# Launch, Explore, Summarize:

## Strategies to Implement a Problem-Based Lesson


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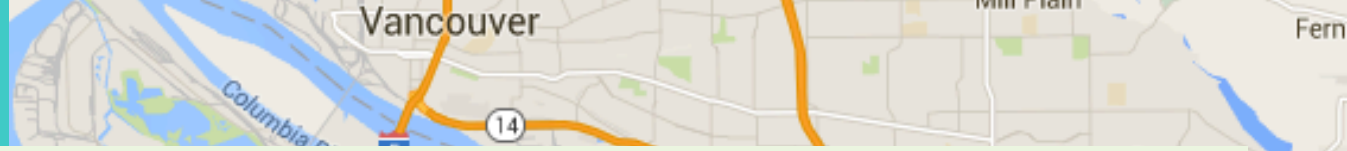


# OREGON REPORT CARD 2016-17

| ENROLLMENT AND DEMOGRAPHICS | Grades K - 3 | Grades 4 - 5 | Grades 6 - 8 | Grades 9 - 12 |
|---|---|---|---|---|
| Total Enrollment | 3,238 | 1,696 | 2,358 | 3,036 |
| Regular Attenders | 84.2% | 86.2% | 83.6% | 71.3% |
| Economically Disadvantaged | 77% | 77% | 75% | 74% |
| Students with Disabilities | 11% | 11% | 13% | 11% |
| Ever English Learners | 39% | 43% | 47% | 48% |
| Different Languages Spoken | 43 | 41 | 41 | 45 |
| Mobile Students | 16.3% | 13.8% | 15.3% | 15.2% |

# Practices of Ambitious Teaching

1. Beginning and closing activity to facilitate entry and summary of work.
2. Working towards a mathematical goal.
3. Eliciting and responding to students' mathematical contributions.
4. Representing student thinking verbally and on the board.
5. Orienting students to one another's ideas and to the mathematics.
6. Positioning students as competent mathematical thinkers.
7. Assessing student understanding.
8. Managing time, space, voice, and manner.

Lampert, M., Franke, M., Kazemi, E., Ghousseini, H., Turrou, A.C., Beasley, H., Cunard, A., & Crowe, K. (2013). Keeping it complex: Using rehearsals to support novice teacher learning of ambitious teaching in elementary mathematics. *Journal of Teacher Education,* 64, 226-243.

