

Highlights and Update

National Council of Teachers of Mathematics

Robert Q. Berry, III

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NCTM President-Elect



NATIONAL COUNCIL OF
TEACHERS OF MATHEMATICS

Mission Statement

- The **National Council of Teachers of Mathematics** supports and advocates for the highest-quality mathematics teaching and learning for each and every student.



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Strategic Framework

- **Teaching and Learning:** NCTM provides support for research-informed teaching that ensures the learning of each and every student in equitable environments.
- **Access, Equity and Empowerment:** NCTM advances a culture of equity where each and every person has access to high quality teaching and is empowered as a learner and doer of mathematics.
- **Building Member Value:** NCTM fosters communities that engage members to improve the teaching and learning of mathematics.
- **Advocacy:** NCTM engages in advocacy to focus, raise awareness, and influence decision makers and the public on issues concerning teachers of mathematics and high-quality mathematics teaching and learning.



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New Membership Model

Tiered Membership for Launch April 2018

- *Introductory Membership* for 2 years: \$49.
(current full membership \$96).
- *Essential Membership*
- *Premium Membership*

Benefits increase as you move up tiers. Details will be released next spring.



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MyNCTM

- This will be formally announced next month.
 - MyNCTM is designed to provide opportunities for members and non-members to share, collaborate, mentor and learn.
 - Find, upload, and organize resources and documents.
 - Access a knowledge base of best practices, documents, pictures, videos, podcasts, and more—and contribute your own favorite materials in a safe and effective environment.
 - Save and sort favorite content from NCTM and other members along with your own files.
 - Add notes and give context to resources with commenting and rating features.



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A Re-imagined Practitioner Journal

Coinciding with NCTM's centennial year celebration, in January 2020 NCTM will re-launch the practitioner journals as a consolidated journal. The new publication will provide more frequent and timely content on topics of relevance to math educators.



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A Re-imagined Practitioner Journal

The digital version of the journal will embrace the latest technology to promote individual member engagement and community, while continuing to deliver the grade-band specific high-quality classroom resource materials members love and expect.



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Catalyzing Change in High School Mathematics

September 25 the Public Review Draft was posted at www.nctm.org/ccreview (October 15)

- The purpose of *Catalyzing Change* is fivefold:
 1. Explicitly broaden the purposes for teaching high school mathematics beyond a focus on college and career readiness.
 2. Catalyze a serious discussion of the challenges facing high school mathematics as well as recommendations for implementing the actions necessary to overcome those challenges.



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Catalyzing Change in High School Mathematics

- September 25 the Public Review Draft was posted at www.nctm.org/ccreview (October 15)
- The purpose of *Catalyzing Change* is fivefold:
 3. Define imperatives for high school mathematics in the areas of structures, instructional practices, curriculum, and pathways for students.
 4. Identify essential concepts for focus that all high school students should learn and understand at a deep level in an equitable common mathematics pathway shared among all students.



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Catalyzing Change in High School Mathematics

- September 25 the Public Review Draft was posted at www.nctm.org/ccreview (October 15)
- The purpose of *Catalyzing Change* is fivefold:
 5. Provide examples of pathways that include 2½ years of mathematical study expected of high school students, followed by 1½ years of alternate paths of study, differentiated by postsecondary education and career goals.



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Regional Conferences

- **2017 NCTM Orlando Regional**
 - October 18–20
- **2017 NCTM Chicago Regional**
 - November 29–December 1
- **2018 NCTM Kansas City Regional**
 - November 1-3
- **2018 NCTM Seattle Regional**
 - November 28-30



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2017 Innov8

INNOV8
CONFERENCE



November 15–17
Las Vegas



Breaking Barriers:
Actionable approaches to reach each
and every learner in mathematics



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NCTM ANNUAL MEETING & EXPOSITION 2018

April 25-28 | Washington, DC

Join Us
in Washington, DC

**Save
the
Date!**



Using Tasks and Discourse to Position Students as Mathematically Competent

Robert Q. Berry, III

NCTM President-Elect

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#weteachmorethanmath

#blackkidsdomath



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The Plan

- Background
- Define situated-mediated identity theory
- Discuss a situated-mediated identity theory in a classroom context
- Discourse connected to situated-mediated identity theory
- Questions



Access, Equity and Empowerment

Advance knowledge about, and infuse in every aspect of mathematics education, a culture of equity where each and every person has access to and is empowered by the opportunities mathematics affords.

A reframing of the Access and Equity Principle from *Principles to Actions*.



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Access, Equity and Empowerment

- NCTM has re-framed Access and Equity to include Empowerment, to capture the critical constructs of:
 - Identity
 - Agency, and
 - Social Justice.

Source: <http://www.nctm.org/News-and-Calendar/Messages-from-the-President/Archive/Matt-Larson/A-Renewed-Focus-on-Access,-Equity,-and-Empowerment/>



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Eight Mathematics Teaching Practices

1. Establish mathematics goals to focus learning.
2. Implement tasks that promote reasoning and problem solving. (Build mathematics identity)
3. Use and connect mathematical representations.
4. Facilitate meaningful mathematical discourse. (Position as Competent)
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning mathematics. (Sense of Agency)
8. Elicit and use evidence of student thinking. (Position as Competent)



