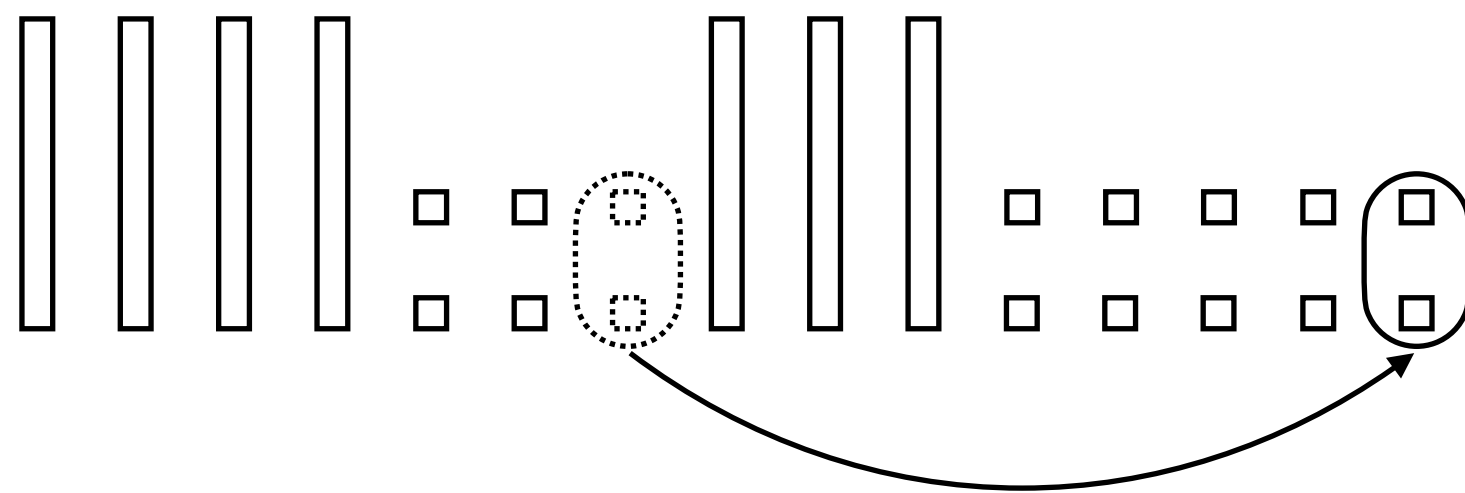
**The same representation can reveal
different mathematical ideas.**

Number Talk

$$46 + 38$$

What strategies might you use?

Representations: $46 + 38$



**The same representation can reveal
different mathematical ideas.**



Difficult to
see.

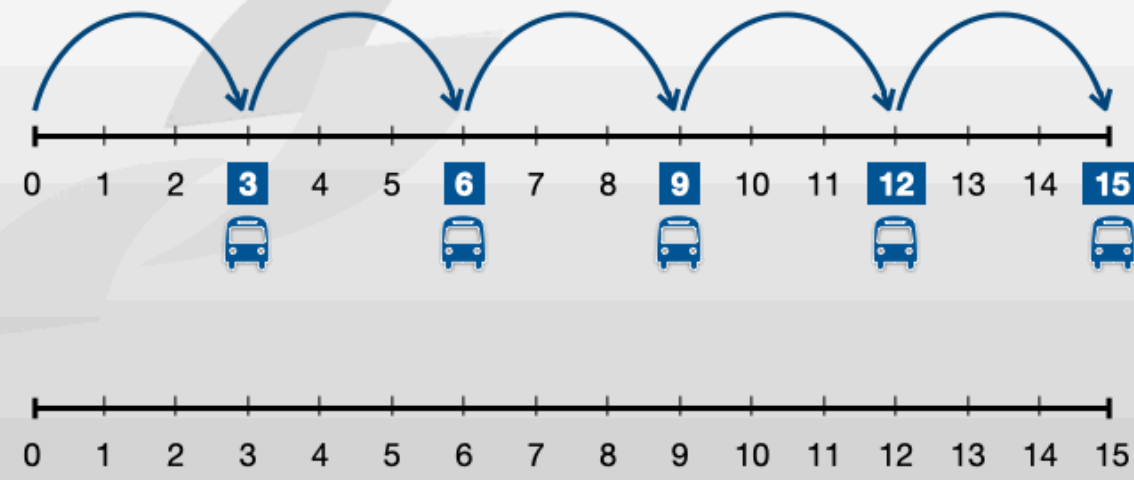
Always in
motion
is the future.

