

# Great Math Leaders as Rebels with a Cause for Students

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**An abbreviate agenda:**

- **Perspectives**
- **Feelings and frustrations**
- **Actions**

# My Motivation

**We are all aware of the impact of following silly rules or misguided directives. The one-size-fits-all, top-down, we-know-best approach to running too many schools underserves our students and our professionalism.**

**Great educators have always earned their greatness by closing their doors, breaking some rules, and asking uncomfortable questions.**

**That is, by erring on the side of being trouble-making subversives. And, if they won't lessen control and give us autonomy to do our jobs, we'll just take it.**

# **Risks? What risks?**

**What do any of us really have to lose when the greatest penalty is a direct ticket back to the classroom where we were always the happiest?**

**And where, after our current gig as coach, department head, supervisor, TOSA, etc., we are better than ever?**

# **Accordingly...**

**This session will serve as a practical guide to being a rebel teacher/coach/leader of mathematics on behalf of the best interests of our students. That is, educators who focus far more on students' needs than on all the distractions that have little to do with more effective teaching and learning of mathematics.**

# **So with that mild-mannered introduction...**

## **This afternoon's more detailed agenda:**

- Rebels and their key characteristics**
- Reasons to get angry or why we need to break the insidious inertia of the status quo**
- Productively channeling our anger into subversion on behalf of students**
- Summary advice to my fellow rebels**

**Ready?**

# Opening Perspective

- Look at our colleagues and their social studies curriculum.
- Look at our colleagues and their science curriculum.
- Look at whom we name our schools after.

**Martin Luther**

**Nelson Mandela**

**Rosa Parks**

**Bill Gates**

**Cesar Chavez**

**Martin Luther King**

**Galileo**

**Steve Jobs**

**Mother Teresa**

**Mahatma Gandhi**

**Jesus**

**Abraham Lincoln**

**Thomas Edison**

**Jane Goodall**

**????**

**Rebels All! Game Changers All!**

# What do rebels do? They:

- Question
- Agitate and annoy
- Are outspoken
- Break silly rules
- Are comfortable as non-conformists
- Fearlessly explore alternatives and take risks
- Are passionate about their cause
- Challenge convention
- Make a difference

**Am I holding up a mirror to you?**

# Alternatively.....

**What do non-rebels do? They:**

- Conform**
- Follow the rules**
- Often bore to tears**
- Go along to get along**
- Don't rock the boat**
- Think and act hierarchically**
- And sad to say, they don't make a lot of difference**

**Let's be honest:**

**It's easy to TALK about bold leadership.**

**It's much hard to ENACT bold leadership.**

**As a teacher as well as a leader.**

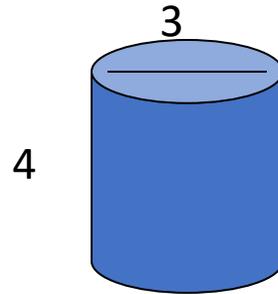
# What is all too typical and much too underperforming

Good morning class.

Today's objective: Find the surface area of right circular cylinders.

Open to page 384-5.

Example 1:



$$\text{S.A.} = 2\pi rh + 2\pi r^2$$

Find the surface area.

Homework: Page 385 1-19 odd

**Alternatively, in a rebel infested environment:**

**Overheard in the ER as the sirens blare:**

**“Oh my, look at this next one. He’s completely burned from head to toe.”**

**“Not a problem, just order up 1000 square inches of skin from the graft bank.”**

**You have two possible responses:**

**- Oh good – that will be enough.**

**OR**

**- Oh god – we’re in trouble.**

- **Which response, “oh good” or “oh my” is more appropriate?**
- **Explain your thinking.**
- **Assuming you are the patient, how much skin would you hope they ordered up?**
- **Show how you arrived at your answer and be prepared to defend it to the class.**
- **With a partner or two, GO!**

- **Exit slip:** Sketch an object and its dimensions that has a surface area of about 100 square inches?
- **Homework:** How many square cm of skin do you have and be prepared to show how you arrived at your answer.