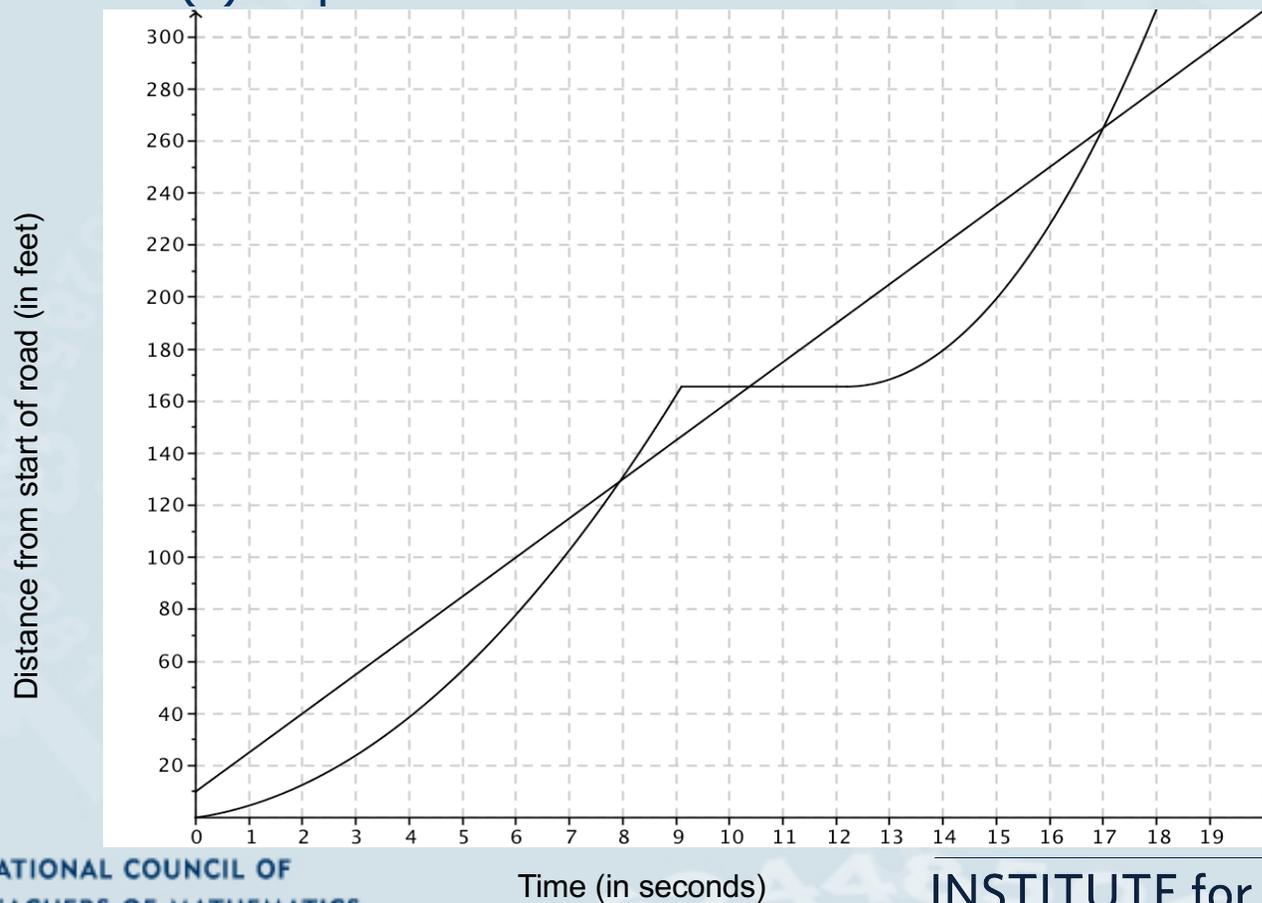
Shalunda Shackelford

- School: Tyner Academy
- Teacher: Shalunda Shackelford
- Class: Algebra 1
- Curriculum: IFL Lessons *Creating and Interpreting Functions*
- Class Size: 26
- At the time the video was filmed, Ms. Shackelford was a teacher at Tyner Academy in the Hamilton County School District. The lesson occurred in April in an Algebra 1 class.



Bike and Truck Task

A bicycle traveling at a steady rate and a truck are moving along a road in the same direction. The graph below shows their positions as a function of time. Let $B(t)$ represent the bicycle's distance and $K(t)$ represent the truck's distance.



Bike and Truck Task

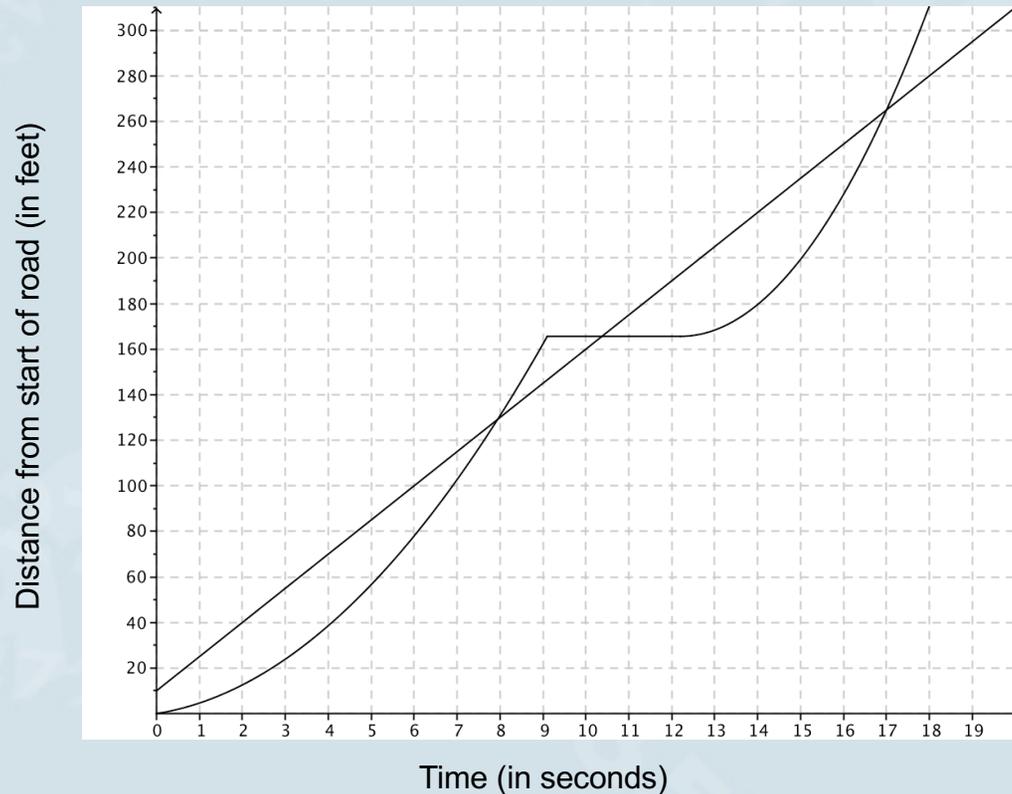
1. Label the graphs appropriately with $B(t)$ and $K(t)$. Explain how you made your decision.
2. Describe the movement of the truck. Explain how you used the values of $B(t)$ and $K(t)$ to make decisions about your description.
3. Which vehicle was first to reach 300 feet from the start of the road? How can you use the domain and/or range to determine which vehicle was the first to reach 300 feet? Explain your reasoning in words.
4. Jack claims that the average rate of change for both the bicycle and the truck was the same in the first 17 seconds of travel. Explain why you agree or disagree with Jack and why.



Bike and Truck Task

Discussion question introduced by the teacher:

Between what two seconds did the truck drive the fastest? How do you know?



