

Creating the Opportunity for ALL Students to Become Confident Mathematicians

Tara DeV Vaughn
@tara_devaughn
Samantha Wuttig
@swuttig

Fairbanks North Star Borough School District



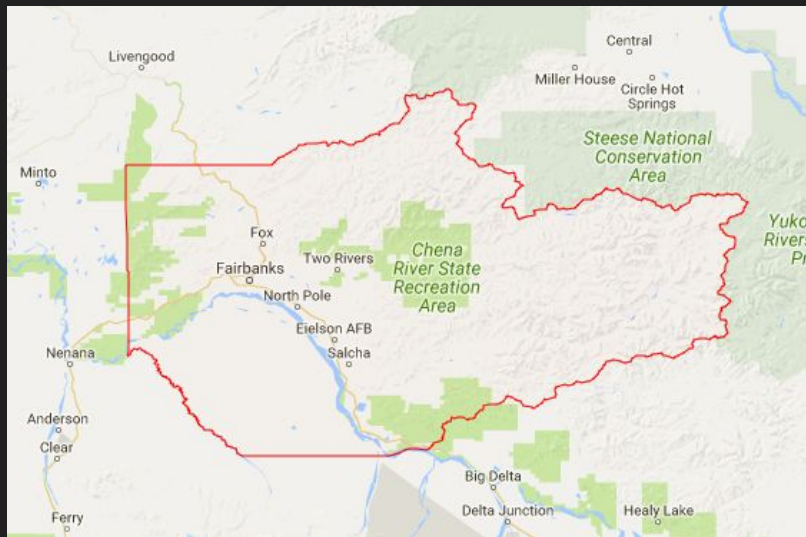
Where Are We From

Summer Math Camp

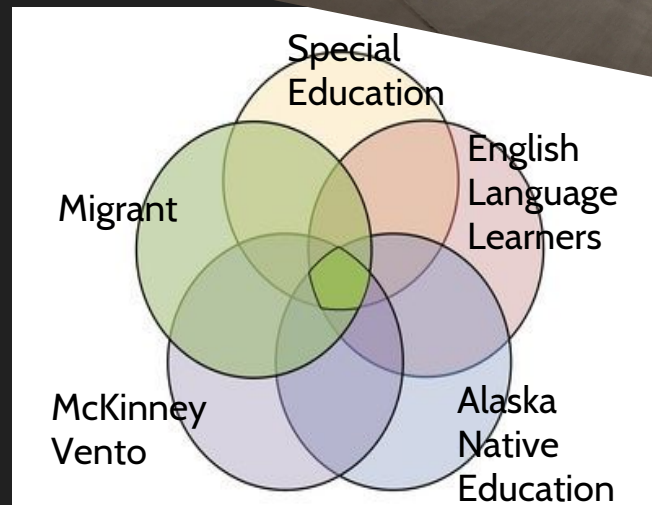
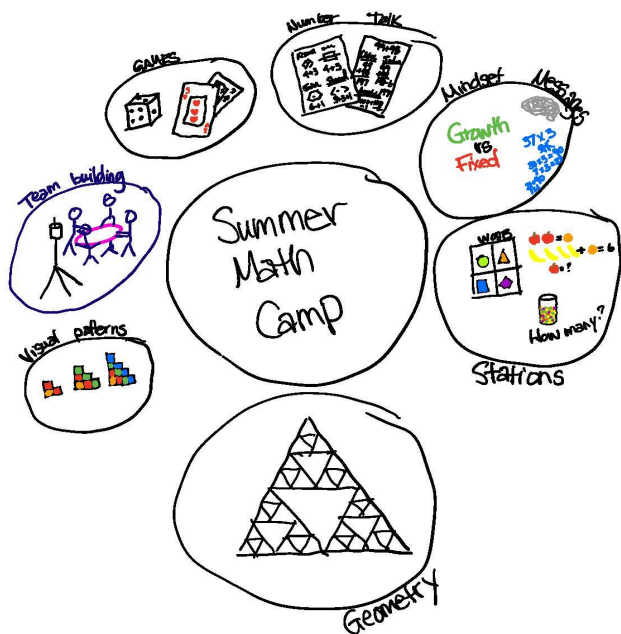
Instructional Routines & Activities

Q & A

Where Are We From?