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# LAUNCH

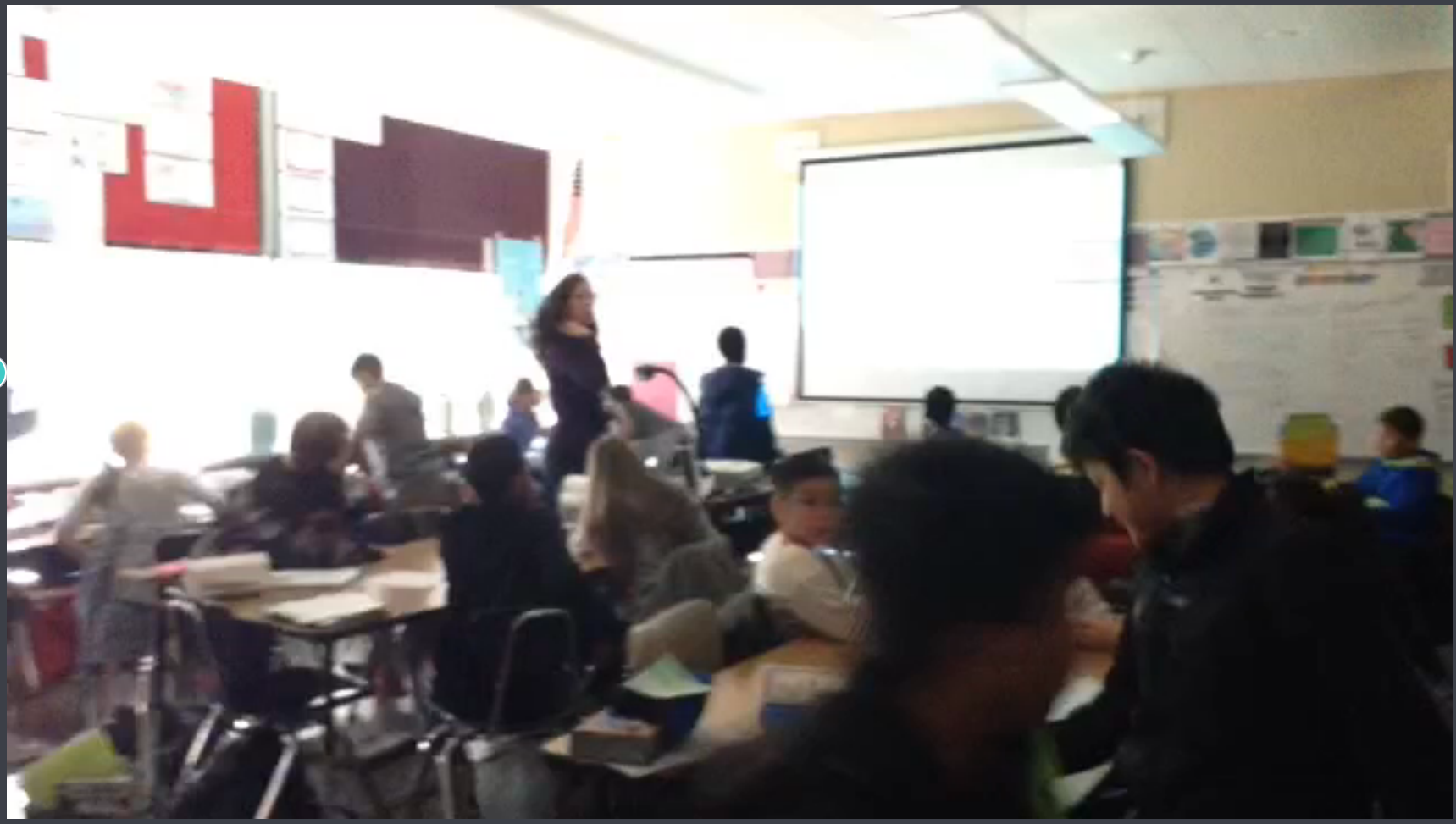
# Launching Complex Tasks

- Read the article.
- What is the purpose of an effective Launch?
- What are the four crucial aspects of an effective Launch?

# THREE READS & PROBLEM STEM


## WAYNE BUND, 1ST GRADE

# THREE ACT TASK & I NOTICE, I WONDER



## CARLA MONTOYA, 5TH GRADE

# Structures for a Launch

- I notice, I wonder (Annie Fetter & Max Ray-Riek)
- Three Reads (Kelemanik & Lucenta)
- Problem Stem (Phil Daro or Tracy Zager)
- Three-Act Tasks – Act 1 (Dan Meyer or Graham Fletcher)
- Which One Doesn't Belong (Christopher Danielson)
- Math/Number/Pattern Talks or Number Strings (Cathy Fosnot or Sherry Parrish or Ruth Parker or Cathy Humphreys)
- Other?

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Navigate to the Lesson Study Tab

# TURN AND TALK

?

How does the launch support equity and increase access to the mathematics task?

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# EXPLORE

# 3 KEY FEATURES OF GROUPWORK

1. Worthwhile task
2. Authority delegated to students
3. Members need one another to complete the task

Cohen, E.G. & Lotan, R.A. (2014). Designing groupwork: Strategies for the heterogeneous classroom (3rd ed.). New York: Teachers College Press.

# THINK, WRITE, SHARE

- What are traditional classroom norms?
- How would the norms for groupwork differ from traditional classroom norms?
- What behaviors would students need to learn to participate effectively in groupwork?