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INSTITUTE for LEARNING

Shalunda Shackelford

- How are mathematical identities supported?
- Are students positioned as mathematically competent?
- How does one see themselves as doers of mathematics?



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Orchestrating Productive Mathematics Discussions

1. **Anticipating** likely student responses to challenging math task
2. **Monitoring** students' actual responses to the task (while students work on the task)
3. **Selecting** particular students to present their mathematical work during whole group discussion
4. **Sequencing** student responses that will be displayed in a specific order
5. **Connecting** different students' responses and connecting to key mathematical ideas.



Situated-Mediated Identity Theory

The situated-mediated identity framework describes three types of identity growth:

1. Situated Identity
2. Positionality
3. Agency (Murrell, 2007, 2009).

Our identities are situated within the context of the learning environment and are mediated by the environment in which they act.



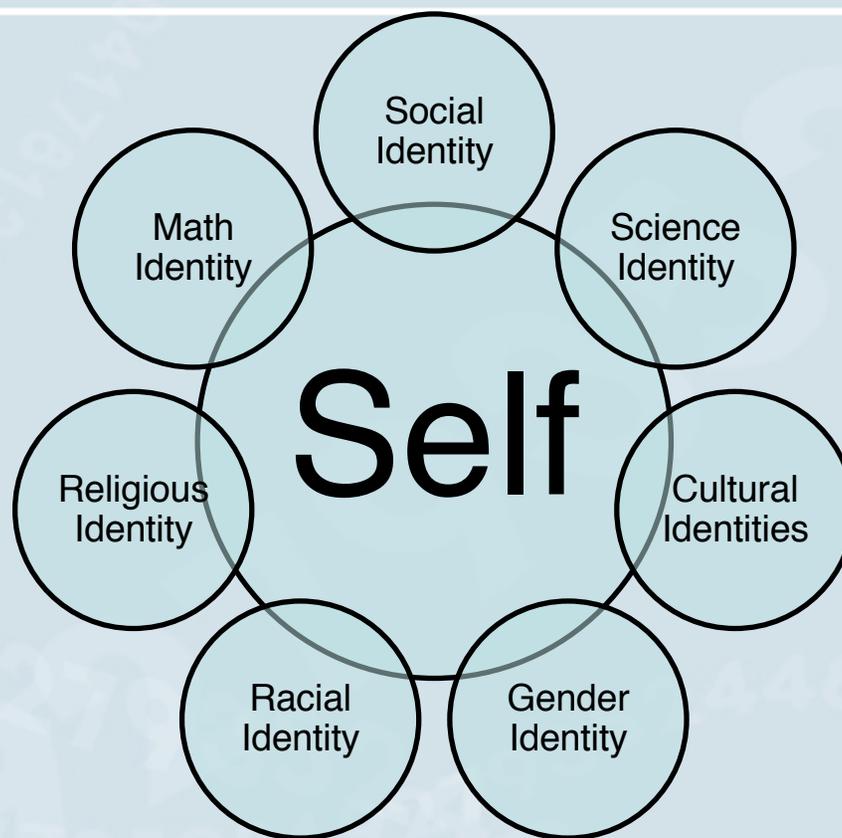
Situated Identity

Situated identity implies that a person's identity is multi-factored, fluid, and situationally determined.

- Jacobi and Charles in Shalunda Shackelford's class.
 - How are Jacobi and Charles' identities similar or different in other classrooms?
 - When situations or contexts change, so does the manner in which one represents or expresses oneself, as the varying context mediates the representation of self.
- Teachers create classroom environments for building identities. Think Shalunda Shackelford.



Intersectionality



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Situated Identity

- Different situations elicit different modes of interactions and behaviors.
- For students, identities are mediated from classroom to classroom

Positionality

Positionality refers to the tension between individual representations of self and the ascriptions made of the individual by wider society.

- In other words, how individuals position themselves in a social context depends on both the manner in which they wish to be represented and their perceptions of how others view them.
- How did Shalunda Shackelford position her students to be active participants and contributors?

Positionality

- DeShawn, a Black Boy who is a 10th grader, appears to be shy and reserved, reluctant to ask questions whole group because he does not want to appear deficient in his mathematics abilities.
- However, he thrives in small groups where he has time and freedom to think and discuss his ideas. The manner in which this student positions himself is largely dependent on and mediated by the social setting.

Agency

Agency refers to the expression of one's identity. The enactment of agency is an individual's self-presentation to the world.

- Through agency, people tell others through words and actions who they are and what their purpose is in that particular setting, space and situation.
- If one sees themselves as a doer of mathematics, then they engage in behaviors that present themselves as a doer of mathematics.

Connecting Identity to Agency

- If we accept that participation is a risk-taking event, how do we create structures such that students are willing to take risks?



Agency

“I like being with the smart kids because that means I am one of the smartest...since I answer all of the questions in math that means I am the smartest of the smart kids.”

Clayton 8th grader



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Math, Men, & Mission

Teachers are identity builders who position learners as being mathematically and socially competent by creating time and space for learners demonstrate their agency.



Summer 2015



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Math, Men, & Mission



Summer 2016

We do that by engaging in cultural practice inquiry and by creating mathematics tasks ground in social interactions from which learning can occur.