Summer Math Camp (2016-2019)



Structure

Routine

Do the routine as a group

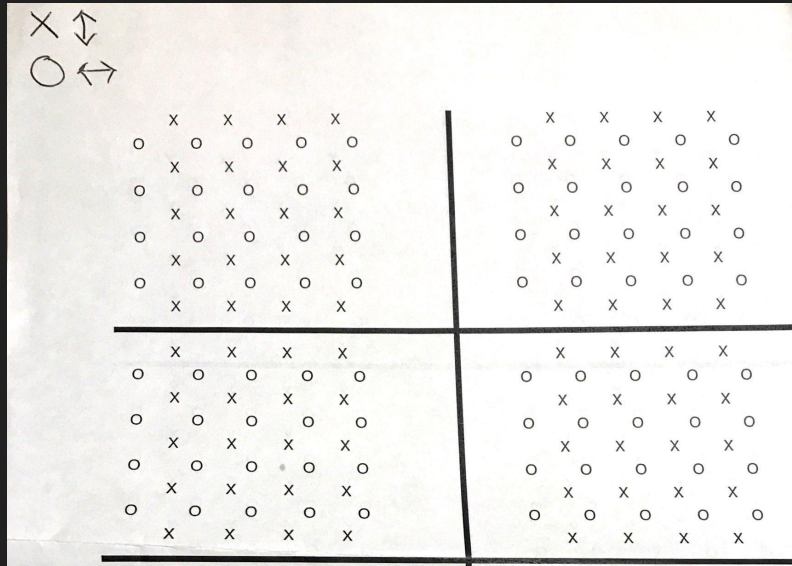
Debrief the routine

Share resources of where to find the routine

Share hashtags & people to follow on Twitter for this routine

Games

Games - Bridges



One player is O and one player is X.

Objective: To make a bridge that connects the left side to right side (O) or top to bottom (X).

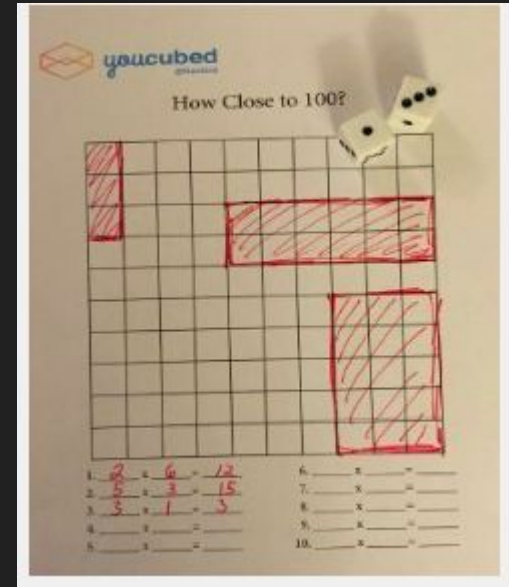
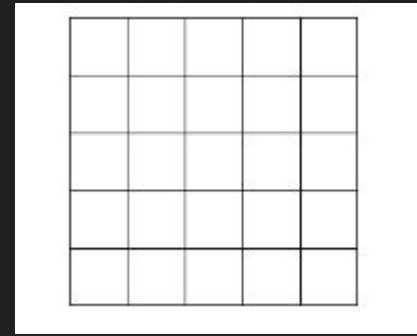
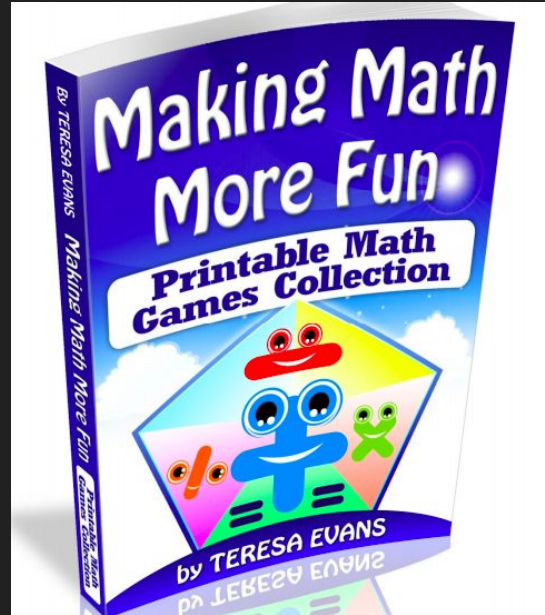
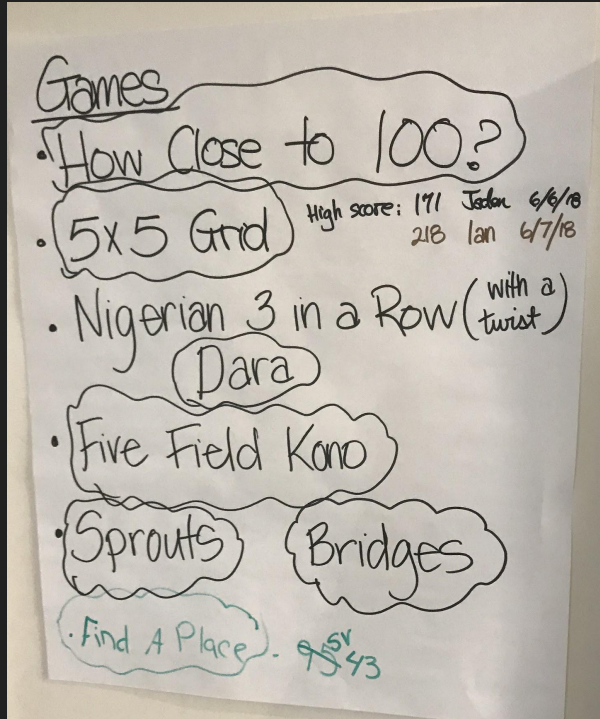
Rules:

- O can only connect to O vertically or horizontally and X can only connect to X vertically or horizontally.
- You cannot cross each other's paths.