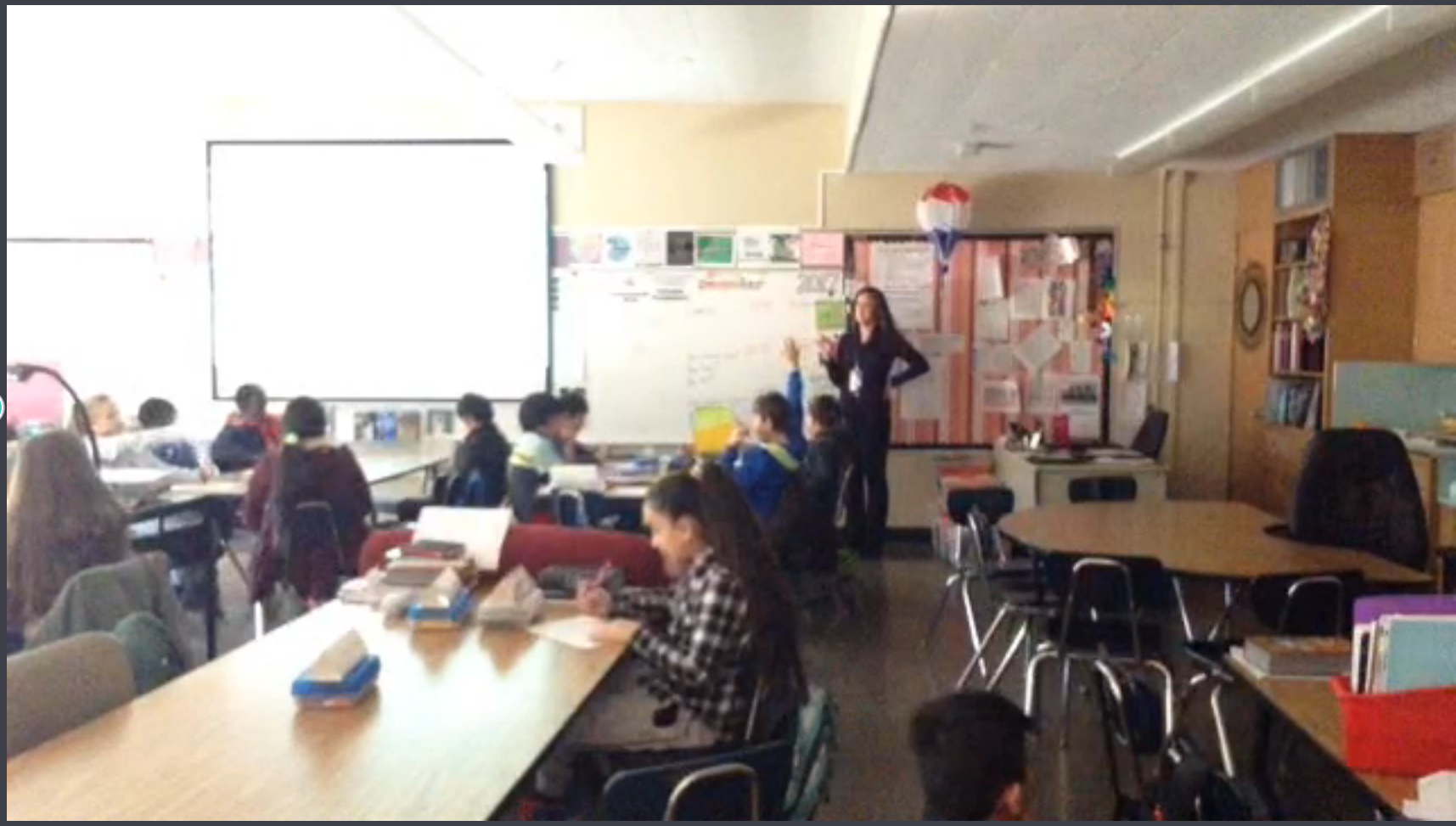
Norms, behaviors, and possible skillbuilders

| Norms for Groupwork | Behaviors | Skillbuilders |
| --- | --- | --- |
| Responding to the needs of the group | • Pay attention to what other group members need.<br>• No one is done until everyone is done. | Broken Circles<br>Broken Squares |
| Learning to help, ask questions, and explain | • Discuss and decide.<br>• Give reasons for your suggestions.<br>• Explain by telling how.<br>• Everyone helps.<br>• Help others do things for themselves.<br>• Find out what others think.<br>• Tell why. | Rainbow Logic<br>Master Designer<br>Four-Stage Rocket<br>Guess My Rule |