# Need I remind you:

- **Goal**
- **Task**
- **Representations**
- **Discourse**
- **Questions**
- **Fluency**
- **Struggle**
- **Evidence**

**Thank you NCTM Principles to Actions**

# Look at what I just did:

- **I was a non-conformist**
- **I supplemented my textbook**
- **I challenged convention**
- **I milked an intriguing context**
- **I engaged my students and got them actively collaborating**
- **I made a difference with my students**
- **I modeled exactly the raging hormones of my students**
- **I was a MATH REBEL on behalf of engaging my students**

# You know you are true rebel if you:

- **Find the mere thought of accepting authority spine-tingling.**
- **Have a strong preference for doing things your way.**
- **Find yourself automatically nominated for leadership positions in group settings.**
- **Stick to your convictions, even if they go against the grain and get you into trouble.**
- **Are prepared to live and die alone rather than have your freedom to think for yourself restrained by the needs or desires of a “superior”.**

# And in our math ed business:

The status quo is no longer acceptable when it comes to ensuring that mathematics works for all students. Standard operating procedures of teaching by telling, showing and practicing fail far too many students. When it comes to **implementing** the conceptual orientation of the Common Core or its derivatives and **consistently doing** what research conclusively demonstrates about distributive practice, student and professional collaboration, alternative approaches (as opposed to the one right way) and multiple representations, all as part of a school and classroom culture of inquiry, questioning and problem solving, **we are all being asked to be rebels on behalf of students.**

So let me turn to **WHY** and **HOW**.

**But exactly why is such rebel behavior so dearly needed?**

**Because there are many opportunities to just get angry.**

To be blunt

**When teachers spend  $\frac{1}{2}$  a math lesson talking at students and showing HOW to get answers, it's educational malpractice and student learning is being compromised. And frankly we are complicit when we look the other way.**

**Do you agree? What are you doing about it?**

To be blunt:

**When students are doing more than 4 exercises on a mindless practice worksheet without pausing to get feedback on their work and to discuss alternatives and explanations, their learning is being compromised. When we tolerate the use Mad Minute, Math Sprints, etc. we are contributing to the development of math anxiety and worse.**

**Do you agree? What are you doing about it?**

# To be blunt

**When teaching is driven by rules that make no sense:**

- Keep, change, change (KCC)**
- Keep, change, flip (KCF with IEP students)**
- The butterfly method (OY)**

**student understanding is being undermined. And frankly we are complicit when we look the other way.**

**Do you agree? What are you doing about it?**

To be blunt

**When some students have access to calculators and Desmos and computers and others, in the same grade or course, don't, kids and their teachers the next year are being set up.**

**Do you agree? What are you doing about it?**

To be blunt

**When there are no retesting policies, we are just being lazy and mean and hurting kids...**

**Do you agree? What are you doing about it?**

To be blunt

**When math class periods are only 45 or 47 or 49 minutes, teachers are being set up.**

**Effective teaching of our standards requires 60 minutes per day!**

**Do you agree? What are you doing about it?**

Let's be honest:

**There is a lot we SEE and KNOW and fail to act on.**

**That's not leadership.**

**That's going along to get along and it's just not acceptable.**

**This mathematics education work is not about being popular,  
WE NEED TO BELIEVE (and act on the belief) THAT WE WORK  
FOR THE KIDS – ALL THE KIDS – ALL THE KIDS IN OUR SCHOOL  
AND DISTRICT!**

And that's just a start.