How do Games help develop a growth mindset?

How do Games help develop mathematicians who are confident?

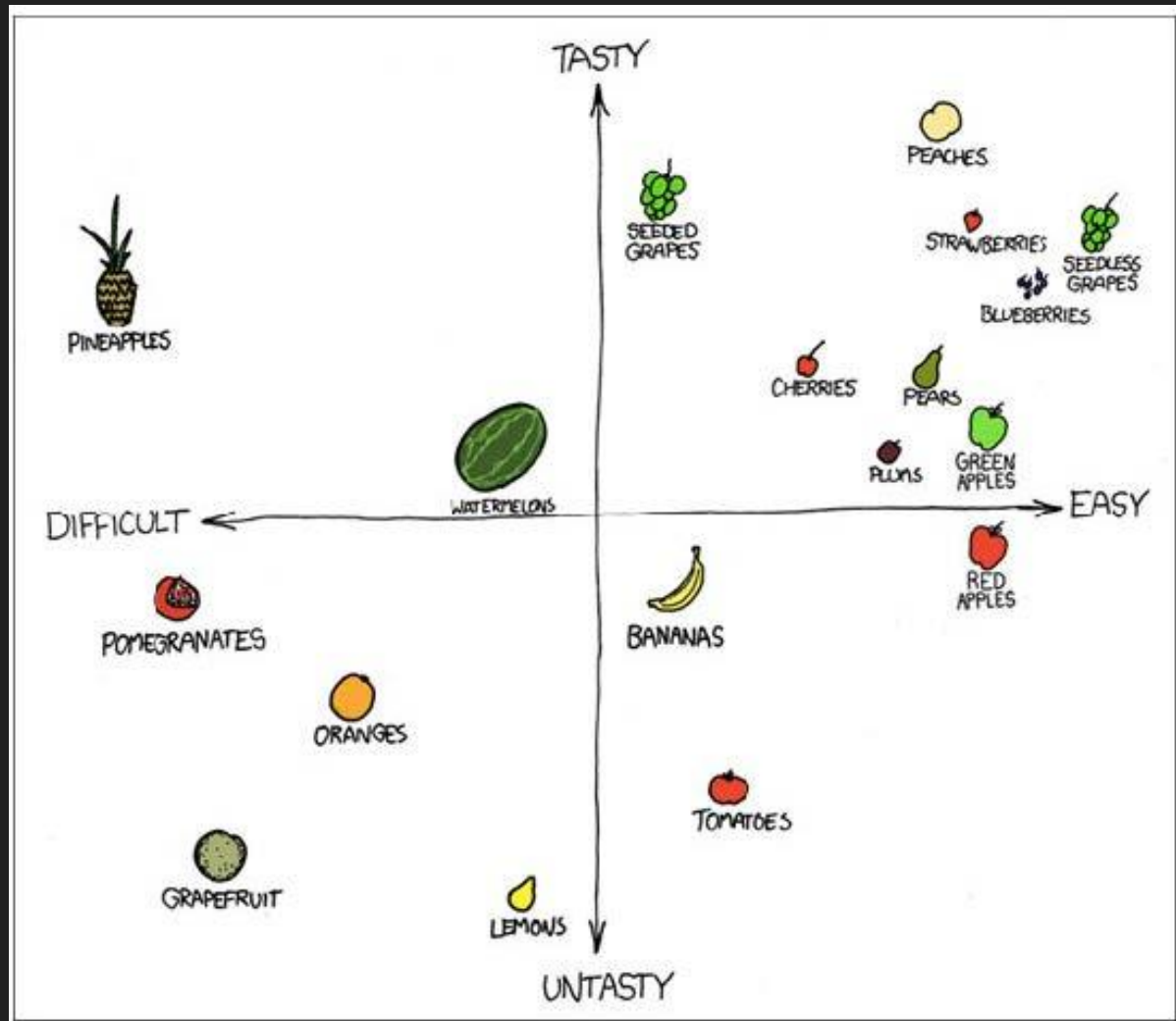
Where can you find more?



Notice & Wonder

What do you
notice?

What do you
wonder?



**How does Notice & Wonder help develop
a growth mindset?**

**How does Notice & Wonder help develop
mathematicians who are confident?**

Where can you find more?