Norms, behaviors, and possible skillbuilders

| Norms for Groupwork | Behaviors | Skillbuilders |
| --- | --- | --- |
| Preventing dominance | • Everyone gives information.<br>• Make a plan.<br>• Agree on strategies.<br>• Describe accurately and in detail.<br>• Say your own ideas.<br>• Listen to others; give everyone a chance to talk.<br>• Ask others for their ideas.<br>• Give reasons for your ideas. | Shipwreck<br>Space Ship<br>Alligator River |

# DETERMINING GROUPS



## CARLA MONTOYA, 5TH GRADE

# TURN AND TALK

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*“Groupwork is…a superior technique for conceptual learning, for creative problem solving, and for developing academic language proficiency. Socially, it will improve intergroup relations by increasing trust and friendliness… Most important, groupwork provides greater access to the learning tasks to more students in the classroom with a wide range of academic skills and linguistic proficiency. Productive groupwork increases and deepens opportunities to learn content and develop language and thus has the pontential to build equitable classrooms.”*

Cohen, E.G. & Lotan, R.A. (2014). Designing groupwork: Strategies for the heterogeneous classroom (3rd ed.). New York: Teachers College Press.

# SUMMARIZE

# How Expert Discussion Facilitation is Characterized

- Skillful improvisation…
  - Diagnose students' thinking on the fly
  - Fashion responses that guide students to evaluate each others' thinking, and promote building of mathematical content over time.

Stein, M.K., Engle R.A., Smith, M.S., & Hughes, E.K. (2008) Orchestrating Productive Mathematical Discussions: Five Practices for Helping Teachers Move Beyond Show and Tell, Mathematical Thinking and Learning, 10:4, 313-340, DOI: 10.1080/10986060802229675

# How Expert Discussion Facilitation is Characterized

- ...requires deep knowledge of:
  - Relevant mathematical content
  - Student thinking about it and how to diagnose it.
  - Subtle pedagogical moves
  - How to rapidly apply all of this in specific circumstances

Stein, M.K., Engle R.A., Smith, M.S., & Hughes, E.K. (2008) Orchestrating Productive Mathematical Discussions: Five Practices for Helping Teachers Move Beyond Show and Tell, Mathematical Thinking and Learning, 10:4, 313-340, DOI: 10.1080/10986060802229675

# Some Sources of Challenge in Facilitating Discussions

- Lack of familiarity
- Reduces teachers' perceived level of control
- Requires complex, split-second decisions
- Requires flexible, deep, and interconnected knowledge of content, pedagogy and students.

# Five+ Practices for Orchestrating Productive Mathematics Discussions

$O_1$ Identifying learning goal

$O_2$ Selecting a mathematical task

1. Anticipating (e.g., Fernandez & Yoshida, 2004; Schoenfeld, 1998)
2. Monitoring (e.g., Hodge & Cobb, 2003; Nelson, 2001; Shifter, 2001)
3. Selecting (Lampert, 2001; Stigler & Hiebert, 1999)
4. Sequencing (Schoenfeld, 1998)
5. Connecting (e.g., Ball, 2001; Brendehur & Frykholm, 2000)

Smith, M.S., & Stein, M.K. (2015). 5 practices for orchestrating productive mathematics discussions. Reston, VA: National Council of Teachers of Mathematics.

# Purpose of the Five+ Practices

To make student-centered instruction more manageable by moderating the degree of improvisation required by the teachers and during a discussion.

Smith, M.S., & Stein, M.K. (2015). 5 practices for orchestrating productive mathematics discussions. Reston, VA: National Council of Teachers of Mathematics.

