Zooming In and Out on Problem Based Learning

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Experience a Problem Based Lesson

Identify common PrBL Structures

Rolling out PrBL to ensure yearlong success

Research clearly suggests that problem solving should not be taught as a separate topic in the mathematics curriculum. In fact, research tells us that teaching students to use general problem-solving strategies has little effect on their success as problem solvers. Thus, problem solving must be taught as an integral part of mathematics learning, and it requires a significant commitment in the curriculum at every grade level and in every mathematical topic. - NCTM Research Brief on Problem Solving

http://www.nctm.org/uploadedFiles/Research_and_Advocacy/research_brief_and_clips/Research_brief_14_-_Problem_Solving.pdf

Entry Event: The Race

NewTech Network

Problem Solving Framework

Act 1: Ask the Question	
After viewing Act 1, what's the first question that comes to mind? What other question(s) do you have?	
Analyze the Problem	
What do you **know** from the problem scenario or lessons that can help solve the problem?	What concepts or information do you **need to know** in order to solve the problem?

Geoff's Teacher Notes

"Knows" I want identified	"Need to Knows" I want identified
Normal Guy has a head start Squirrel Guy is faster than Normal Guy Running from Right Field to Left Field	What is the head start for Normal Guy? What's the speed of Normal Guy? What's the speed of Squirrel Guy? How long is the race?