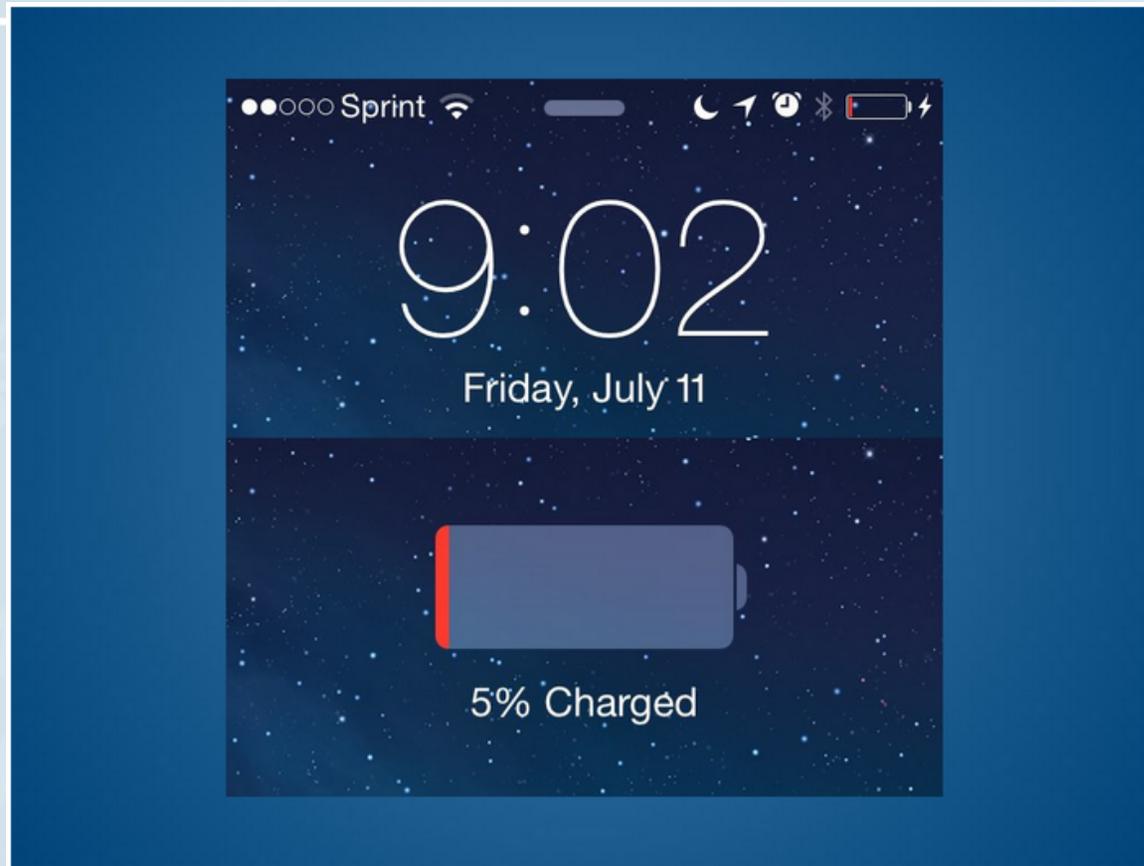
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Using tasks and discourse to position learners as competent



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What do you notice

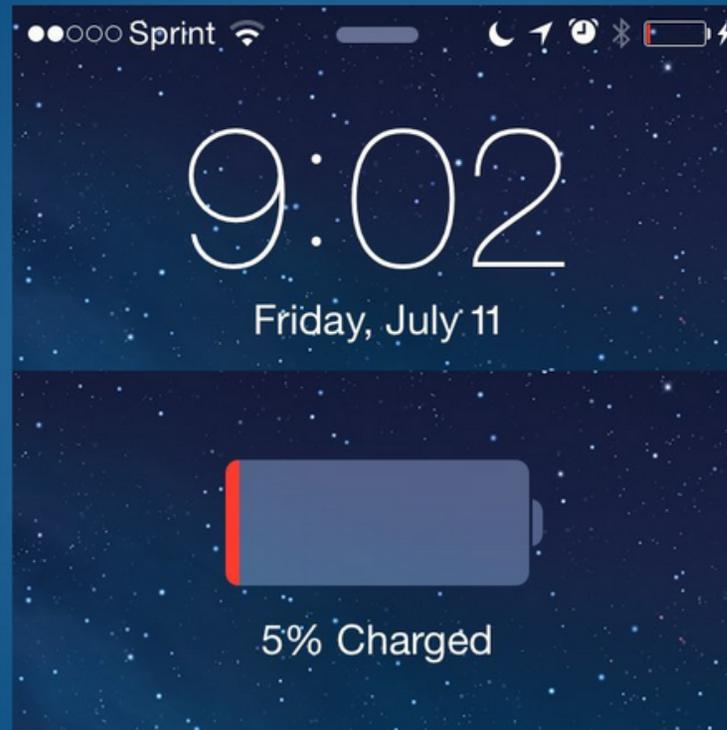


Source: Michael Fenton's Reason and Wonder Web Site: <http://reasonandwonder.com/charge/>



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What do you wonder?



Source: Michael Fenton's Reason and Wonder Web Site: <http://reasonandwonder.com/charge/>



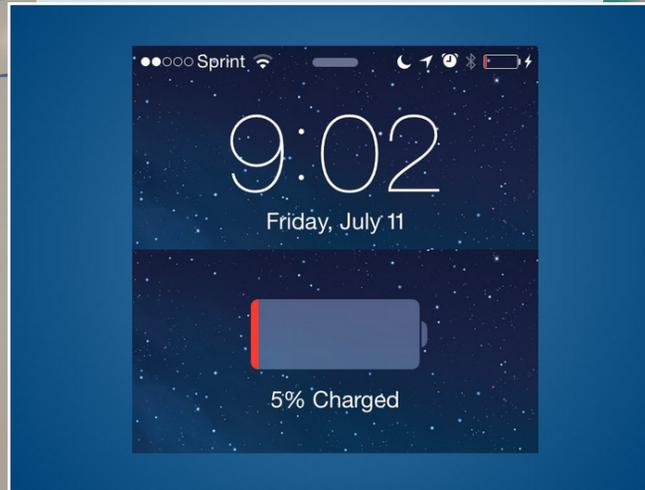
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Taking Risks

10:12

Notice

- Low Battery
- Alarm set
- Wifi
- Two bars cellular
- Bluetooth
- Do not Disturb
- Charging
- Cole's Birthday
- 9:02
- Next time



10:21 / 10:26

Wonder

- if Bluetooth is on
- this person uses their phone a lot
- what did they not pull their notification
- do they have to go to work or school
- how their battery get to five percent
- what are they using it for

Taking Risks: Dyad

If we accept that participation is a risk-taking event:

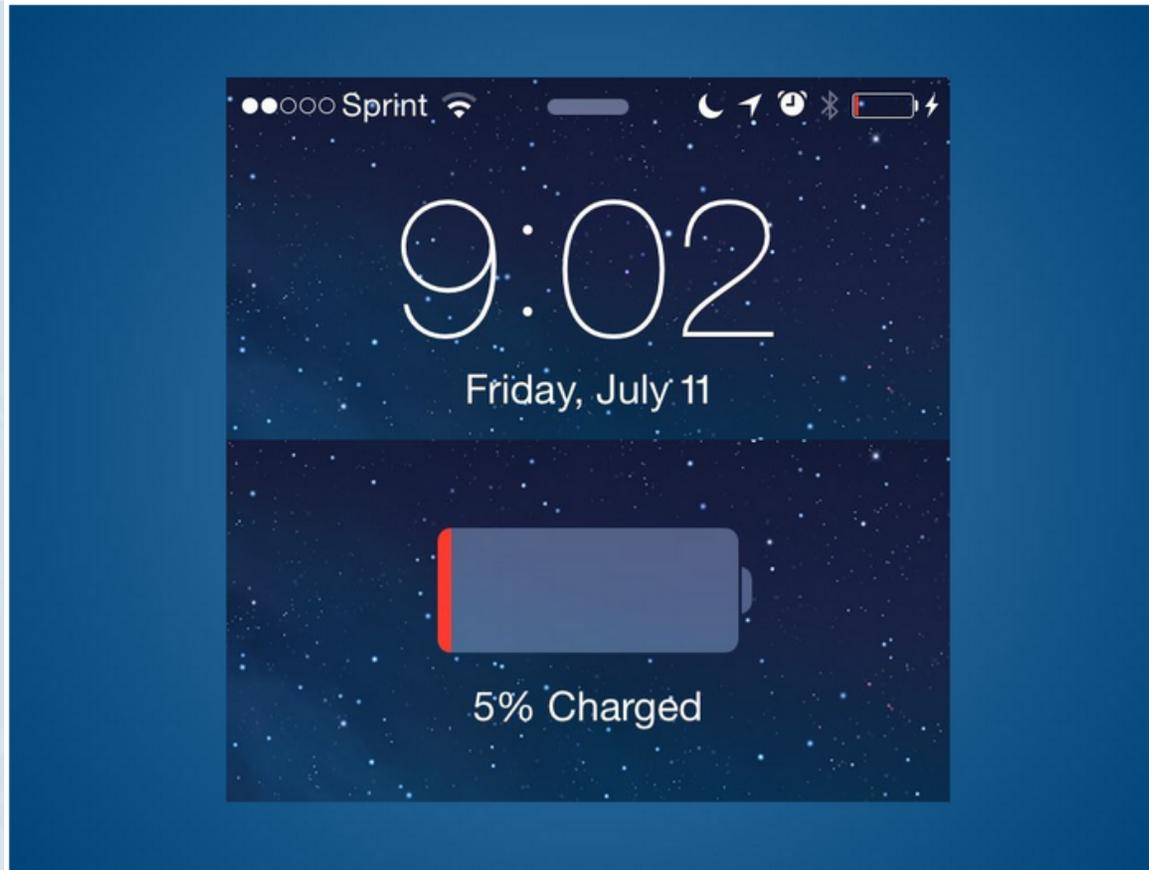
- How might noticing and wondering support risk-taking?
- How does noticing and wondering support discourse?
- How noticing and wondering position learners as competent?

Identity, Positionality, and Agency



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Wonder: At what time will the phone be fully charged?



Source: Michael Fenton's Reason and Wonder Web Site: <http://reasonandwonder.com/charge/>



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What Is Your Guess?

Too high – _____

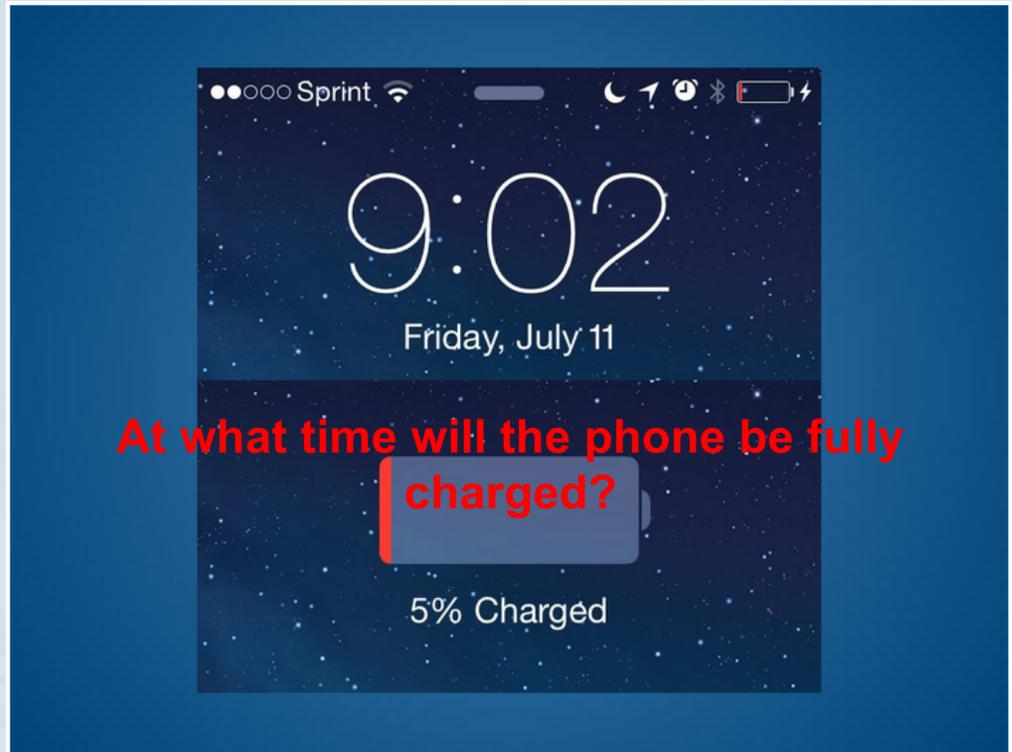
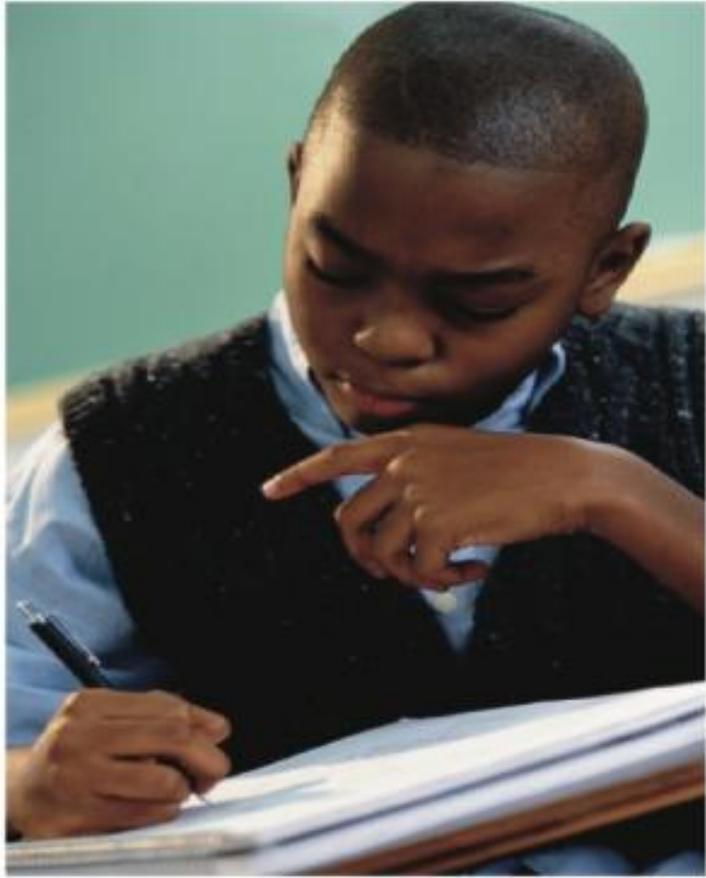
Too low – _____

Just Right - _____



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What Information Do We Need?