You fill 8 drinking glasses ¾ of the way full. How many of those glasses could you have filled to the top instead?

# 5 Practices Organizer

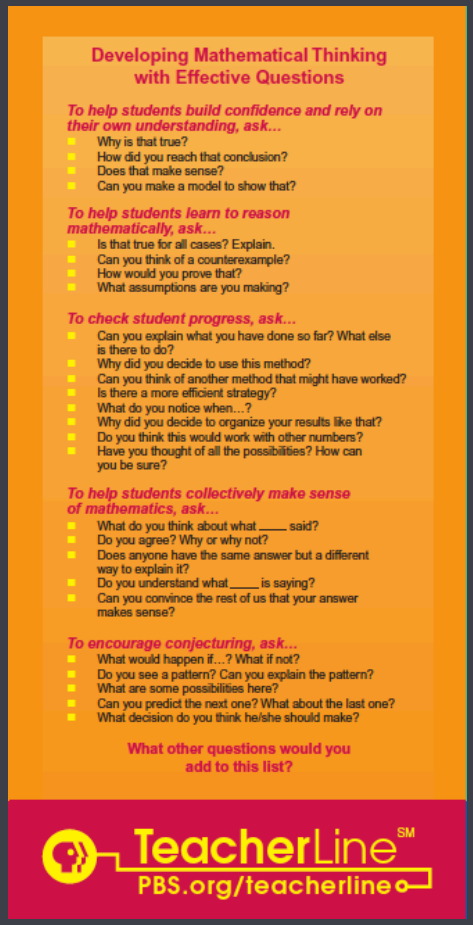
| Strategy | Work of Specific Students | Sequence | Compare | Questions to Assess | Questions to Advance |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

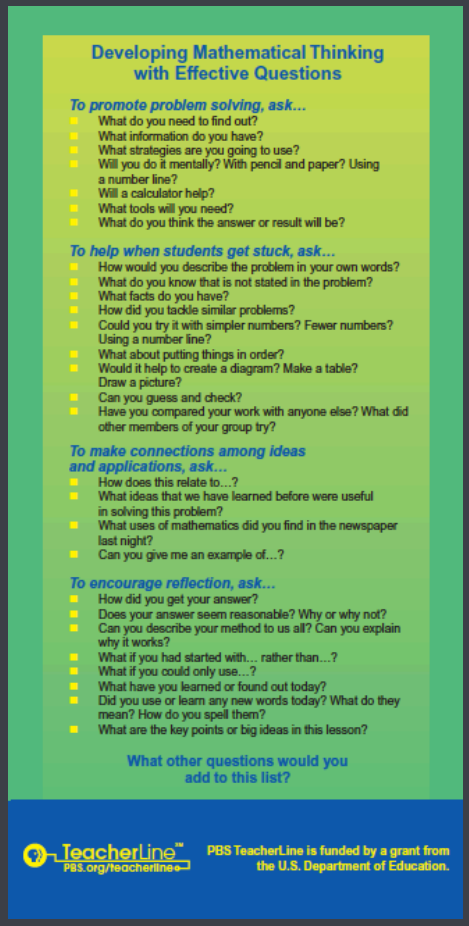
# Questioning – 4 Question Types

| | |
|---|---|
| Gathering Information | Students recall facts, definitions, or procedures |
| Probing Thinking | Students explain, elaborate, or clarify their thinking, including articulating the steps in solution methods or the completion of a task. |
| Making the mathematics visible | Students discuss mathematical structures and make connections among mathematical ideas and relationships. |
| Encouraging reflection and justification | Students reveal deeper understanding of their reasoning and actions making an argument for the validity of their work. |

Principles to actions: Ensuring mathematical success for all. (2014) Reston, VA: NCTM, National Council of Teachers of Mathematics.