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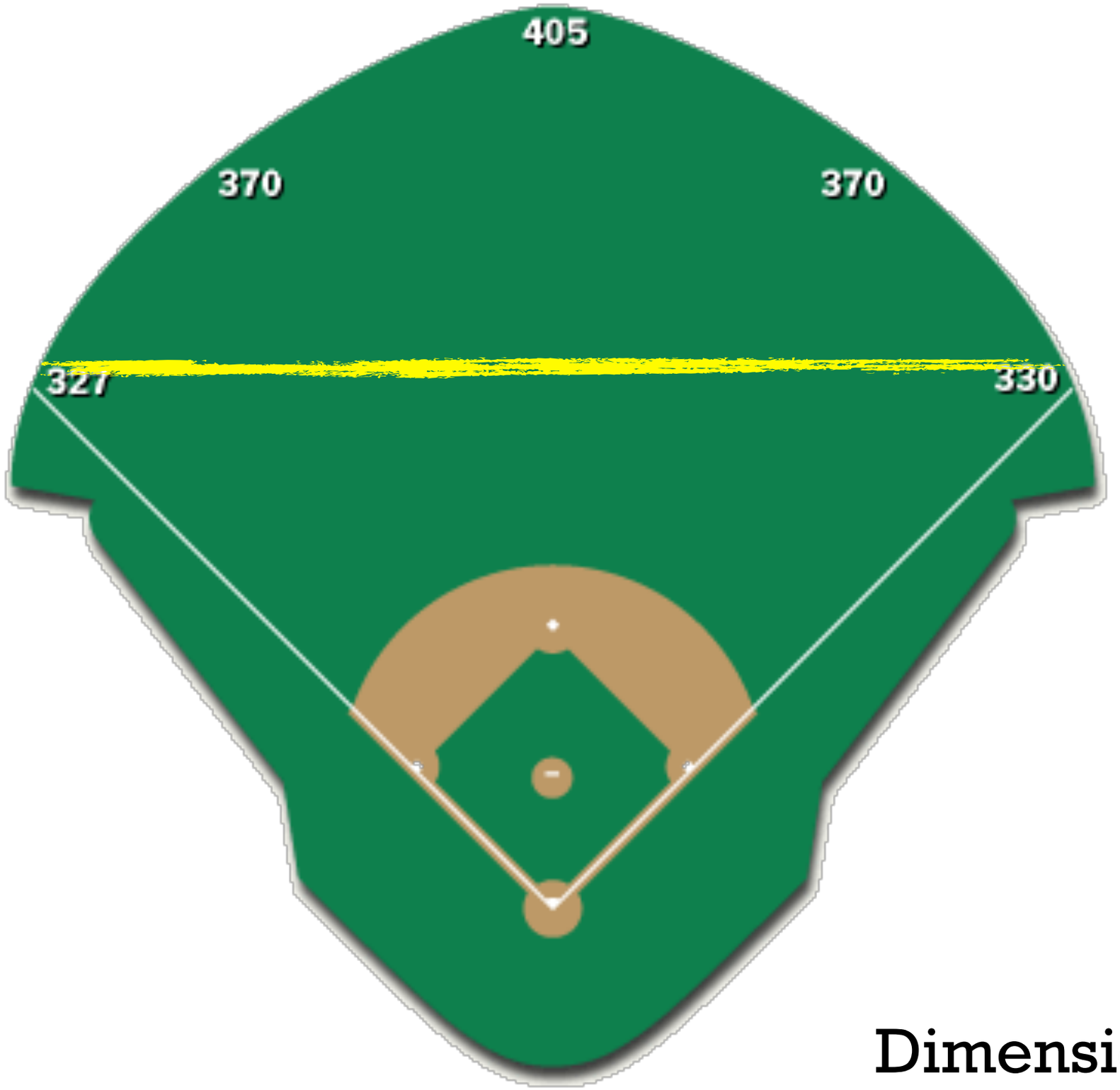
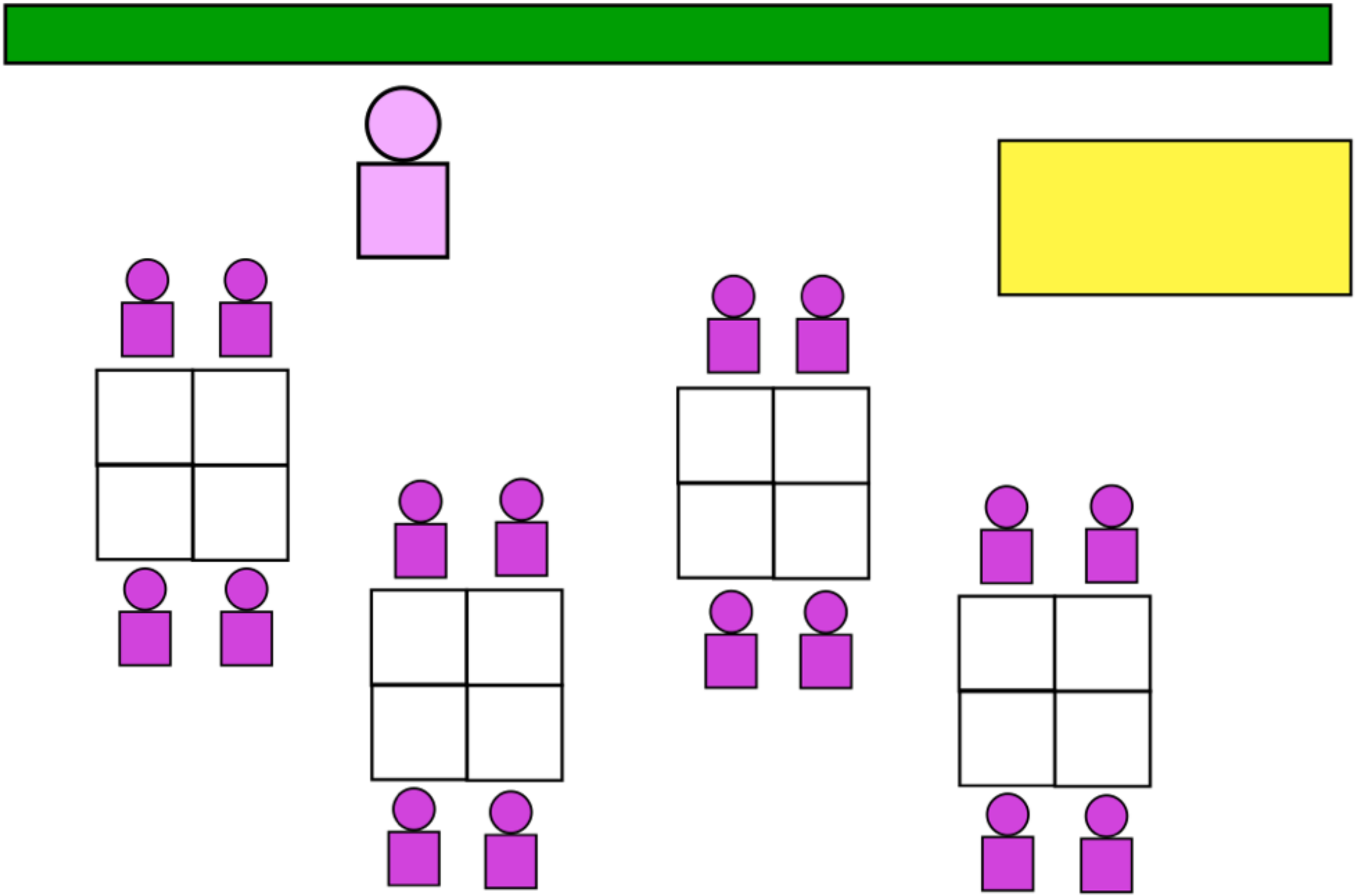
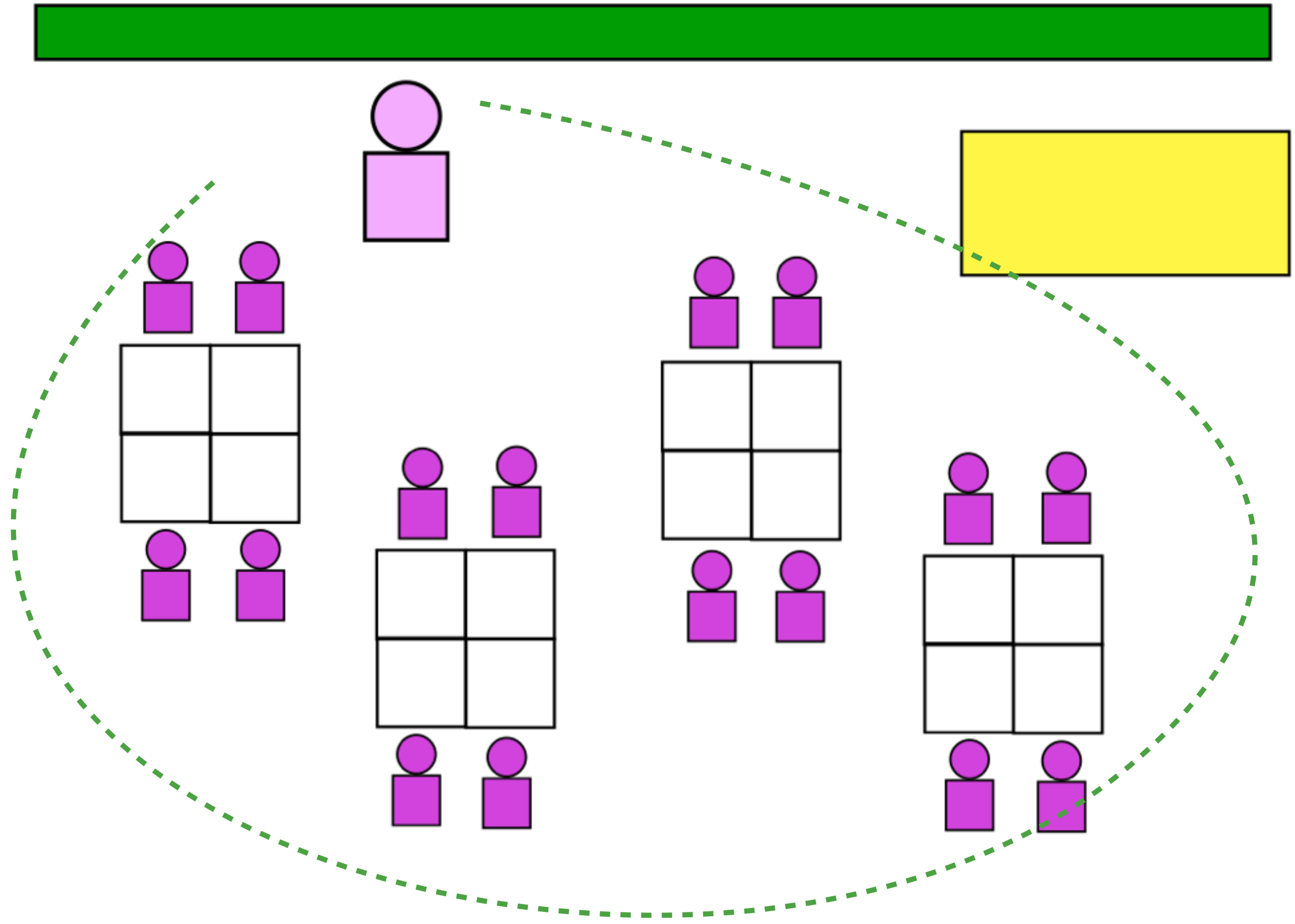