THINKING MATHEMATICALLY

ABOUT + BLOG TITLES /

Noticing and Wondering

A Powerful Tool For Assessment

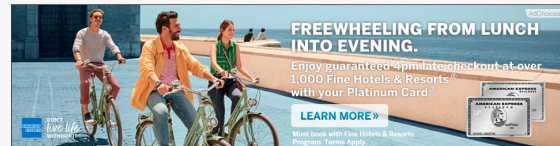


THE LEARNING NETWORK

The New York Times

PLAY THE CROSSWORD

Account

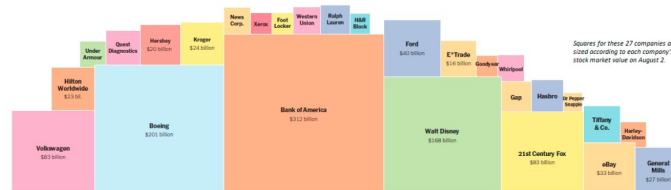


WHAT'S GOING ON IN THIS GRAPH?

What's Going On in This

Graph? | Sept. 26, 2018

\$1,000,000,000,000



On August 2, Apple's stock market value topped a trillion dollars, a first for a U.S. corporation. In early September, Amazon crossed the trillion dollar threshold as well.

Source: Thomson Reuters; Credit: Karl Russell and Jon Huang/The New York

Times

Where can you find more?

#noticeandwonder

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Annie Fetter

@MFAnnie

Math educator, GSP lifer, Desmos newbie, bike commuter, reader, bass guitarist, hockey goalie, off-grid home owner, beer nerd, cat person w/o cat
[#NoticeWonder](#)

Philadelphia, PA

Joined April 2010

Tweets 7,712 Following 428 Followers 6,975 Likes 1,201 Lists 1

Tweets Tweets & replies Media

Pinned Tweet



Annie Fetter @MFAnnie · Sep 2

And apparently that auction expired, so here's a new link.



Four (4) "Notice and Wonder" Vinyl Stickers Math

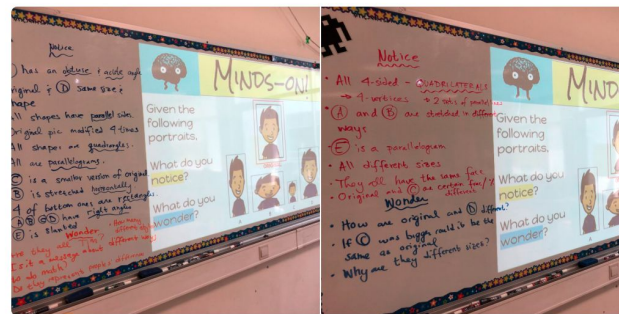
You will get four stickers for each "order". Buy Quantity = 2, you'll get 8 stickers. (Obviously my goal is distributing stickers, not making any money). If you don't specify, it'll

[ebay.com](#)



KristenMcG @k10mcg · 2h

Love capturing their thinking with [#noticeandwonder](#). We used this to kick off our unit. The kids named him Tim. [#MTBoS](#) [@openupresources](#)



1



Amanda Schantz @SchantzMath · Sep 25

Shout out to my math colleagues, I've been working on Noticing and Wondering in Geometry, but I'm struggling to incorporate it in my Algebra 1 class (unless it's graphing). Does anyone have any suggestions or ideas to help me?

[#noticeandwonder](#) [#pleasehelp](#)



1



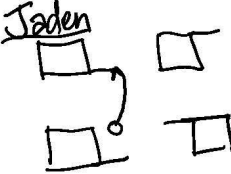
Number Talk
Images/How
Many?



Number Talk

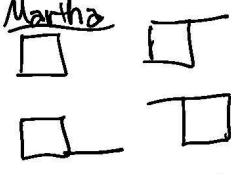
19
20

Jaden




$$5 + 5 + 5 + 5$$

Martha



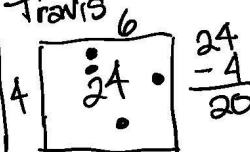
$$4 + 5 + 5 + 5$$

Emmanuel




$$4 + 4 + 4 + 4 + 4$$

Travis



$$24 - 4 = 20$$

Shirley

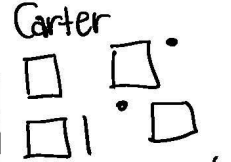


$$4 + 6 = 10$$

$$5 + 5 = 10$$

10 + 10

Carter



$$1 + 4 + 4 + 4 + 2 + 1$$

**How does Number Talk Images help
develop a growth mindset?**

**How does Number Talk Images help
develop mathematicians who are
confident?**

Where can you find more?

NUMBER TALK IMAGES

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PHOTOS

SUITES | STRINGS

ÉLÈVES | STUDENTS

MORE...

Number Talk Images

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.

CONSEILS | CONTRIBUTES

Where can you find more?