—Yoda

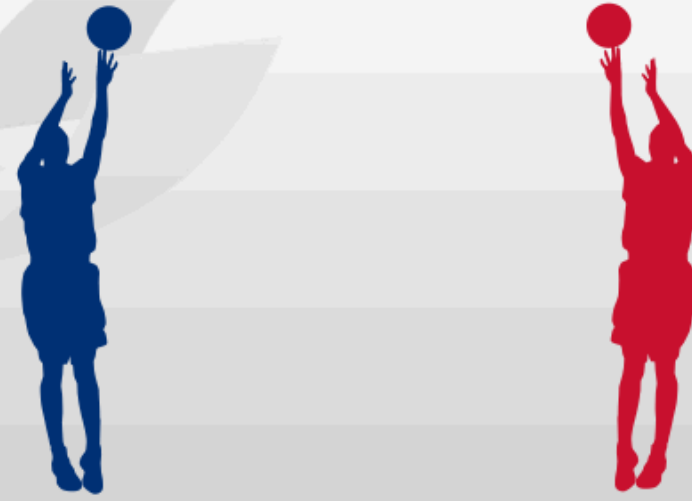


In **motion** is math.

Exploring Multiples



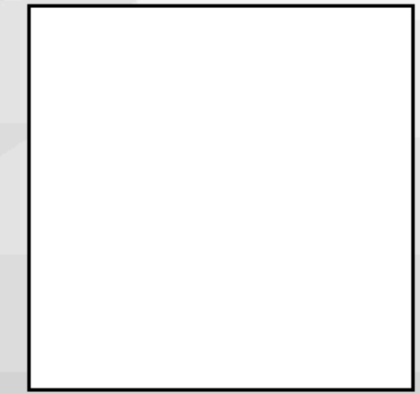
Applying Percents



Applying Percents

What is 78% of 49?