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Some More Data



Source: Michael Fenton's Reason and Wonder Web Site <http://reasonandwonder.com/charge/>



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Some More Data



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Some More Data



Source: Michael Fenton's Reason and Wonder Web Site <http://reasonandwonder.com/charge/>



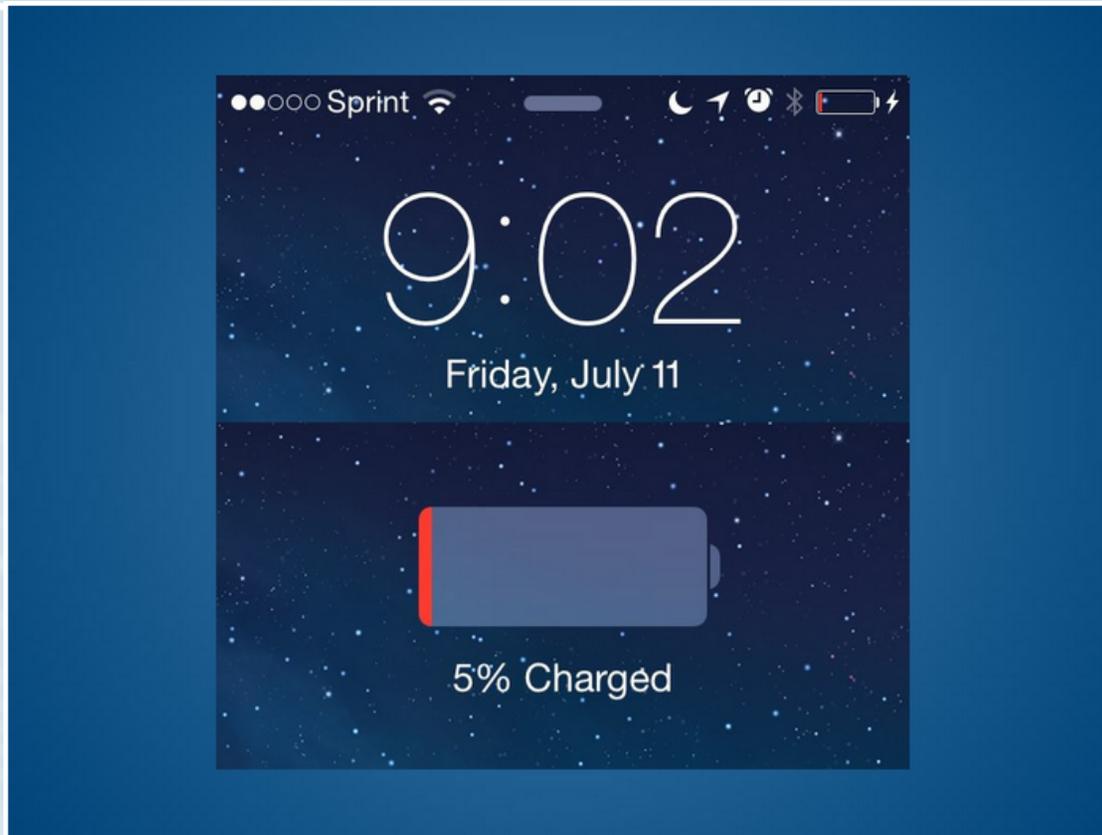
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Data

Time	Percent Charged
9:02	5%
9:10	14%
9:14	19%
9:26	33%



At what time will the phone be fully charged? (Individually 3 mins)



Source: Michael Fenton's Reason and Wonder Web Site <http://reasonandwonder.com/charge/>



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Rough Draft Talk



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Rough Draft Talk

Principle 1: Foster a culture supportive of intellectual risk taking. Explicitly tagging initial discussions of solutions as “rough drafts” encourages students to share in-progress thinking.

- This tagging reduces the threat of being wrong. A non-evaluative stance by the teacher empowers students.

Amanda Jansen, Brandy Cooper, Stefanie Vascellaro, & Philip Wandless. (2017). Rough-Draft Talk in Mathematics Classrooms. *Mathematics Teaching in the Middle School*, 22(5), 304-307.



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Rough Draft Talk

Principle 2: Promote the belief that learning mathematics involves revising understanding over time. Revising mathematical thinking promotes learning through refining ideas.

- Sentence stems/starters
 - The strategy I am confident about is _____ because _____
 - After talking to _____, I did/did not revise my strategy _____
- Promote the use of mathematics vocabulary