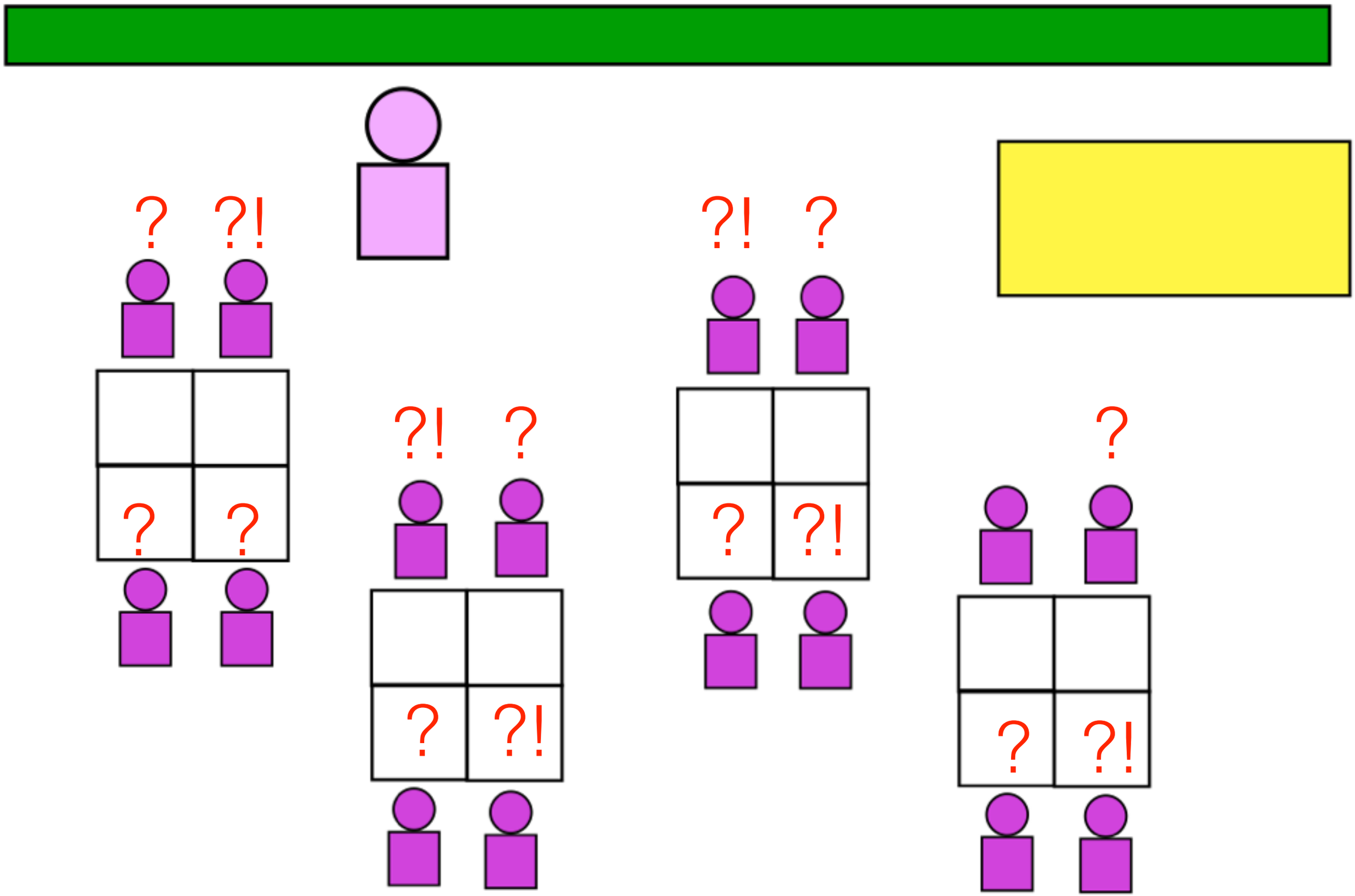
Dimensions of Qualcomm Field

My 2-day Agenda

MONDAY	TUESDAY
Warm Up Show Entry Event (Squirrel Race Guy) Solicit Knows/Need to Knows Reveal crucial info based on NTKs Workshop on Pythagorean Theorem (if necessary) Revisit Knows/Need to Knows Exit Ticket	Warm Up Lesson: Systems of Equations Revisit Need-to-Knows Workshop (if necessary):Writing an equation based on a scenario Student work time: Equation, Graphs, Systems Present solutions in a gallery walk Exit Ticket







