SESSION B1:
Math Assessment to Enhance Learning

Panelists: Theresa Morris and Kimberly Seashore
Facilitator: Kimberly Samaniego

Performance Assessments November 5, 2018

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PERFORMANCE ASSESSMENT

Asks students to think and to produce—to demonstrate learning through work authentic to the discipline and/or real world.

SCALE
Stanford Center for Assessment, Learning, & Equity

PERFORMANCE ASSESSMENT

Targets skills and knowledge that matter, and preparing for performance assessment improves skills and knowledge that matter

Assessment for and as learning

Curriculum, instruction, and assessment are all tied together

...is Learning by doing

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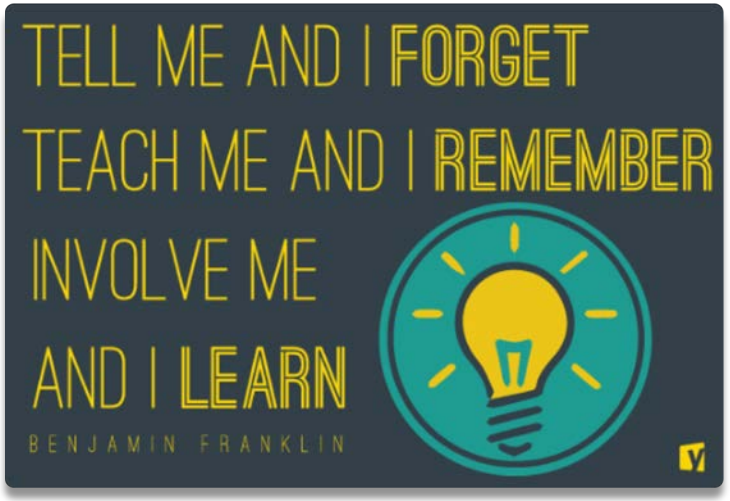
Experience a Performance Assessment

Purpose:

- Common experience to ground our discussion and work
- Sample of high-quality performance assessment



ENVISION LEARNING PARTNERS Inspiring Results

Architectural Planning and Design

Architectural Planning and Design

- The task is to develop a sketch and proposal for Andrea.
- The design must include an **explanation** or **picture** that shows Andrea that all the requirements are met and is within the budget.

Architectural Planning and Design

IN TEAMS:

- REVIEW THE DOCUMENT
- WHAT DO YOU PROPOSE AS THE FIRST STEP IN YOUR THE SOLUTION PATHWAY?
- WHAT INFORMATION WITHIN THE TEXT PROMPTED YOU TOWARDS THAT FIRST STEP?
- WHAT ARE THE POTENTIAL CHALLENGES AND SUCCESSES?
- DESCRIBE WHAT THE FINAL PRODUCT LOOKS LIKE.

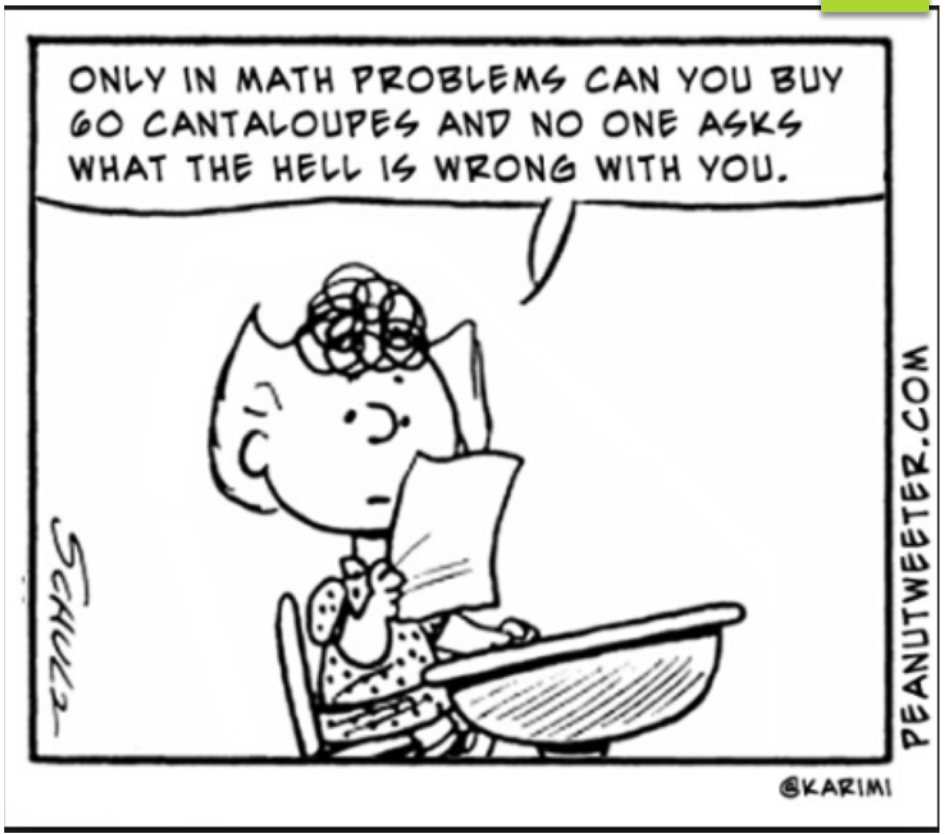
Overview and Insights

- Task has been shared with over 10,000 educators and 4,000 students.
- Educators and students represent diverse populations, geographic, and socio-economic status.
- Task relies upon 6th – 7th grade CCSS
- Students:
  - 6-7th grade have a 92% success and engagement rate on this task
  - High school students have a 68% success rate
  - Major struggle is the writing of the proposal
- Educators:
  - 9% success rate without support
  - 74% with support