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Christopher
@Trianglemancsd
Teaching Faculty at Desmos. Author: Which One Doesn't Belong, and How Many (out now from Stenhouse!) [stenhouse.com/content/how-ma...](https://stenhouse.com/content/how-many)
📍 St Paul, Minnesota
talkingmathwithkids.com
📅 Joined December 2009

Tweets **Following** **Followers** **Likes**

61.4K **731** **12.1K** **7,084**

Tweets **Tweets & replies** **Media**

 Christopher Retweeted

**Janice Novakowski** @jnovakowski38 · 4h
Over thirty K-2 teachers came together this afternoon to think about the big mathematical ideas for K-2 around number concepts. We talked about learning progressions, routines to nurture counting development and introduced #unitchat - everyone got How Many? book set! #sd38learn



Team Building

Team Building - Create the Figure

Rules

1. Everyone in the group must have at least one hand on the rope at all times.
2. You cannot untie the rope.
3. You must use all of the rope for each shape.
4. Convince the teacher that your shape is accurate.



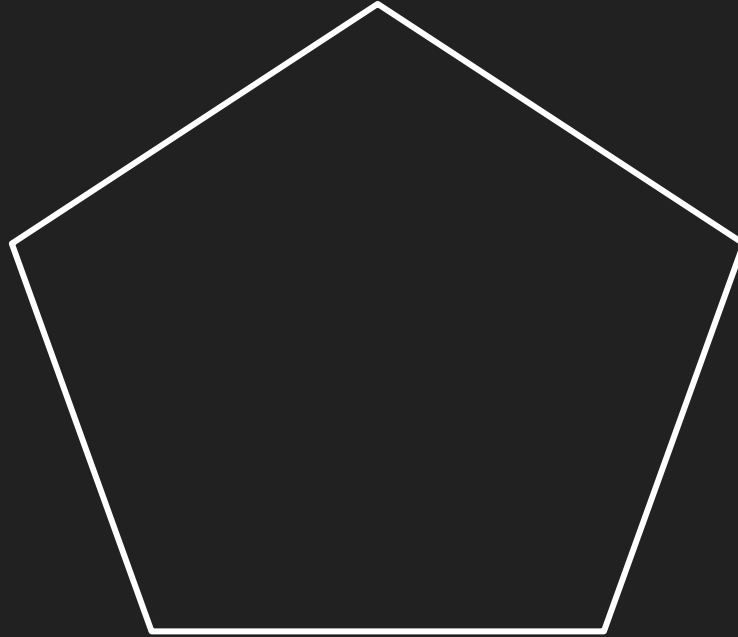
Team Building - Create the Figure

Figure 1



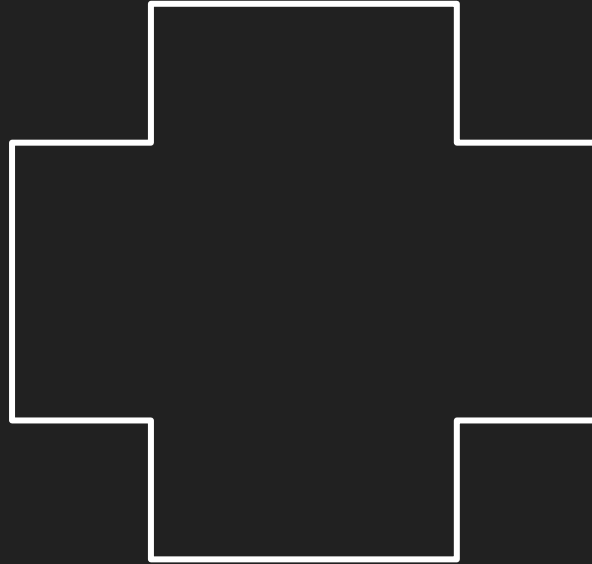
Team Building - Create the Figure

Figure 2



Team Building - Create the Figure

Figure 3



Team Building - Create the Figure

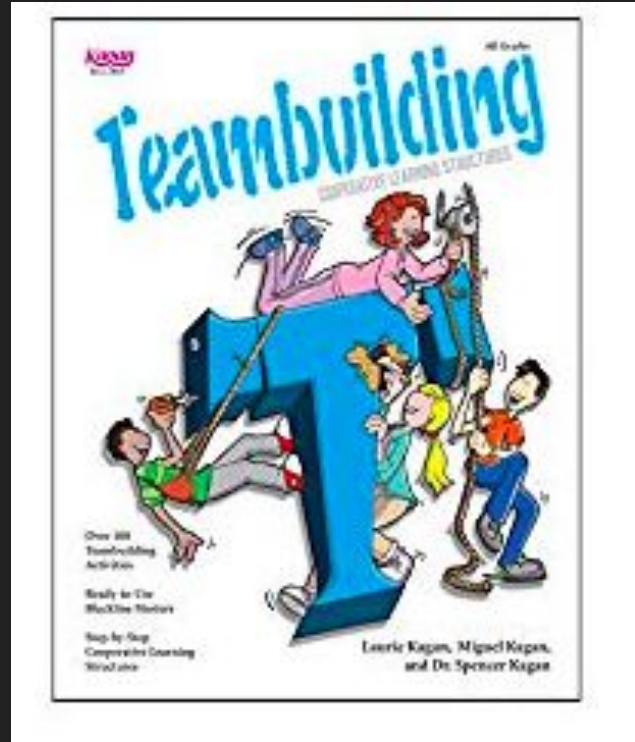
Figure 4



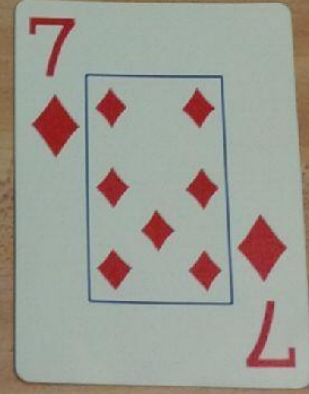
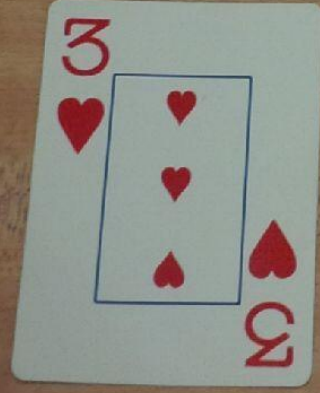
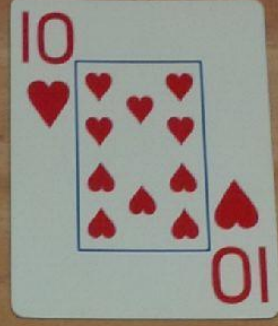
How does **Team Building help develop a growth mindset?**

How does **Team Building help develop mathematicians who are confident?**

Where can you find more?



**Which One
Doesn't
Belong**



only spade
black
only 5
exactly 7 shapes
 $3+7=10$

even
only one w/12 shapes
made up of 3 & 7
'prime'
rotational symmetry