**It should be clear that, despite all the great guidance we have (a coherent K-8 curriculum, SMPs, MTPs), if we indeed work for all of the kids and care deeply about how many just are not being served, then our work is cut out for us.**

**So exactly what do rebellious,  
subversive, non-compliant mathematics  
education leaders need to be doing?**

# **1. We start in the classrooms of our schools and districts.**

## **Elements of Quality:**

- **Clarity of goals (not Lesson 4.5 or pages 214-217)**
- **Context (not naked)**
- **Rich tasks (not exercises)**
- **Focused intentional questions (not punting)**
- **Opportunities for discourse (not just telling)**
- **Gradual reveal (not just a dumping)**
- **Multiple representations (not one way)**
- **Alternative approaches (not one way)**
- **Explanations and justifications (not just answers)**
- **Common errors and misconceptions (not just right correct approaches)**
- **Sense-making by students (not lecture)**
- **Evidence (not I taught it and let the chips....)**

## Rebels with a cause for students:

- **Recognize there really are research-affirmed, common sense answers.**
- **Never stop talking about and modeling what quality looks like.**
- **Publish such lists of expectations.**
- **Work with principals to ensure they can differentiate control from engagement, passive and quiet from active and noisy, effectiveness from tradition.**

**It's hard to believe that any of this could be considered radical**

## **2. We focus on real Professional Development**

**Common sense, research-affirmed PD practices that :**

- help us envision the shifts**
- address beliefs and mindsets**
- link opportunities for practice and feedback**
- involve collaborative work**

**As opposed to after-school, one-shot, fragmented, not relevant to real needs, imposed PD that rarely focuses on teaching and learning.**

# **Rebels don't accept professional isolation**

## **#1: Collegial visits with respectful debriefs**

- **The answers to nearly all of our challenges reside to one degree or another within our schools.**
- **No one knows all and no one is perfect – we're teachers – but someone knows and does things that we don't.**
- **Why do we act as though there were dragon-infested moats around our classrooms?**
- **The best schools I know have a system of at least one collegial classroom visit every other week.**
- **Prep periods, test periods with coverage, substitute enabled, during specials – don't tell me you go non-stop from 8 to 3 M-F.**
- **Followed up ASAP with a truly collegial and professional discussion...**

# **I have visited your math class earlier today.**

- **What really impressed me (and why)...was...**
- **The questions I have about what you/I did are... (let's talk and consider these things you might want to consider)**
- **The two things that I will consider doing differently starting tomorrow are... (BOTH the observer and the one being observed)**

# **Rebels subversively expand the use of video**

## **#2: Videotaping**

- Have you ever videotaped yourself teaching?**
- Have you critically reviewed the video by yourself?**
- Have you done it with others?**
- Have you considered the power of building a video library of powerful teaching?**
- Have you considered the difference between an observation and capturing the observation on start-pause-go back video?**

**Why not?**

# **Westport, CT many years ago**

- **Staples HS, Bedford MS, Coleytown MS**
- **“We’re good, even very good. But we are not great. Help us get there.”**
- **Why don’t each of us videotape one lesson each month?**
- **Observe oneself and write up a few paragraphs on “What I learned, what amazed me, and what changes will I make?”**
- **Upload all videos and select one for collegial viewing and discussion during a department meeting.**

# **For the video we are watching:**

- What really impressed me (and why) was...**
- The questions I have about what you did are...  
(let's talk and consider these things you might want to consider)**
- The two things that I will consider doing differently starting tomorrow are...**

# **Rebels build collaborative learning structures**

## **#3: Seminars**

- Think about your last grade level, grade band or department meeting.**
- What was the balance between teaching and learning on the one hand and administrivia on the other?**
- When did you last engage in a collegial seminar about a critical topic or issue?**
- When was one person assigned the responsibility to orchestrate such a seminar on such topics or issues as:**

# Potential topics or issues

- **Desmos apps**
- **Equivalent fractions grades 3-4**
- **Re-testing**
- **Emergent math**
- **Grade 7 statistics**
- **Graham Fletcher's 3-act lessons**
- **Readings, articles, e.g. Fluency without Fear**

### **3. We target the most powerful levers**

**Why aren't there common high quality unit assessments for every grade and course?**

**Why do we let individuals create their own, often of marginal quality assessments of a common curriculum?**

# **Rebels focus on a system of common high quality unit assessments**

**We tend to let “them” keep the focus on the large scale state tests, the SAT/ACT and MAP that we have no control over and rarely have access to the items or timely actionable results.**