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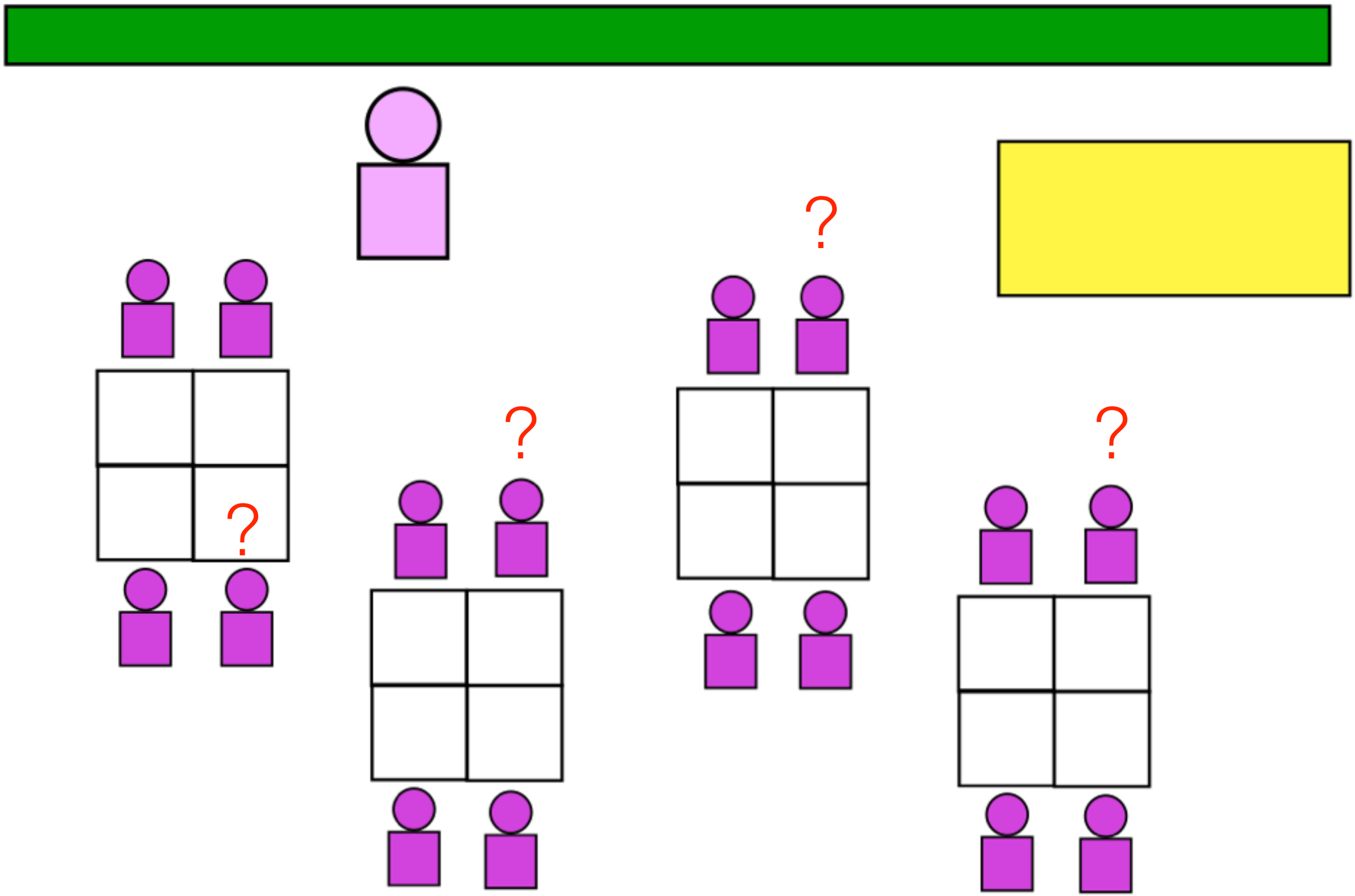