only double of one
of the numbers

single column
exactly 5 shapes
no group of 5 shapes
:::
:::
:::

only diamond
exactly 9 shapes

**How does Which One Doesn't Belong
help develop a growth mindset?**

**How does Which One Doesn't Belong
help develop mathematicians who are
confident?**

Where can you find more?

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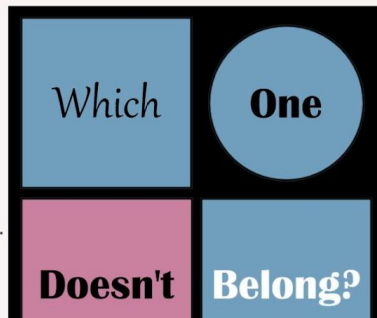
WHICH ONE DOESN'T BELONG?

THIS WEBSITE WAS INSPIRED BY THE MTBOS

with special thanks to Christopher Danielson and his [Which One Doesn't Belong - A Shapes Book](#).

This is **Which One Doesn't Belong?**, a website dedicated to providing thought-provoking puzzles for math teachers and students alike. There are no answers provided as there are many different, correct ways of choosing which one doesn't belong.

Enjoy!



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Which

One

Doesn't

Belong?

WODB? Math

@WODBMath

[wodb.ca](#)

Joined March 2015

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Tweets & replies

Media

WODB? Math Retweeted

Erick Lee

@TheErickLee · Sep 24

A Which One Doesn't Belong question for grade 7 late French Immersion math students. Try using a French word bank next to this (nombre pair, nombre impair, nombre négatif, nombre positif, etc) to help facilitate classroom discussion.

#WODB #HRCMath @WODBMath

-25	-4
-7	9

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Simon Gregg

@Simon_Gregg · 18h

Today's Which One Doesn't Belong?

#wodb

different colours and numbers
In order
Advay

Agel
Same
all 6s on dots
all dice
black
6-sided
All add to 2
Colours
Dante

no symmetry
Candice
Blues
Lisa
1 smallest number
2
Shaped like a diamond
Alexia

All numbers the same
Alexa
numbers face the middle
Hattie
Tom
2 colours
2 numbers
pattern
Davies
Isabelle
2x2=4
Alex