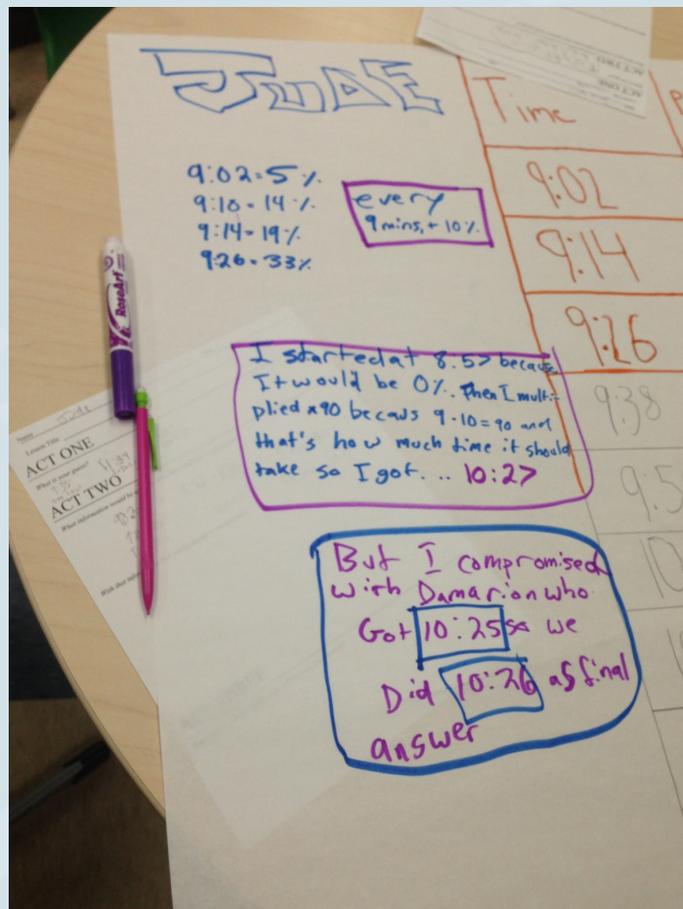


Rough Draft Talk

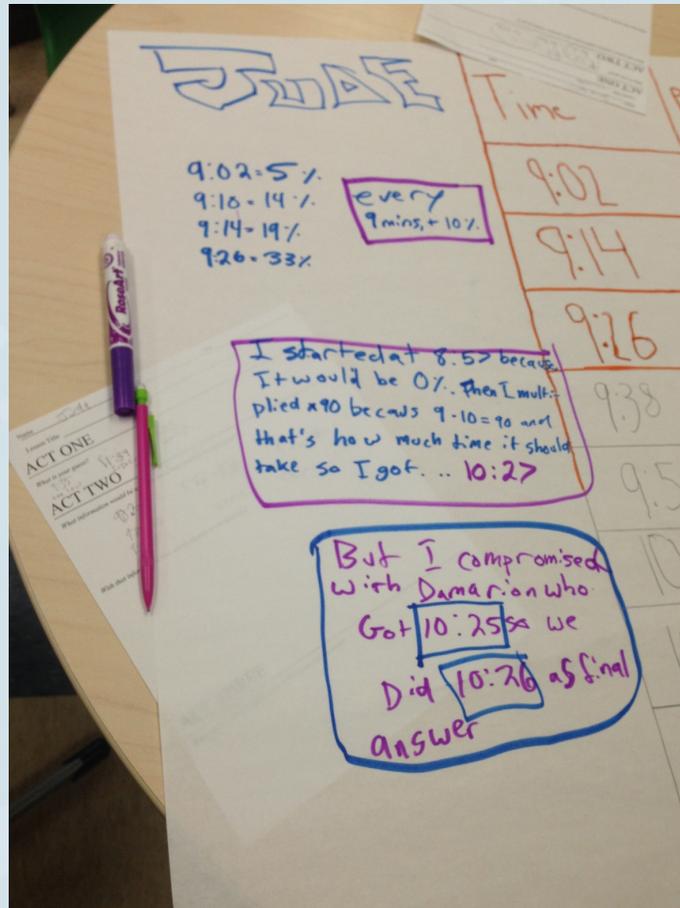
- ***Principle 3: Raise students' statuses by expanding on what counts as a valuable contribution.*** When rough-draft talk is recognized as valuable for supporting learning, then more students can be positioned as competent mathematical thinkers.
 - A teacher can ask a student to share, even if he or she is struggling to understand.



Two Drafts-One Sheet



Taking Risks



Every 9 mins + 10%

I started at 8:57 because it would be 0%. Then I multiplied x 90 because $9 \times 10 = 90$ and that's how much time it should take so I got ... 10:27

But I compromised with Damarion who got 10:25 so we did 10:26 as out final answer

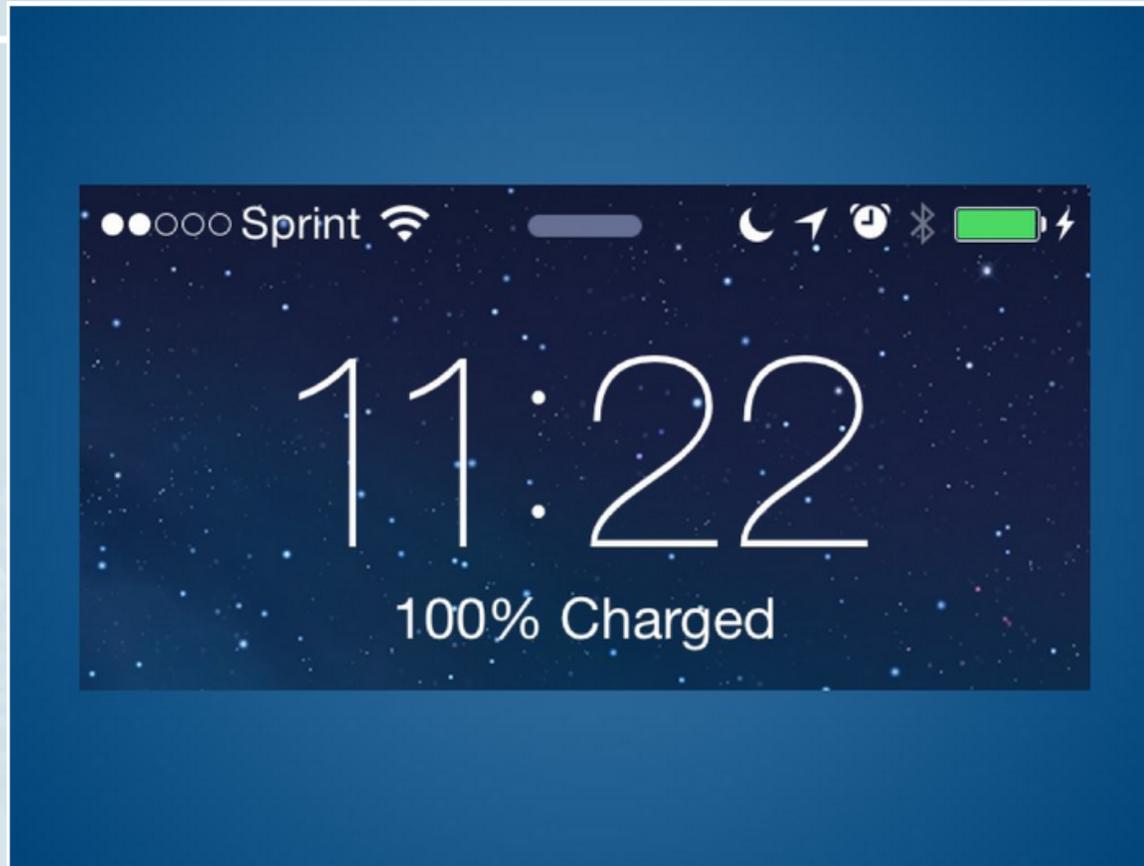
What Happened & Why Did It Happen?