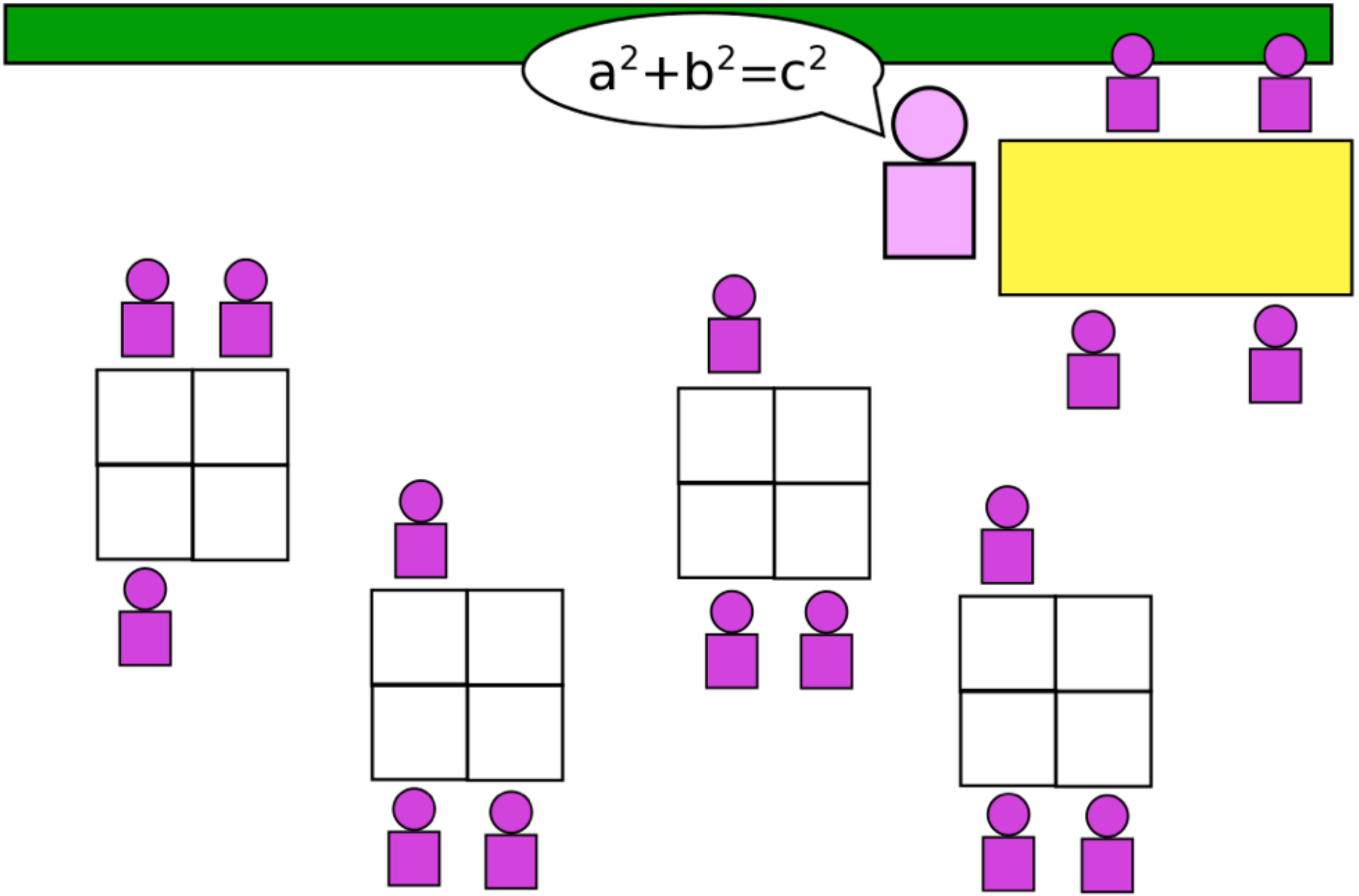
$a^2+b^2=c^2$

$a^2+b^2=c^2$

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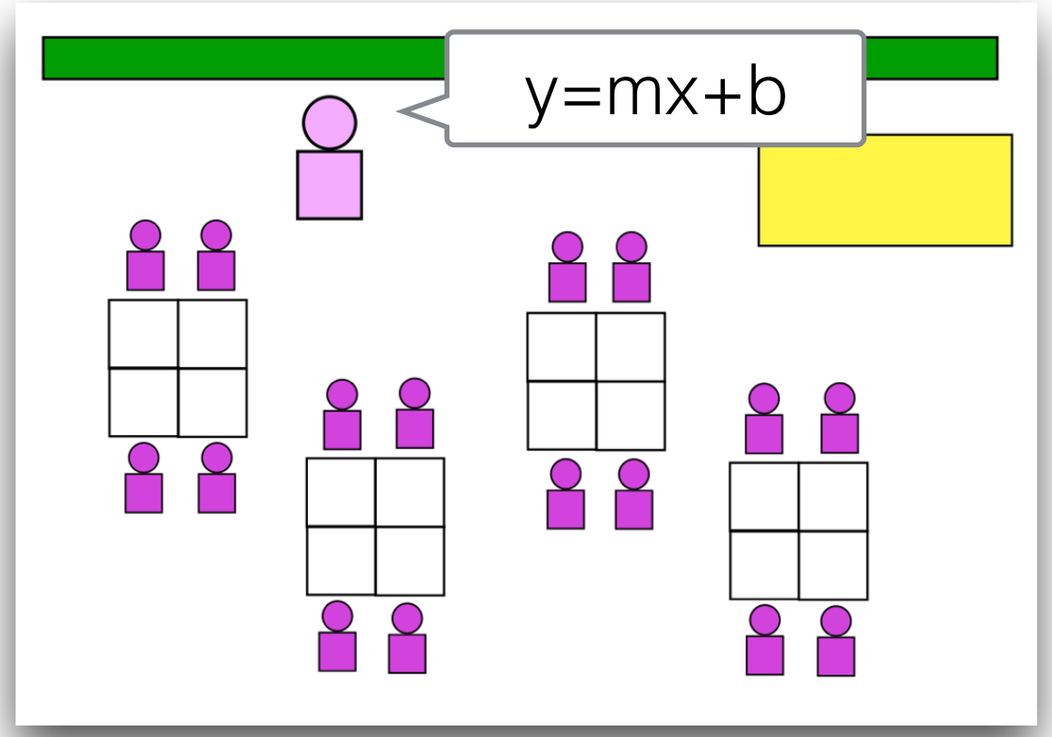
$a^2+b^2=c^2$