**Rebels and anyone with common sense recognizes that high accountability, high quality, open-ended, unit assessments toward which we want teachers to teach are a critical piece of an effective system.**

## **4. We outlaw (and shame) worksheet abuse, mad-minute, math sprints**

**Just read Jo Boaler's YouCubed "Fluency Without Fear."**

**Just look at the damage done when the focus is  
exclusively on speed and right answers.**

**Just look at how much time is wasted teaching with no  
feedback beyond right right wrong right wrong right.**

# **Rebels with a cause for students:**

- Widely distribute “Fluency without Fear” and make it school and district policy.**
- Shame teachers who ignore the policy.**
- Model more effective forms of practice that provide feedback, limit exercises to 4 at a time, focus on alternative approaches, multiple representations and student explanations.**

## **5. We recognize that the Common Core is neither the Bible nor the Koran**

**K-8 has only serious two errors:**

- memorizing the formulas for surface area and volume (which is widely ignored)**
- THE standard algorithm (when we all know that there is not a single standard algorithm that works for all students)**

**9-12 is still a complete mess**

# Rebels with a cause for students:

- Become broken records for “A standard algorithm”
- Scream and yell that there simply isn’t one right way
- Widely distribute Fuson and Beckmann @ [https://www.mathedleadership.org/docs/resources/journals/NCSMJJournal\\_ST\\_Algorithms\\_Fuson\\_Beckmann.pdf](https://www.mathedleadership.org/docs/resources/journals/NCSMJJournal_ST_Algorithms_Fuson_Beckmann.pdf)
- Make partial products and partial quotients your “standard algorithms” – they build understanding and no one uses them anyway.

## **6. We are adamant that 58 minutes/day for math is the absolute minimum EVER.**

- Watch me: kids in rows 47 minute period**
- I rush. I get shrill. I watch the clock. I cut corners. I fail to be responsive to students.**
- Then watch me: kids in groups of 3 or 4 60 minutes**
- All the difference in the world – time for cumulative review or number talk, time for an exit ticket, time to think, time to use lesson chunks.**

# **Rebels with a cause for students:**

**When rebels are asked:**

**“Why aren’t our math scores higher?”**

**“Why are do many students more being more successful?”**

**Rebels respond:**

**“Simple: our kids and teachers are cheated by anything less than 60 minutes given the district/state curriculum.”**

## **7. We build a system of second chances**

**Why are we so driven by one chance tests?**

**Why aren't their widespread retesting policies for all students for every unit assessment?**

# **Rebels with a cause for students:**

**Create systems of Form A and cloned Form B for every unit assessment and mandate that every student has a chance (on his or her own time) to retake every assessment within 10 school days.**

**Start with one elementary school, one middle school and one high school in September!!**

# 8. We shift homework from busy work to formative assessment

There is little that wastes more time in students' lives, in class and at home, than assigning, completing and reviewing math homework.

- We spend precious minutes assigning homework and expecting our student to copy the assignment down.
- We expect students to spend between 30 and 45 minutes each school night except Friday doing homework, usually regurgitating procedures and mimicking from notes and text.
- We spend somewhere between 10 and 20 minutes “going over the homework” in class.
- A typical assignment:

<u>247</u>	<u>243</u>	<u>239</u>
1-19 odd	2-20 even	32, 34, 38

All for what real value?