# Having a hard time determining what questions to ask?

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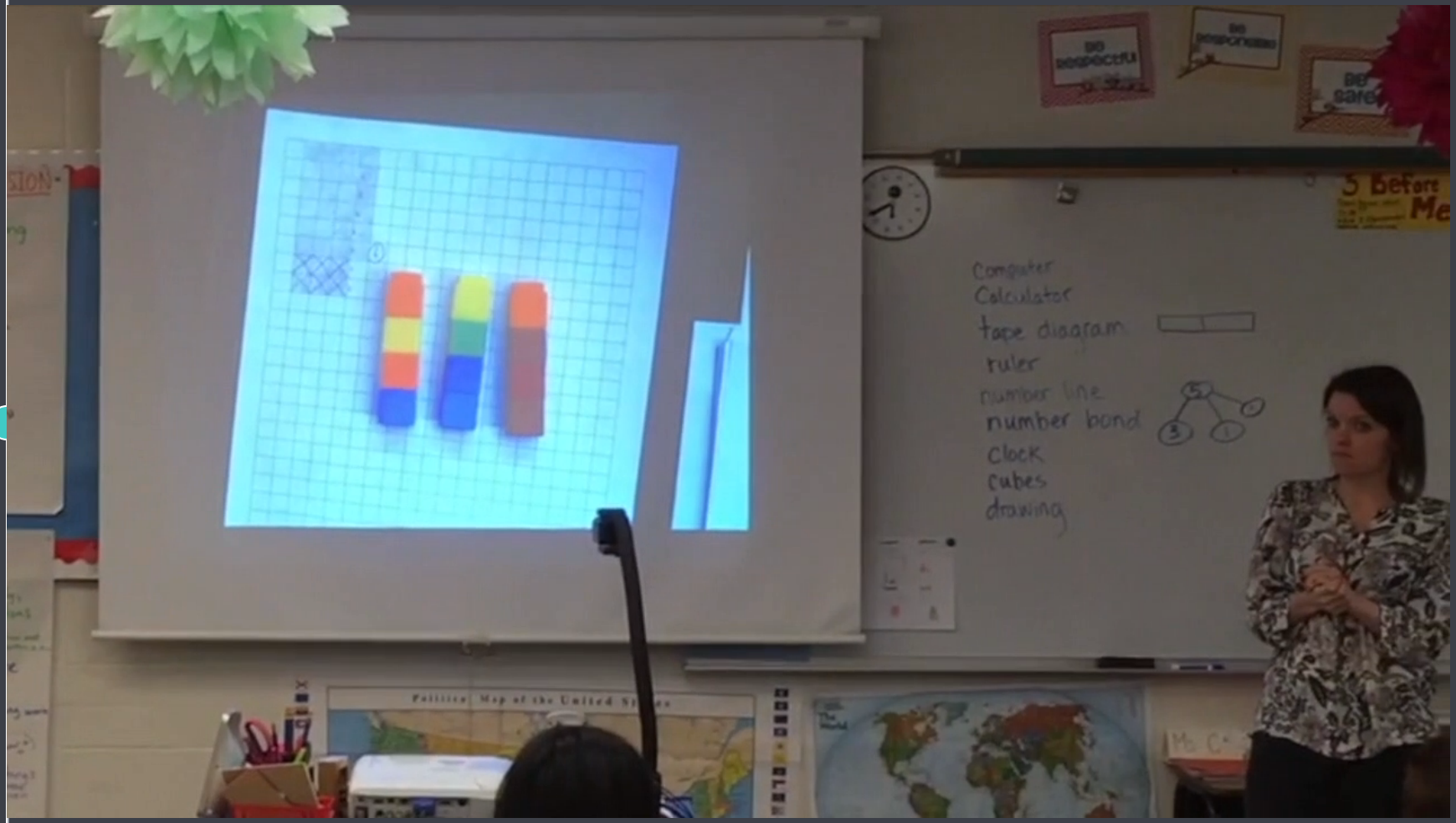
# SUMMARIZE




## SARAH WOLFGANG, 4TH GRADE

# TURN AND TALK

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# Thanks!

## ANY QUESTIONS?

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