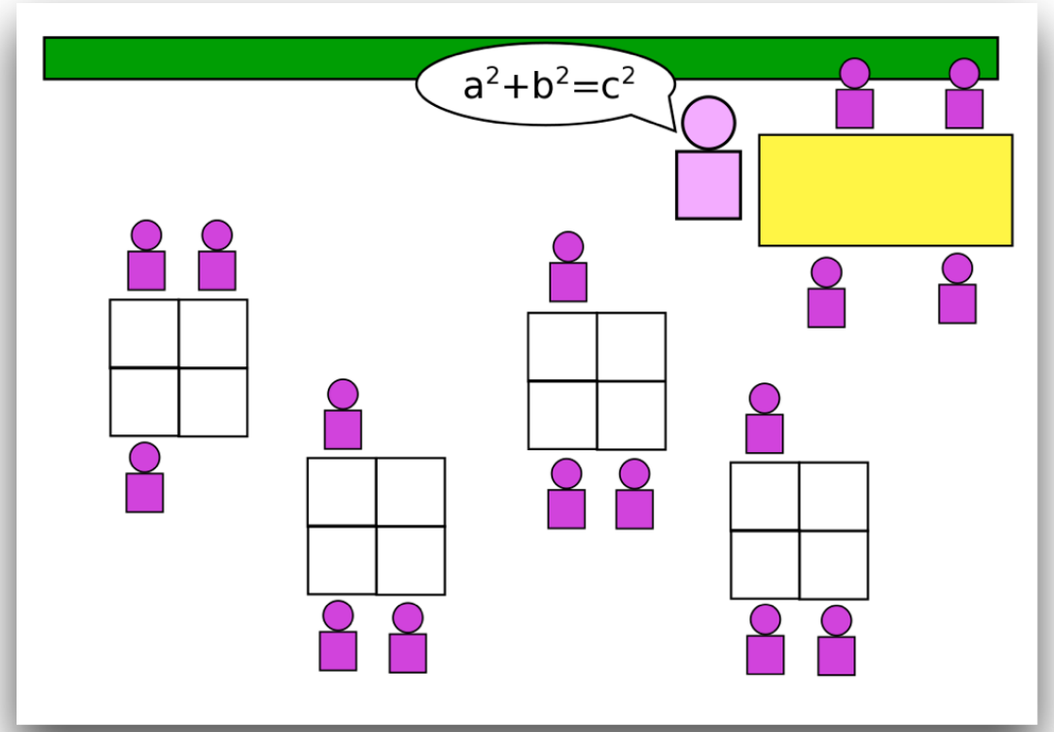
If the content is **germane** to the problem **or >50%** are struggling….

…consider a whole class lesson.



If the content is **ancillary** to the problem **or <50%** are struggling…

…consider a small group workshop.



Points of Emphasis

Do the math yourself beforehand

Identify and narrow your K/NTKs

Look for (don't avoid) connected/covered content (say, Algebra and Geometry)

Visuals are good

Structuring Your Year

SEPTEMBER

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Structuring Your Year

- Find 7-12 complex problems that you find compelling. Start there. Build outward.

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25	H	H	H	H	H	31

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY

Q: What do I do when I'm not PrBL-ing?

A: Smaller activities that promote inquiry and discourse

Which One Doesn't Belong?

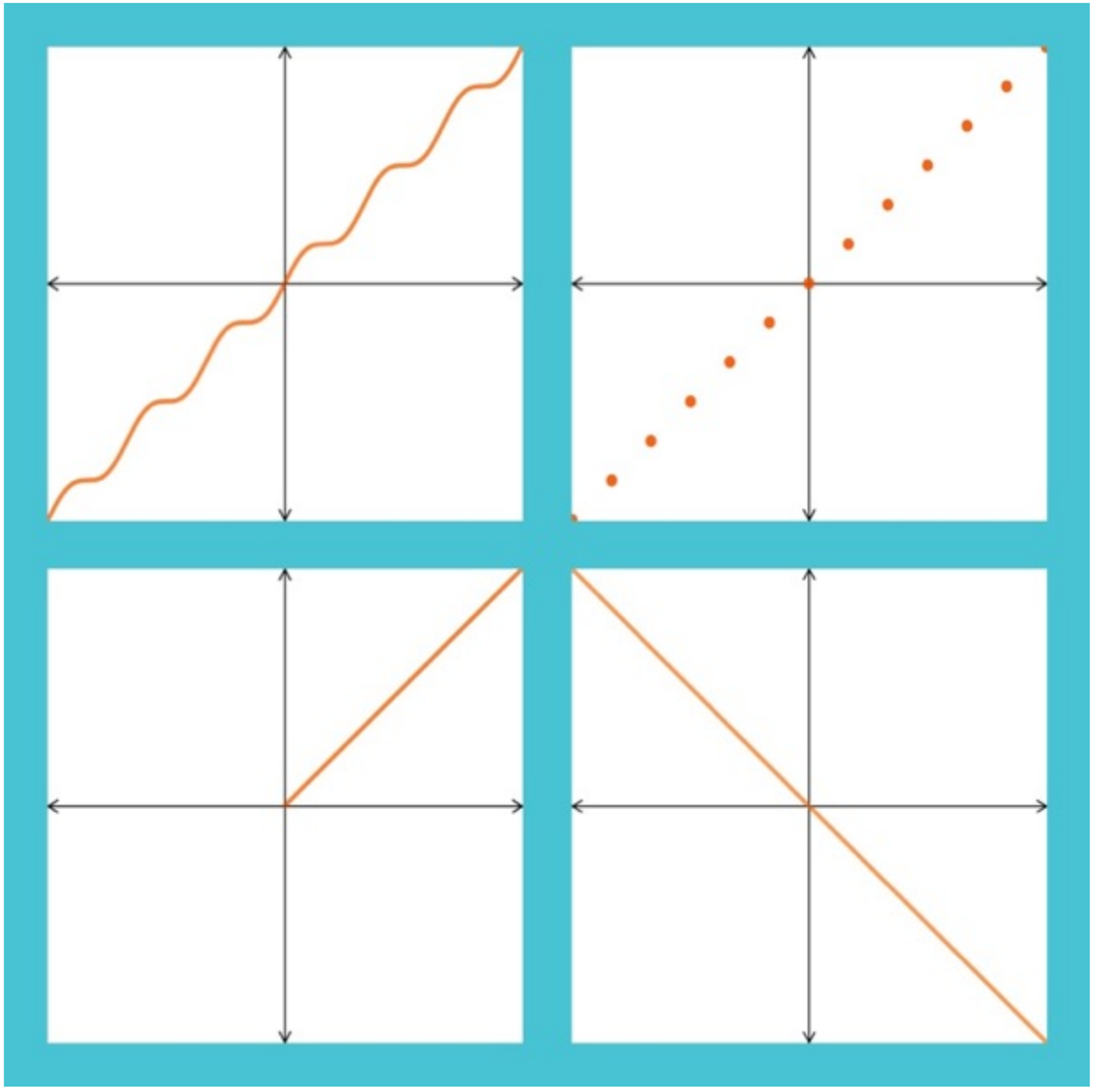
wodb.ca

Which One Doesn't Belong?