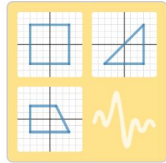
11

8

People

View all

Desmos Polygraph



Polygraph: Shape Bucket



by Melissa Paletta | 30-45 minutes | Introduction

Edited with love by Desmos



Mobile



Tablet

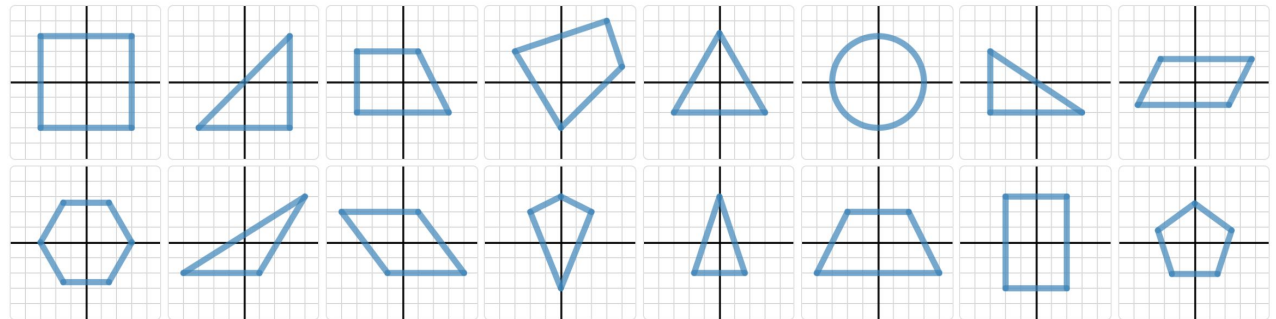


Laptop

This Custom Polygraph is designed to spark vocabulary-rich conversations about geometric figures, including polygons and a circle. Key vocabulary that may appear in student questions includes: side, vertex/vertices, angle, scalene, regular, isosceles, equilateral, acute, right, obtuse, parallel, congruent, opposite, triangle, quadrilateral, square, rectangle, parallelogram, trapezoid, kite, pentagon, hexagon, and circle.

In the early rounds of the game, students may notice shapes from the list above, even though they may not use those words to describe them. That's where you can step in. After most students have played 2-3 games, consider taking a short break to discuss strategy, highlight effective questions, and encourage students in their use of increasingly precise academic language. Depending on their readiness, you might encourage your students to use the grid system to determine the length/slope of line segments in order to verify claims about congruent, parallel, and/or perpendicular sides. Then ask them to play several more games, putting that precise language to work.

The Cards



Polygraph code

Debrief

Growth mindset

Developing confidence

Where can you find more?

desmos

Search for an activity

Q

Samantha B.... ▼

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Activity Pick of the Week



Transformation Golf: Rigid Motion

by Desmos | 30-45 minutes | Development


In this activity, students use their existing understanding of translations, reflections, and rotations to complete a round of transformation golf. For each challenge, their task is the same: Use one or more transformations to transform the pre-image onto the image. We recommend you solve the challenges yourself before assigning this activity.

French translation courtesy Jocelyn Dagenais:
<https://teacher.desmos.com/activitybuilder/custom/59d05b4509730630f4d0a7e7>

Bookmark

More

Featured Activities



What's My Transformation?

by Desmos | 45-60 minutes | Practice

In this activity, students explore the idea that all lines are related to each other, as are all parabolas. They extend this idea to a new function type, and they manipulate it to gain skill with symbolic representations of function transformations.

Inspired by Meg Craig (@mathymeg07) and Sheri Walker (@sheriwalker72)

Bookmark

More

Where can you find more?

The image shows the Twitter profile of Desmos.com (@Desmos). The profile header features a green background with a white circular logo containing a stylized 'W' and a sine wave. Below the header, the profile name 'Desmos.com' and handle '@Desmos' are displayed. The bio states: 'Explore math with our free online graphing calculator and networked classroom activities! Tweets by @eluberoff (eli) and @ddmeyer (dan)'. Location is 'San Francisco, CA', website is 'desmos.com', and joined date is 'March 2011'. A green button says 'Tweet to Desmos.com'. Below this, it says '248 Followers you know' with a row of profile picture icons. The stats bar shows: Tweets 17.1K, Following 1,227, Followers 29.4K, Likes 9,291, and Lists 8. The tweet tab is selected, showing two tweets. The first tweet is from Desmos.com (@Desmos) 4 hours ago, saying 'Building character tho!' with a GIF of a green frog. The second tweet is from Desmos.com (@Desmos) 6 hours ago, saying 'Another one: Pomegraphit! teacher.desmos.com/activitybuilde...' with a photo of students in a classroom.

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Desmos.com @Desmos

Explore math with our free online graphing calculator and networked classroom activities! Tweets by @eluberoff (eli) and @ddmeyer (dan)

San Francisco, CA

desmos.com

Joined March 2011

Tweet to Desmos.com

248 Followers you know

Tweets Tweets & replies Media

Desmos.com @Desmos · 4h
Building character tho!

