Blast from the Past: Return of the Tug-of-War

Julie McNamara, Ph.D.
CSU East Bay
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CALIFORNIA STATE UNIVERSITY
EAST BAY

Welcome!

- If you're looking for *Blast from the Past: Return of the Tug of War,* you're in the right place!
- Please sit near others as you will be problem-solving in small groups. ☺

CCSS Standards for Mathematical Practice

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.

Encouraging Students to Engage in the SMP

Traditional Lesson Design

- I do
- We do
- You do

“Upside Down” Teaching*

- You do
- We do
- I do

*Cathy Seeley

Problem Solving Lesson Design

Phase	Teacher	Students
1. Task Set-Up	Sets up the task; ensures that students understand *what* to do	Make notes, sketches; ask questions as needed
2. Student Exploration	Monitor students as they work	Students work on task
3. Closure	Make connections and highlight important ideas	Share work and discuss strategies

Tug of War!

Mathematical Tug-of-War!

How we'll work:

- After the task is presented you will have a few minutes to consider it quietly and begin to work towards a solution.
- You will then work in groups of 3-4 and share your current thinking. As a group, you will come to a solution.
- Once you come to a solution, you will create a poster to represent your thinking and share it with the rest of the group.
- If time allows, you will create (and solve) a 4^{th} round for your colleagues to solve.

Mathematical Tug-of-War!

Round 1:

- On one side are **five** rebel fighters - **Rey, Finn, Princess Leia, BB-8, and R2D2**. Surprisingly, **they are all of equal strength.**
- On the other side are **four Storm Troopers**. **They too, are all equal in strength.**
- In the contest between these two teams, the result is dead even. **Neither team can out-pull the other.**

Mathematical Tug-of-War!

Round 2:

- On one side is **Chewbacca**, who is known around the galaxy for being very strong.
- On the other side is a team made up of **Rey, Finn, and one Storm Trooper**. Again**, it's a draw – an equal pull.**

Mathematical Tug-of-War!

Round 3:

- It's the final tug that you must figure out.
- It will be between these two teams: **Chewy, Rey, Finn, and Princess Leia** on one side, and the **four Storm Troopers** on the other side.
- Can you figure out who will win this tug-of-war?

Mathematical Tug-of-War!

Round 4:

- Using only the original characters, create (and solve) a 4^{th} round for your colleagues to solve.

Mathematical Tug-of-War!

How we'll work:

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- You will then work in groups of 3-4 and share your current thinking. As a group, you will come to a solution.
- Once you come to a solution, you will create a poster to represent your thinking and share it with the rest of the group.
- If time allows, you will create (and solve) a 4^{th} round for your colleagues to solve.

Preparing for Sharing

- Send a “spy” to see what other groups are doing
- Return to your home group to make any revisions that are necessary
- Gallery Walk – use your mobile device to take pictures
- Talk with your group about what you noticed

Sharing Solutions

Debriefing the Tug of War

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.
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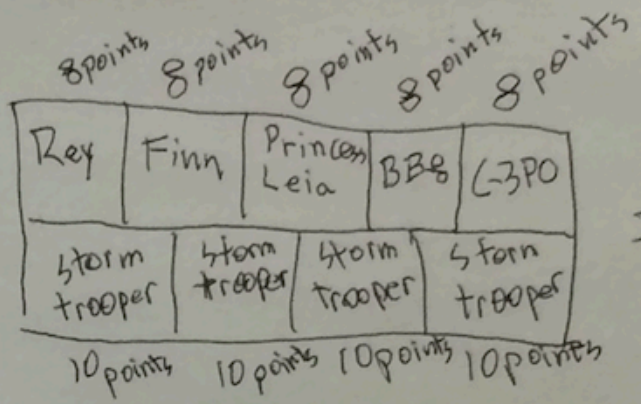
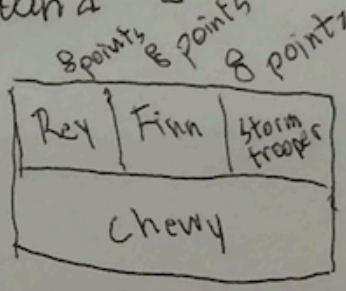
Transition to Kid Work