**The heart of the homework matter:**

**If the point of homework is to see if students “get it,” then 5 practice problems is enough.**

**If kids get it after 5 problems, and you ask them to do another 35, you’re just being mean.**

**And if kids don’t get it after 5 problems, and you ask them to do another 35, you’re really being mean.**

**- Matt Cwalina, Discovery Education**

# Rebels advocate for sensible 2-4-2 HW

- 2 problems on the new skill (which is usually enough to determine understanding and avoids such much practice of mistakes that it is hard to unlearn them);
  - 4 cumulative review problems roughly drawn from the day before, the week before, last month and perhaps a diagnostic readiness check for the next lesson - all of which honor distributive practice; and
  - 2 problems that require showing work or explanation and support problem solving and reasoning and justification.
- 
- After beginning mathematics the next day, teachers can easily post the answers to these 8 exercises or problems on the white board and provide students with 5 minutes to review their work in pairs or triads with particular attention to the last two problems. Classroom policy can then be that correct work for any problems that are still causing trouble can be easily displayed with a document camera and discussed before homework is collected, only to be recorded as completed.

## **9. We recognize technology as a right and an essential learning tool**

- The lack of access, the inequity, the unfairness and the variations from classroom to classroom when it comes to technology is a scar on all of us – and we know it.**

# **Rebels with a cause for students:**

**Take SMP #5 seriously:** Use appropriate tools strategically.

- **Notes and slides on an accessible site for students**
- **Computer delivered assessments**
- **Cell phones**
- **Three-act lessons**
- **Programs like Illustrative Math**

# **10. We fight fight fight for coaches and coaching**

**See my 2018 NCSM Presentation at  
<http://steveleinwand.com/presentations-2/>**

# **Rebels with a cause for students:**

**Make a logical, deductive argument for coaching and coaches based on the gap between what we know is happening in our classrooms and what we know from CCSSM and SMPs and MTPs needs to be happening.**

**That is, coaching and coaches as a critical piece of moving from where we are to where we need to be, unless you are foolish to believe all if hunky-dory.**

**Rebels with a cause for students:**

**Remind people what it takes to change beliefs and practices.**

**At its core, our job as professionals is to help people envision, change beliefs, understand, practice, receive feedback and collaborate.**

**No one is better equipped to do this than a coach.**

# Rebels with a cause for students

Make the case that:

- the expectations for teaching mathematics,
- the changes that teachers of mathematics are expected to make,
- the high visibility of mathematics, and
- the ever so much greater need in society for mathematical literacy,

**ALL CALL FOR DIFFERENT APPROACHES AND COMMITMENTS WHEN IT COMES TO TEACHERS OF MATHEMATICS.**

**All teachers are NOT the same and those who call for differentiation for students, conveniently ignore the need for differentiation among teachers are seriously misguided!**

# **Finally, my fellow rebels 1:**

**Don't expect to be popular:**

**Early on, I learned that rebels are not particularly popular. Our colleagues and superiors don't appreciate being questioned at every turn. They don't like being shown up by our policy statements and action plans. But most of all, bureaucratic inertia despises our success. Be prepared for the slings and arrows of the jealous naysayers and misguided bureaucrats we all encounter.**

**Harsh, but so true.**

## **Finally, my fellow rebels 2:**

**The overarching message that I seek to convey is that as (mathematics) leaders, we must be advocates – squeaky wheels and consciences – for great math for all students.**

**Advocates who push back. Leaders who walk into the principal's office to argue for changes in school schedules and policies that undermine mathematics. Or who send another memo (with lots of cc's) to the assistant superintendent.**

**Duh...bold leaders don't wimp out; they take big risks!**

## **Finally, my fellow rebels 3:**

**We must gather the data no one wants to see that reveal that students who are tracked into lower-level, lower-expectations courses actually do worse each year.**

**We must stand up to school boards and our critics, often at great risk, and urge policies that support course committees, time for collaborative structures and coaches.**

**Finally, my fellow rebels 4:**

**And as leaders, our mindsets must be that we are no longer just cogs in a monolithic, change-only-from-the-top institutions. Rather, we are integral parts of the shared leadership found in all effective organizations.**

**That is leader as rebel!!**

**A rebel who consistently asks for forgiveness and almost never for permission!!!**

# Revealing my Age

As Bobby Kennedy said:

**“Some people see things are they are and ask why; I [and fellow rebels] dream things that never were and ask why not?”**

**I ask you: Why not?**

**Thank you!**