- <https://www.desmos.com/calculator/hzlch8fx0x>



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What happened ? Why?

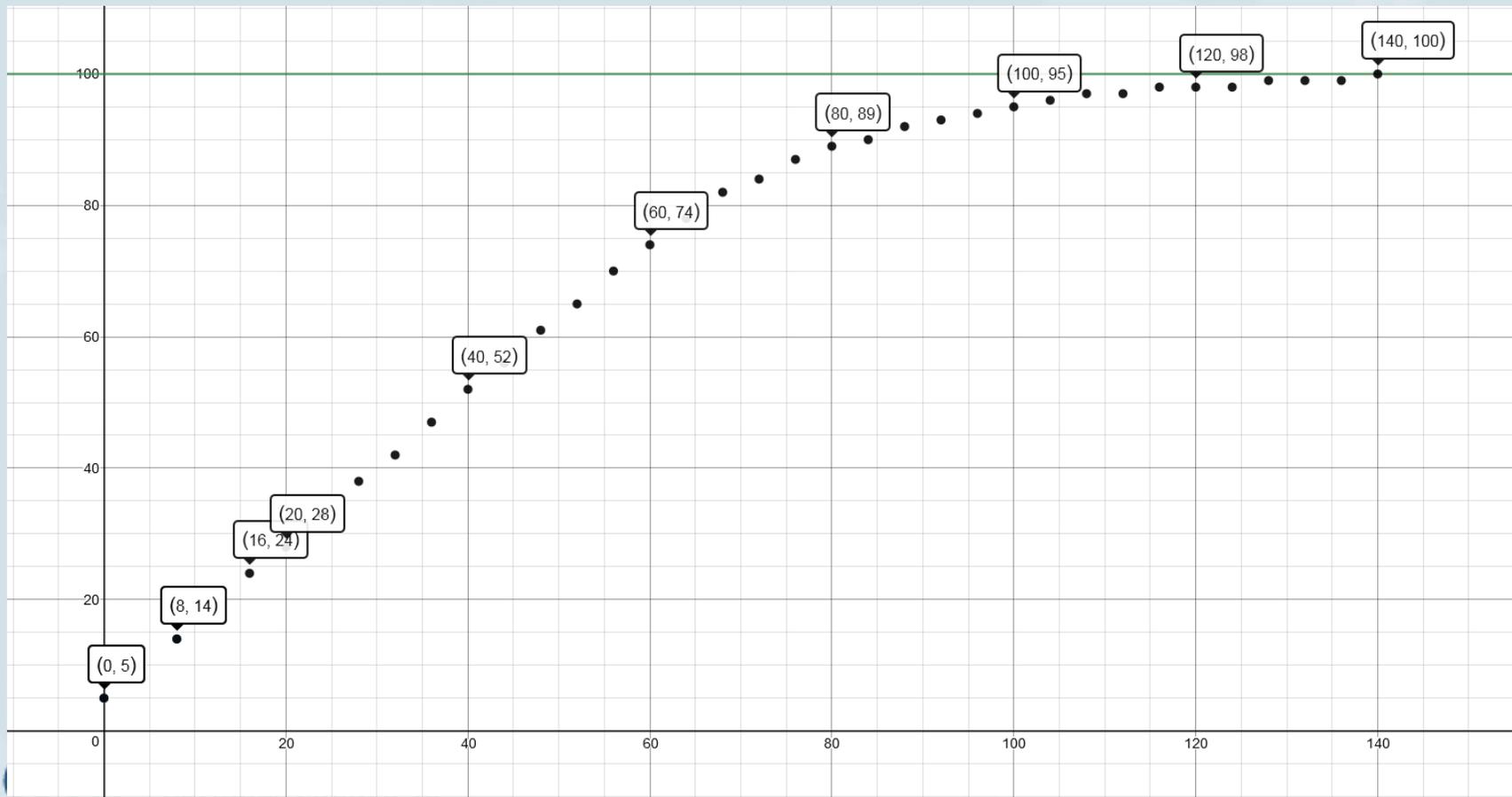


Source: Michael Fenton's Reason and Wonder Web Site
<http://reasonandwonder.com/charge/>



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Act 3



Framing Identity, Positionality, and Agency

Tasks supporting Impasse

Decision-making

Multiple Entry Points

Discourse & Questions

Noticing & Wondering

Rough Draft Talk

Questioning that promote reasoning

Identity & Agency

Identity-Affirming Engagement

Risk-taking

Competence

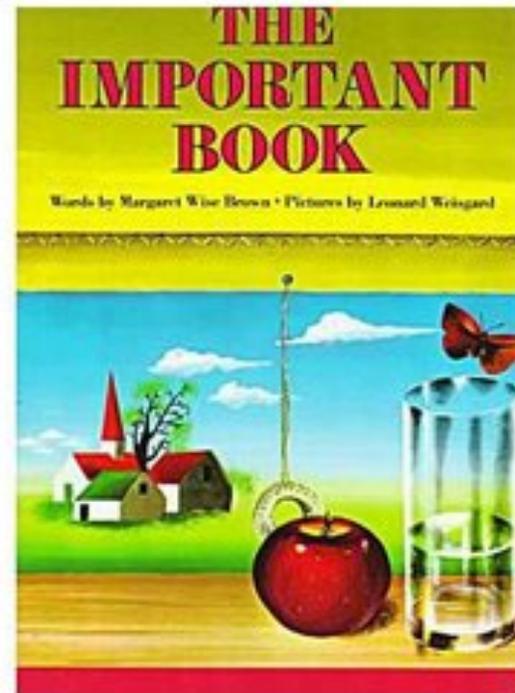
The Important Book

- The important thing about rain is that it is wet.
It falls out of the sky,
and it sounds like rain,
and makes things shiny,
and it does not taste like anything,
and is the color of air.
- But the important thing about rain is that it is wet.

Margaret Wise Brown, *The Important Book*



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The Important Thing

The important thing about identity and agency teaching is _____

- Really great detail #1
- Really great detail #2
- Really great detail #3

But the most important thing about identity and agency teaching is



Questions, Wonders, or Musings

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#weteachmorethanmath

#blackkidsdomath



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