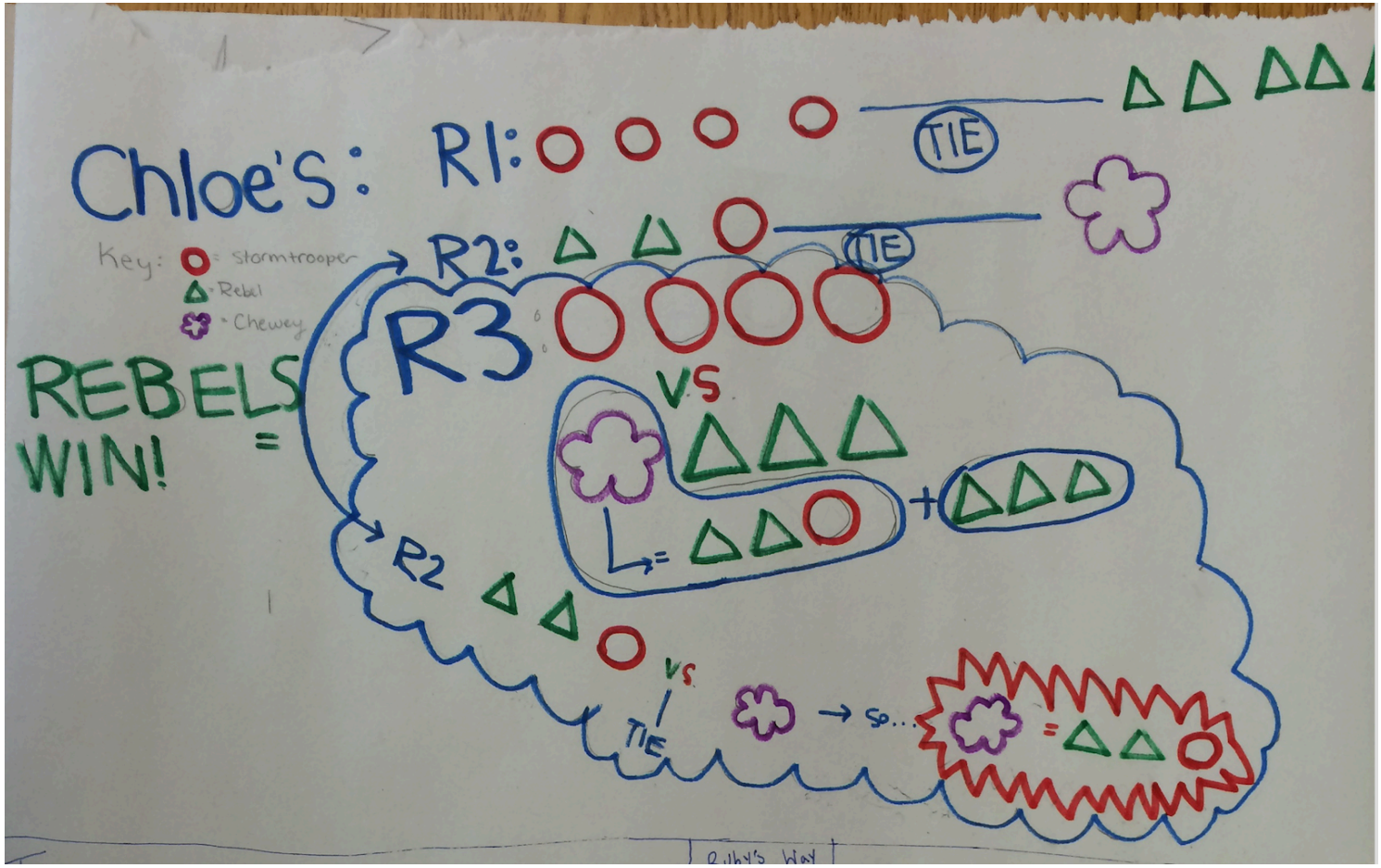
Round 1

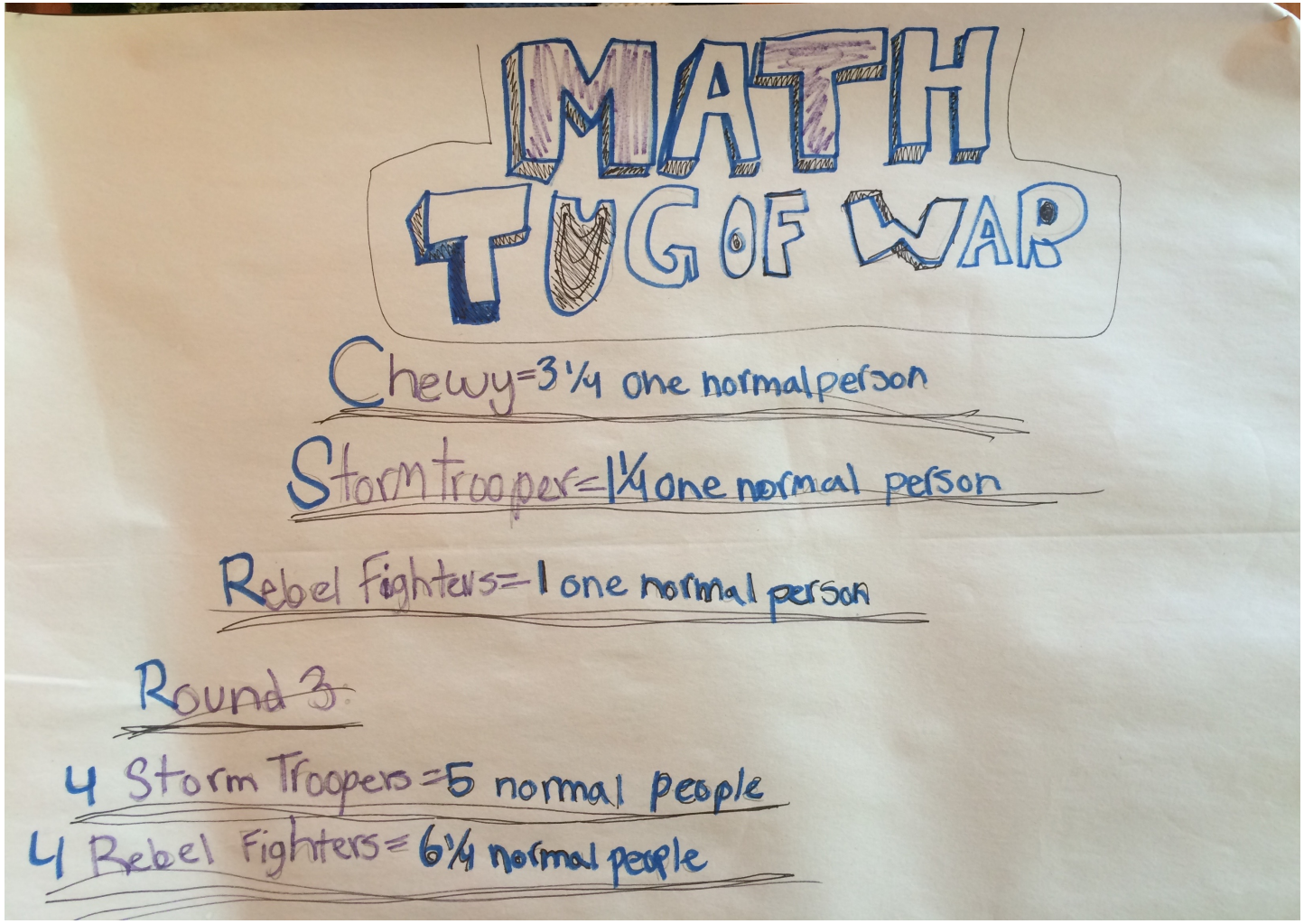


= they are all equal in strength

Round 2




Chloe's:
R1:
TIE
R2:
TIE
Key:
= Stormtrooper
= Rebel
= Chewey
REBELS WIN!
=
R3
VS
+
R2
VS
TIE
→ So...
=
Ruby's Way


MATH
TUG OF WAR
Chewy=3¼ one normal person
Storm trooper=1¼ one normal person
Rebel Fighters=1 one normal person
Round 3
4 Storm Troopers=5 normal people
4 Rebel Fighters=6¼ normal people

Mathematical Tug-of-War Values

Rebel	ST	Chew
4	5	13
20	25	65
$\frac{4}{5}$	1	$\frac{13}{5}$
.20	.25	.65
1	$1\frac{1}{4}$	$3\frac{1}{4}$

How are they the same?