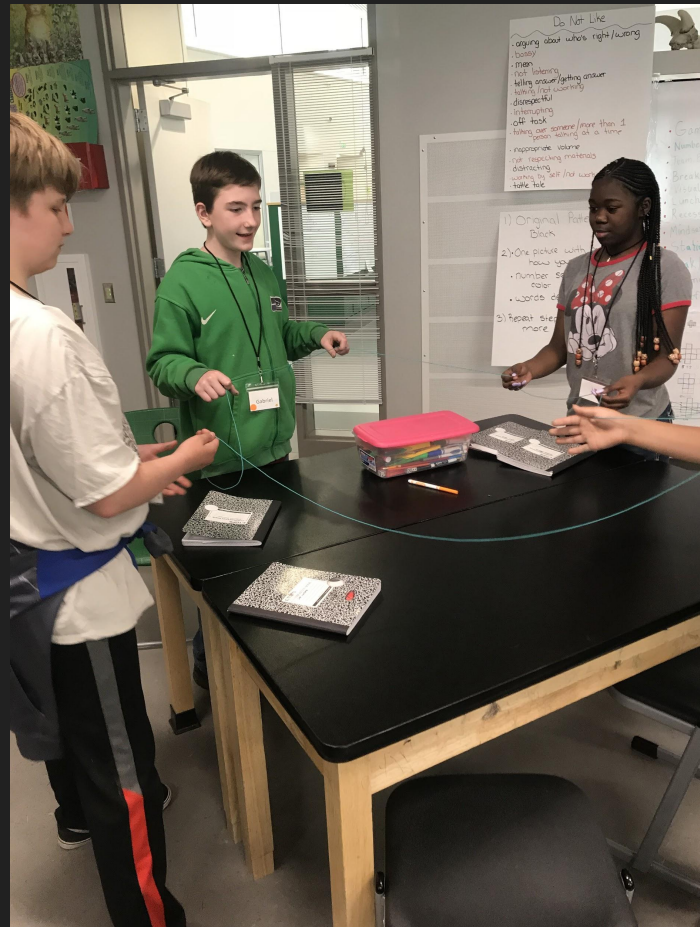
Jacob Wagner @MrWagsMath
Feeling frustrated... @Desmos found rational roots in 2 seconds. Proceeded to then wade through graphical issues and finicky systems for 45 minutes to teach kids Casio and TI method. #mtbos #teachmath
Show this thread

1 1 15

Desmos.com @Desmos · 6h
Another one: Pomegraphit! teacher.desmos.com/activitybuilde...

Jessica Borah @JessicaBorah
Love it when they spontaneously stand up to talk to each other - some engaging conversations while comparing their classmates' opinions on fruit using the snapshot

What We Learned



Mindset Messages

You Can Learn Anything

Patterns

Believe in Yourself

Making Mistakes

Speed

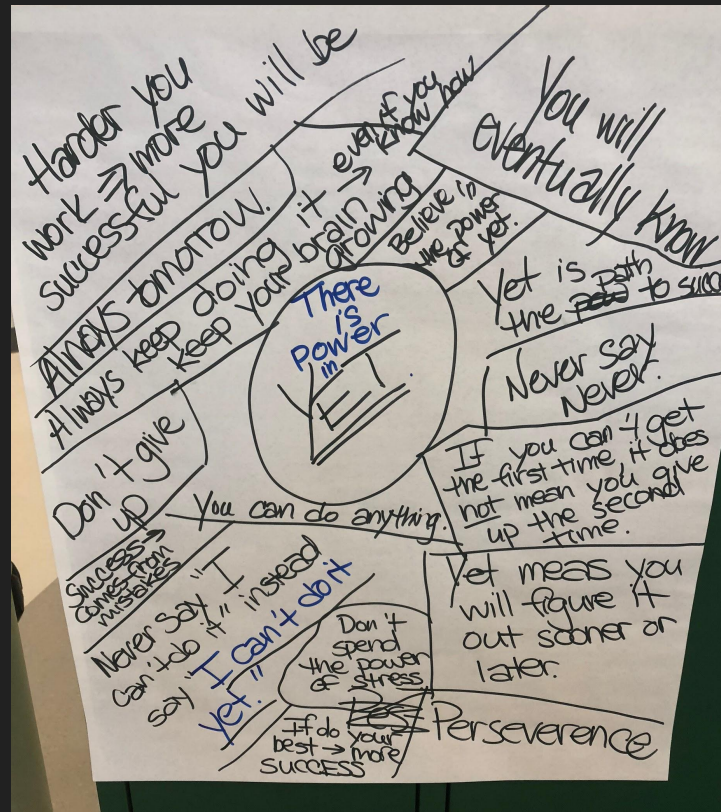
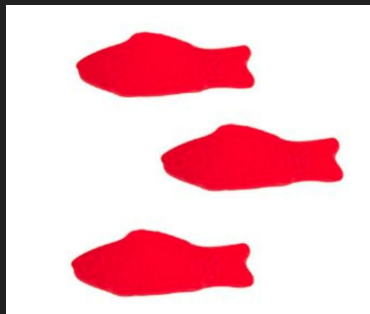
Perseverance

The Power of Yet

Try Everything

Get Back Up Again

Disney Mash Up





Questions??

Feedback for us & slides
for you:

<http://bit.ly/2019NCTMSanDiego>

Thank you

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Samantha Wuttig

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