121	16
9	73

wodb.ca

Which One Doesn't Belong?



wodb.ca

Estimation

How many cheeseballs will fit on the *large* plate?

Make an estimate.

* Required

What's too LOW? *

What's too HIGH? *

Your estimate. *

Your reasoning. *
Do better than "I guessed." Try "I noticed"

Your name.

estimation180.com - Andrew Stadel @mr_stadel

Open Middle

Challenging math problems worth solving

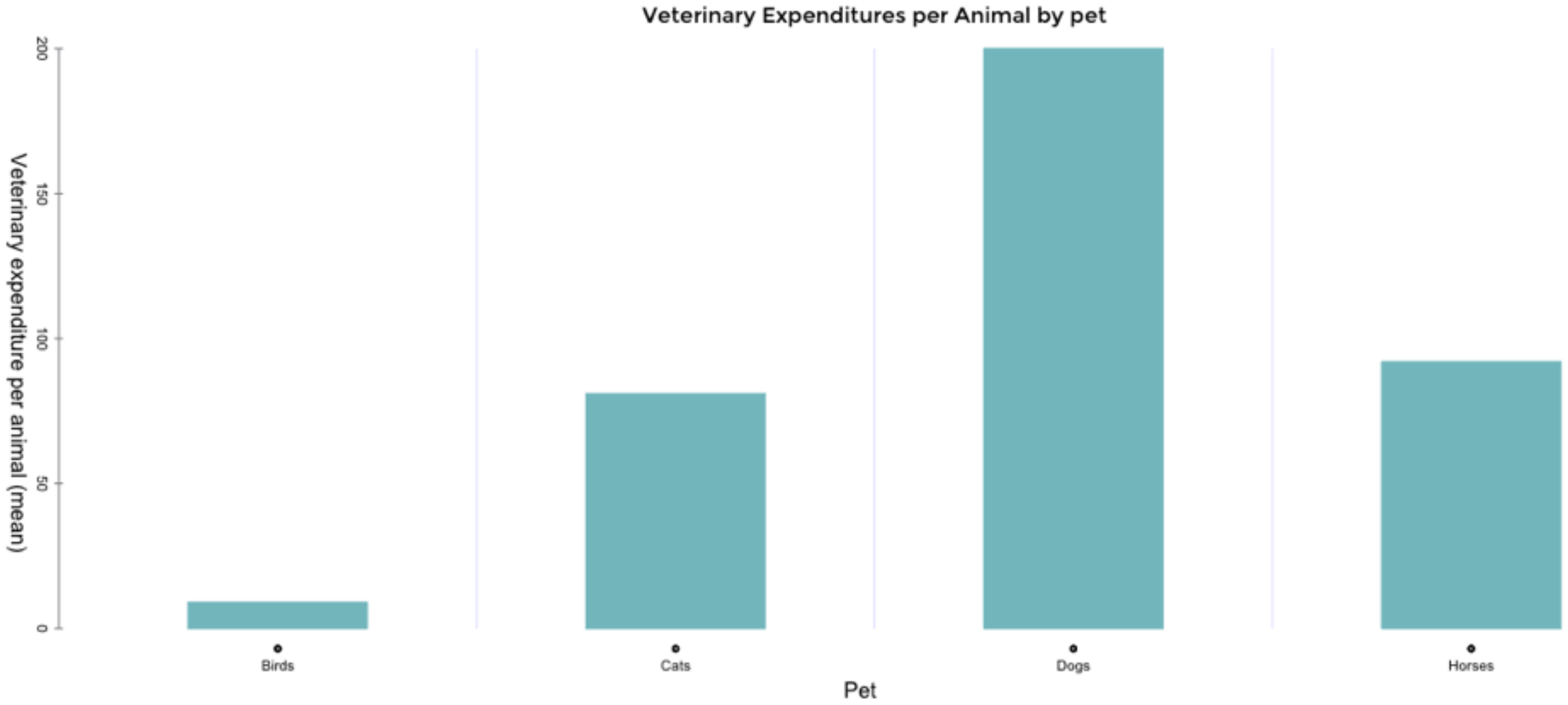
SUBTRACTING MIXED NUMBERS

Directions: Using the whole numbers from 1 to 9, at most one time each, find three different mixed numbers that will make the equation true. You may reuse the same numbers for each of the three numbers.