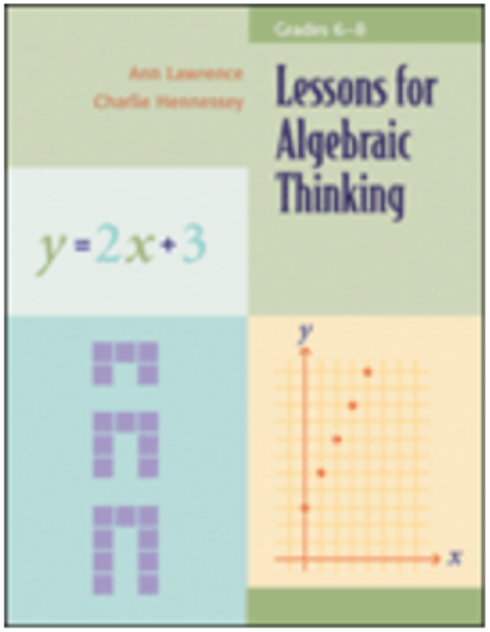
How are they different?

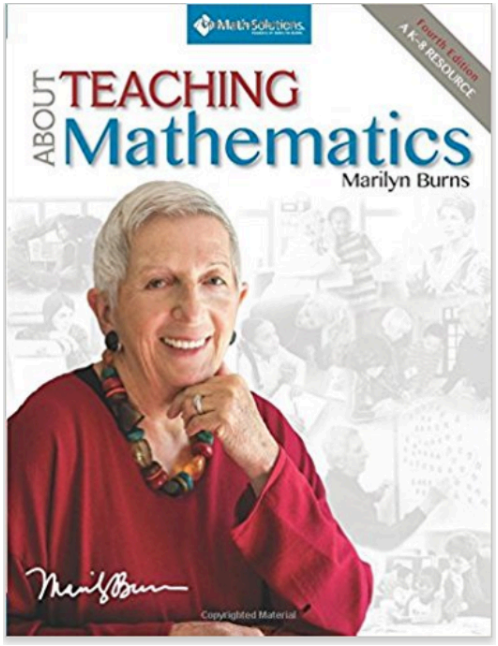
Other “Oldies but Goodies”

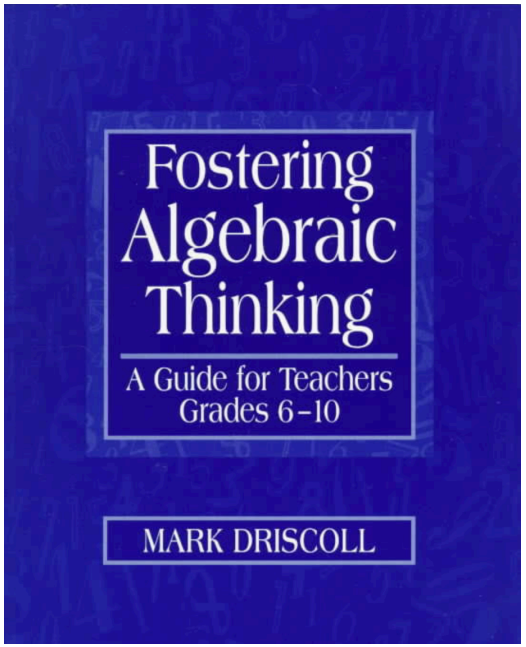
- The Prison/Locker Problem
- The Condo Challenge
- Eric the Sheep
- Knights of the Round Table

Jo Boaler:The Condo Problem

Additional Resources







Thank you!!!

julie.mcnamara@csueastbay.edu

@juliemcmath

juliemcnamarasblog.wordpress.com