



# *FUN WITH STATISTICS IN MIDDLE SCHOOL*

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CMC South 2015 – Session #257

# Guess what...

- All of our slides and materials will be available digitally. Take notes accordingly.
- Fill out an information card online or on paper to get a copy of today's presentation.
- You are going to be working with the people near you, introduce yourself!
- We are going to interrupt your thinking several times, forgive us.



# Who are they again?

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## Jenny Hagman

- Works with Center for Math and Teaching
- Is a Lesson Study facilitator
- Loves math!
- Is President of RSBCMTA (an affiliate of CMC-South)

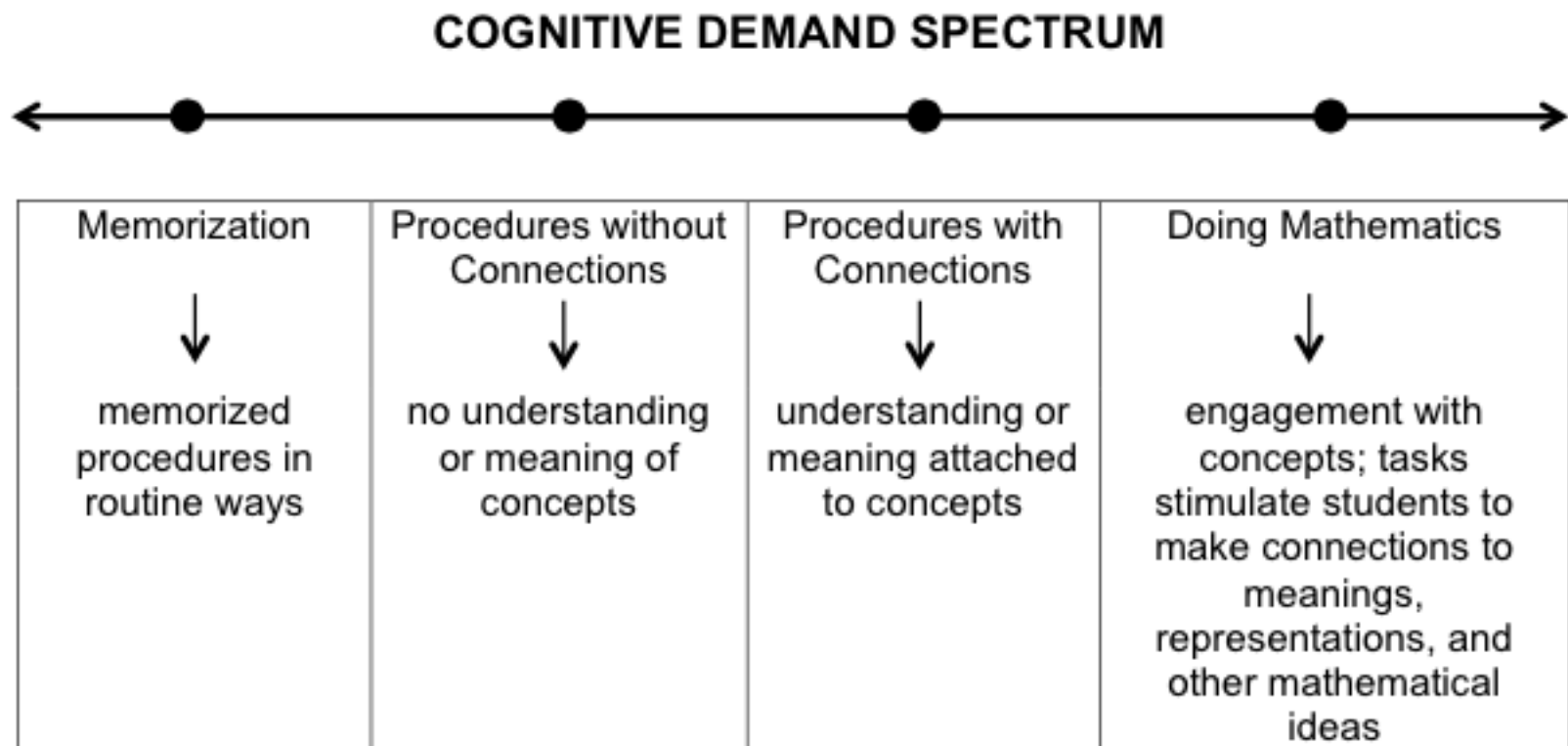
## Zach Hagman

# Today's focus...



We will experience two engaging statistics lessons. First, we will find and use our name scores to discuss and illustrate center and spread. Second, we will pursue math modeling by performing a simulation that estimates the number of fish in a lake.

# Cognitive Demand Spectrum



lower cognitive demand

higher cognitive demand

# Name Scores



A = 1	E = 1	I = 1	M = 4	Q = 10	U = 2	Y = 4
B = 4	F = 4	J = 10	N = 2	R = 1	V = 5	Z = 10
C = 4	G = 3	K = 5	O = 1	S = 1	W = 4	
D = 2	H = 3	L = 2	P = 4	T = 1	X = 8	

- Using the scores above, find your name score and write it on your handout.
- Write your name (small) and name score (big) on an index card using a marker.

# Name Scores



A = 1	E = 1	I = 1	M = 4	Q = 10	U = 2	Y = 4
B = 4	F = 4	J = 10	N = 2	R = 1	V = 5	Z = 10
C = 4	G = 3	K = 5	O = 1	S = 1	W = 4	
D = 2	H = 3	L = 2	P = 4	T = 1	X = 8	

- If you know someone has a score of 15, can you tell what their name is? Justify your answer.
- There are red beads at your table. Take one bead for each point you scored with your name score.