Exploring Percents



Exploring Ratios



Exploring Ratios

Applying Ratios

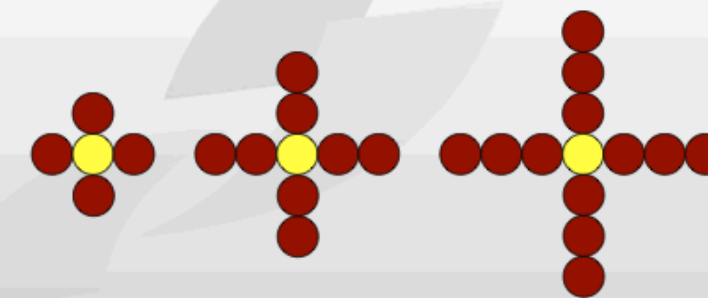
Exploring Equations



<https://chrishunter.ca/2020/11/23/principles-of-math-videos/>



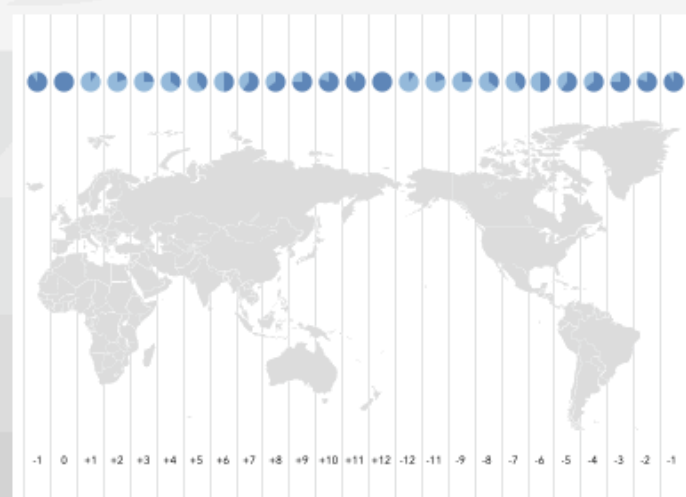
$$3x + 2 = 14$$



$$(-5) - (-3)$$



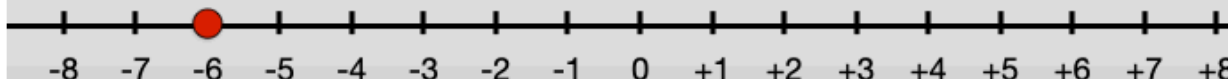
Applying Integers



Exploring Division

Exploring Division

$$(-6) \div (+3)$$



Applying Integers



Grade 6

<https://sites.google.com/view/sd36clnumeracy/>

Introduction

Exploring the Concepts:

- Exploring Multiples
- Exploring Improper Fractions & Mixed Numbers
- Exploring Ratios
- Simplifying Angles

vocabulary

Factors and Multiples

Math 6: Factors and Multiples

1 × 18

2 × 9

3 × 6

factors

Improper Fractions and Mixed Numbers

Math 6: Improper Fractions and Mixed Numbers

$2\frac{5}{6}$

$\frac{17}{6}$

numerator > denominator

improper fraction

Ratios

Math 6: Ratios

Strawberries	4	8	12	16	20
Raspberries	2	4	6	8	10

$\frac{4}{2} = \frac{20}{10}$

proportion

Percents

Math 6: Percents

80%

75%

Increasing and Decreasing Patterns

Math 6: Increasing and Decreasing Patterns

Figure #	1	2	3	4	10
# of Cubes	4	7	10	13	31

Input →

Output →

NUMBER SENSE

Partitive Division of Whole Numbers Revealing a Fractional Quotient

7 days ago

How could the 10 cheese slices be cut to share evenly with the 5 crackers?



Convince your neighbour.

MATH is VISUAL.COM

Let's teach it that way.



ADD COMMENT



WATCH LATER



CINEMA MODE

<https://mathisvisual.com/>

How could the 10 cheese slices be cut to share evenly with the 5 crackers?

VIDEO



Convince your neighbour.

MATH is VISUAL.COM

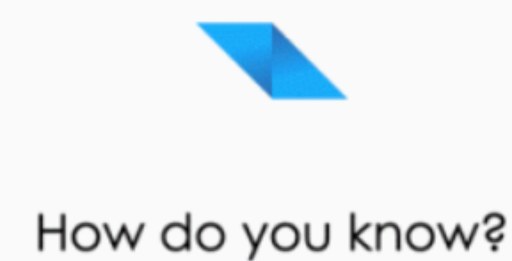
Let's teach it that way.

NUMBER SENSE

Partitive Division of Whole Numbers

VIDEO

If $\square = 1$, how much is...



How do you know?

MATH is VISUAL.COM

Let's teach it that way.

MEASUREMENT, NUMBER SENSE

Area of Composite Figures With Non-

What do you NOTICE? What do you WONDER?