$$5\frac{4}{5} - \square\frac{\square}{\square} = 3\frac{1}{20}$$

Hint

Notice and Wonder

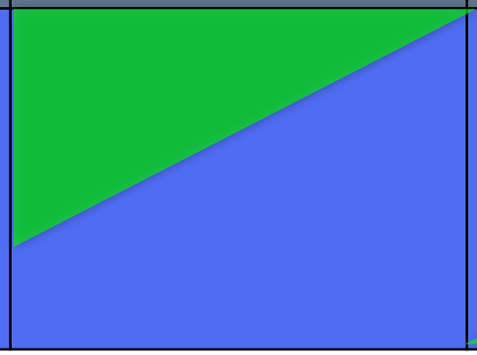
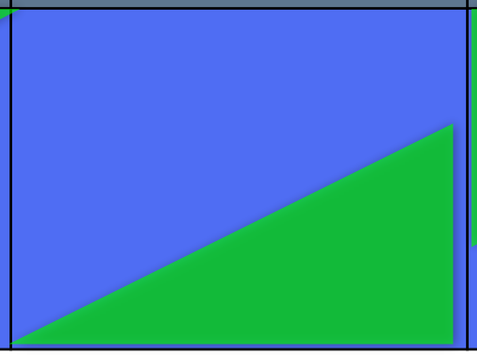
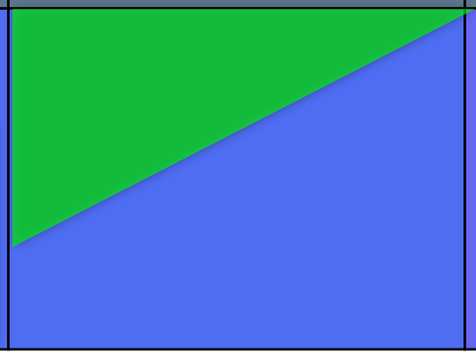


Tuva http://tuva.la/1xRPbUg

SOURCE: American Veterinary Medical Association

Which One Doesn't Belong?

Estimation180

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				

Notice and Wonder

Good First Problems

- Hotel Snap
- FAL Security Camera
- 3-Act File Cabinet
- Squirrel Guy Race

To help students become successful problem solvers, teachers must accept that students' problem-solving abilities often develop slowly, thereby requiring long-term, sustained attention to making problem solving an integral part of the mathematics program. - NCTM Research Brief on Problem Solving

http://www.nctm.org/uploadedFiles/Research_and_Advocacy/research_brief_and_clips/Research_brief_14_-_Problem_Solving.pdf

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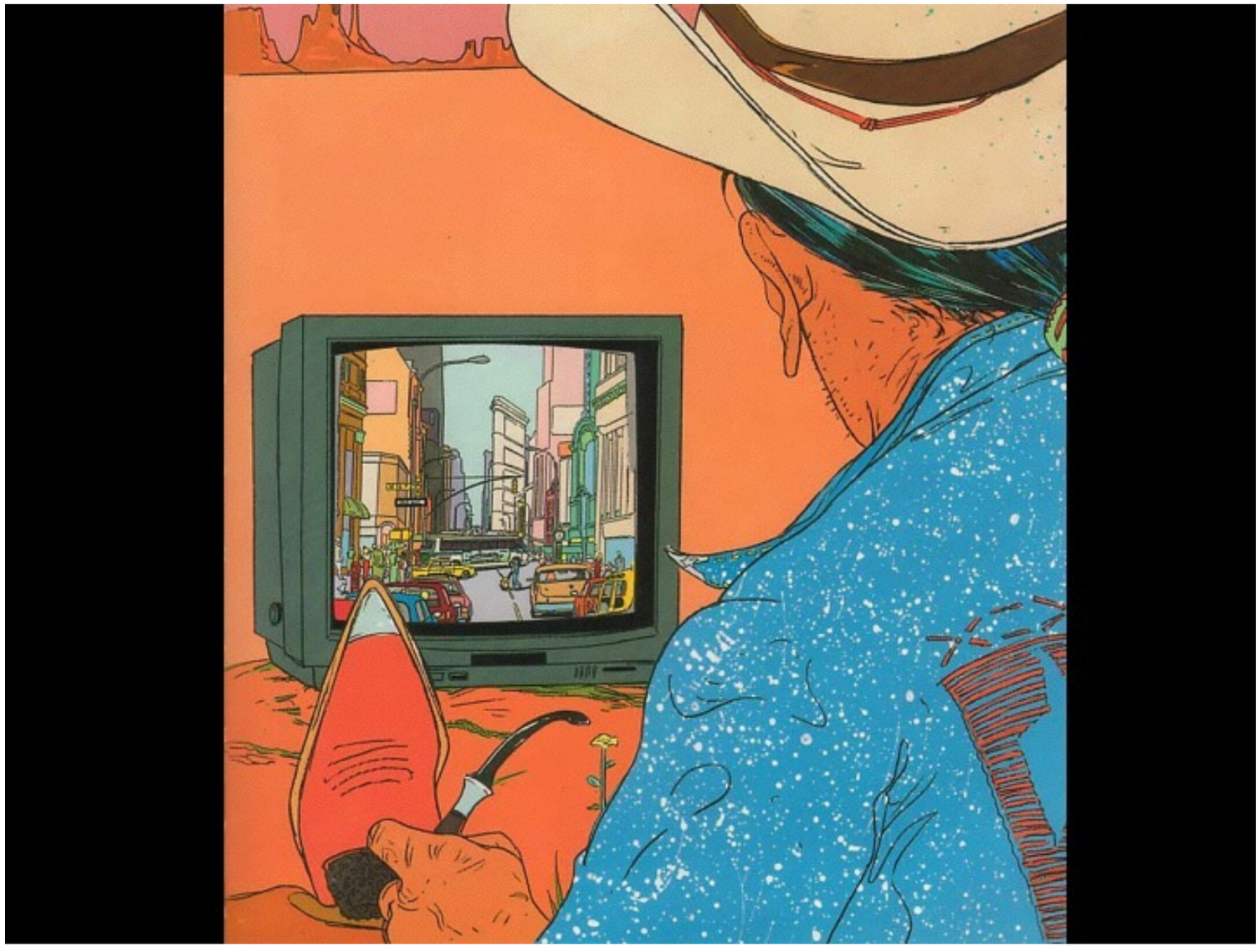

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This slide deck and resources: emergentmath.com/zoom