# Name Scores



- Take a moment to recall how many red beads are in your cup.
- In a moment you will be asked to move around. When you meet someone new, share your beads as fairly as you can between the two of you. Continue meeting new people until everyone has as close to the same number of beads as we can get.



# Name Scores



- Let's create a human number line.
- When your name is called, come take your card and stand on the number line.
- Feel free to move along the number line as others join you.

lesser numbers

greater numbers



# Name Scores



- Take a look at our “class data”.
- Record it on your handout.
- How many *observations* were there?
- Take a moment to think about what the *mean* and *median* represent and how to calculate them.

# Name Scores



- Which measure of center do you think best represents the middle of the name score data set? Explain.
- Which measure of spread do you think best represents the variability in the name score data set? Explain.

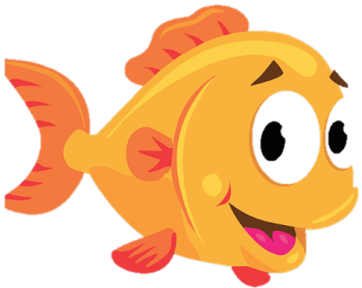
# Name Scores



- Turn to page 5 of your handout and complete your favorite graphical display.
- How does the dot plot compare to our virtual number line?
- What information do you gain by constructing a histogram? What information is hidden?
- How does the box (and whisker) plot compare to the other displays?

# Estimating Fish Populations

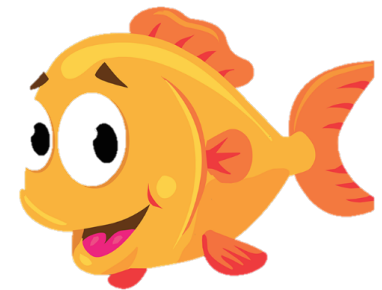
- Suppose we would like to estimate the fish population of a large lake? How might we do this?
- Marine biologists sometimes use the capture-recapture method to estimate populations.



# Estimating Fish Populations

Marine biologists sometimes use the capture-recapture method to estimate populations.

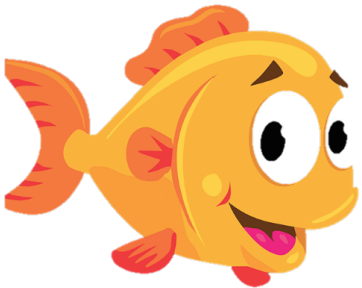
- After capturing a sample of fish, the fish are tagged and released.
- After a sufficient time has passed, fish are recaptured, and the number of tagged fish vs. untagged fish are recorded.



# Estimating Fish Populations

For our experiment, we will assume:

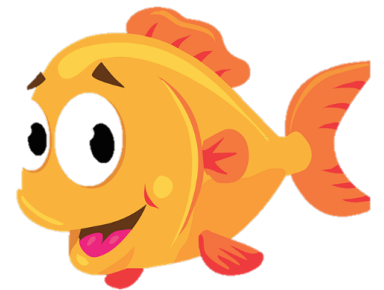
1. Once a fish is tagged, the tag will remain fixed on the fish.
2. Capturing a fish will not influence the fish's behavior.
3. The population of fish in the lake is fixed.



# Estimating Fish Populations

The experiment:

1. There are three different types of fish in our local lake (the bag). There are blue fish, green sunfish, and yellow tang.
2. Using a net (cup), you will go fishing and pull your fish into your boat (plate).
3. Once the fish are in the boat, tag them (replace them with red beads), and release them back into the lake.

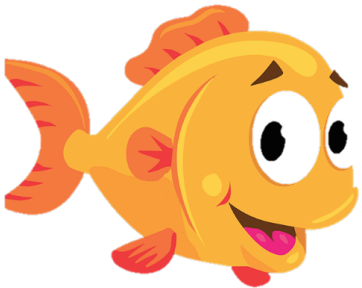




# Estimating Fish Populations

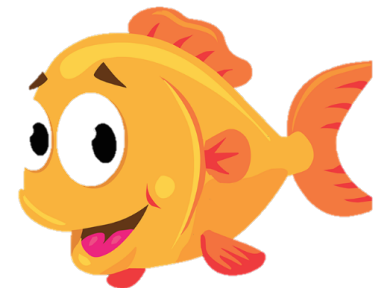
The experiment (continued):

3. Once the fish are in the boat, tag them (replace them with red beads), and release them back into the lake.
4. Make sure the fish are well mixed in the lake (shake the bag). Then go fishing for a sample.



# Estimating Fish Populations

- What was your estimate for the fish population?
- Do you think your estimate is reasonable? Why or why not?
- How many fish are actually in your lake?
- How accurate was your estimate?
- How might you improve your estimate?



# CCSS-Mathematics



1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.



- Thank you for attending and participating.
- If you would like a copy of today's presentation, please make sure you have filled out an information card (online or by hand).
- Please feel free to contact us with any comments, questions or concerns.
- Please stop by **Booth 427** for more information about *MathLinks*.
- Don't forget to text in your feedback!

Strongly Disagree

Disagree

Agree

Strongly Agree

0

1

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Send your text message to this Phone Number: 37607

poll code  
for this session

Speaker was engaging  
and an effective  
presenter (0-3)

Other comments,  
suggestions, or  
feedback (words)

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Speaker was well-  
prepared and  
knowledgeable (0-3)

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Session matched title  
and description in  
program book (0-3)

Example: **7776 323 Inspiring, good content**

Non-Example: 7776 3 2 3 Inspiring, good content

Non-Example: 7776 3-2-3Inspiring, good content