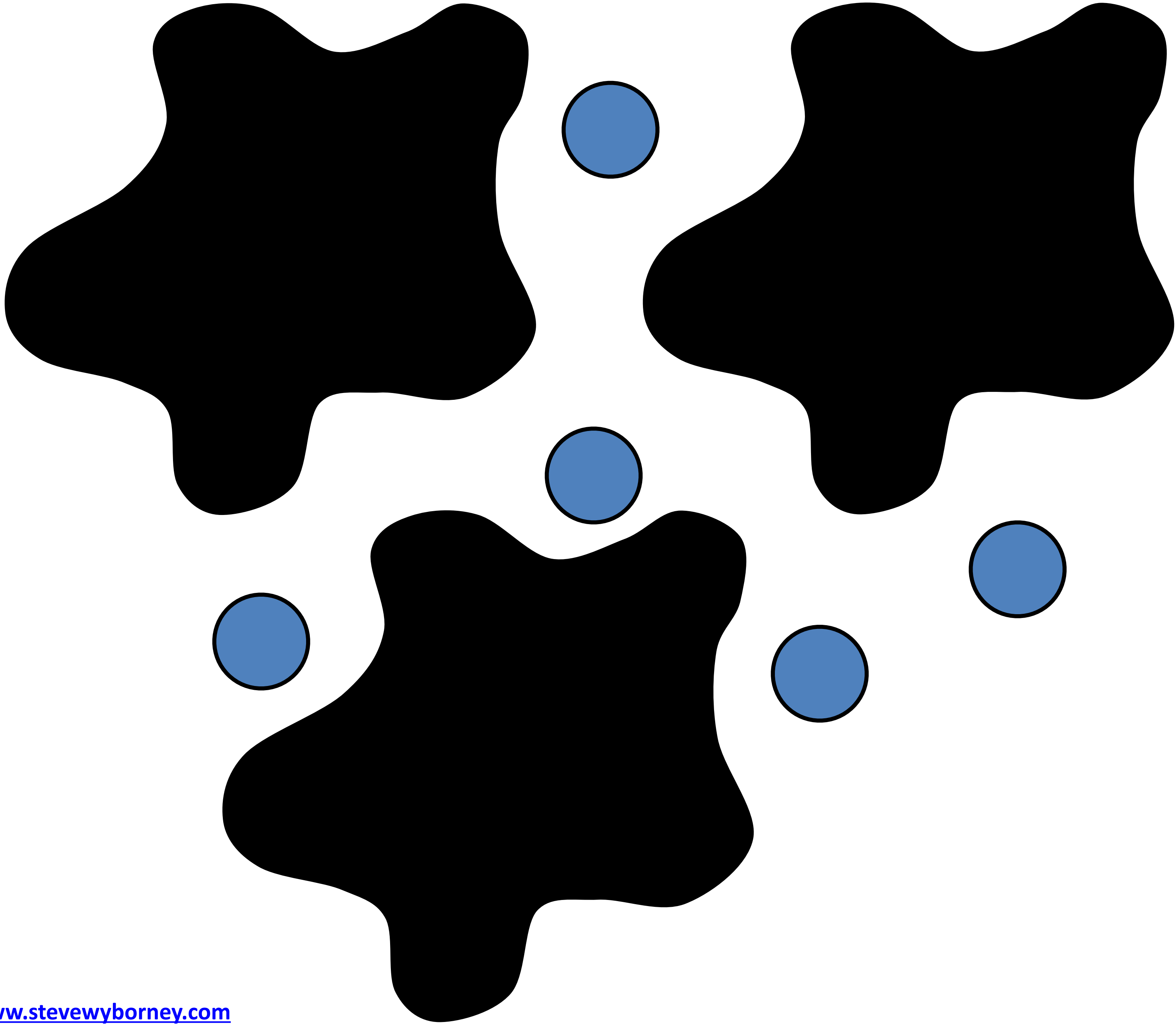
MATH is VISUAL.COM


Let's teach it that way.

MEASUREMENT, NUMBER SENSE

Multiplicative Comparison With





A scene from Star Wars: The Clone Wars showing Yoda in the center, flanked by two Jedi Padawans in blue robes and helmets. They are in a dark, circular room with a blue patterned floor and a starry background. Yoda is speaking, and the Padawans are listening attentively.

Truly
wonderful,
the mind of
a child is.

—Yoda

Chris Hunter

K-12 Numeracy Helping Teacher

email: hunter_c@surreyschools.ca

Twitter: [@ChrisHunter36](https://twitter.com/ChrisHunter36)

blog: chrishunter.ca