Discussion of the PA

- Why do you think educators have had more of a challenge than middle school students with this task?
- What does the implementation statistics of this PA imply about our current math teaching pedagogy?

Questions?


ONLY IN MATH PROBLEMS CAN YOU BUY 60 CANTALOUPES AND NO ONE ASKS WHAT THE HELL IS WRONG WITH YOU.
SCHULZ
PEANUTWEETER.COM
@KARIMI

SCALE Quality Criteria for High Quality Performance Assessments

Does the task require the demonstration and/or application of complex skills?

Can students' responses to this task provide evidence of important college/career readiness skills, disciplinary practices and/or Critical Abilities?

Can students' responses to this task provide evidence of important language of the discipline?

Is task content represented in a way that is appropriately authentic, relatable, and meaningful to students and/or the discipline?

SCALE Quality Criteria for High Quality Performance Assessments

Is the task free of significant bias that might disadvantage specific student populations?

Is the overall task prompt clear and organized for the student

Does the task measure key skills and major claims?

Could students' responses to this task be scored reliably?

Does the task prompt and scoring criteria allow for a **variety of responses and/or solution pathways**?

Mar 29, 1971

Reflections

Key Questions

- ***What research is most needed*** *to support effective and equity-oriented assessment to enhance learning and reduce equity gaps?*
- ***What is the best role for policy*** *(state and/or system) to support effective assessment that enhances learning and reduces equity gaps?*
- *How do these strategies apply to a context of multiple math pathways?*

Formative Assessment

KIM SEASHORE

ASSISTANT PROFESSOR, MATHEMATICS

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Assessment: Why, Who, What, When, and How

1. What is the purpose of the assessment? How is it going to be used?

   Diagnostic, Placement, Credential/Validation,Instructional decision making, Teacher/School Evaluation, etc.

2. Who is designing and administering the assessment? Who is being assessed?

3. What is being assessing?

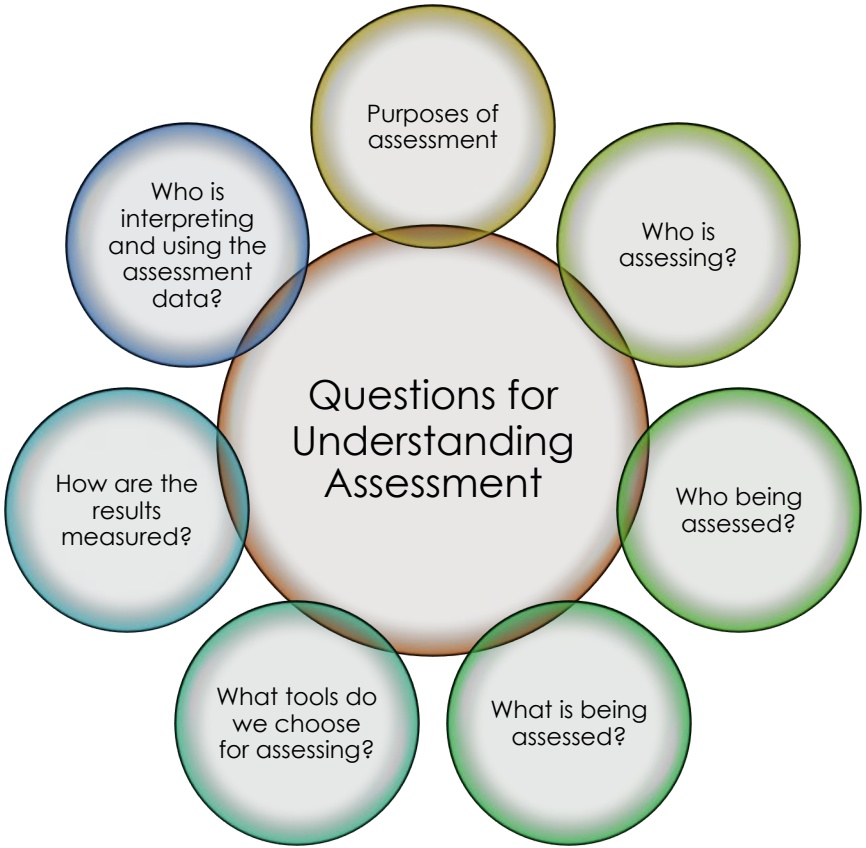
   process, conceptual reasoning, skills, facts, integration of ideas, application o skills and concept, presentation

4. How are results measured and interpreted?

   standards-based, norm-referenced, comparison with peers/curved, individual targets, progress towards goal

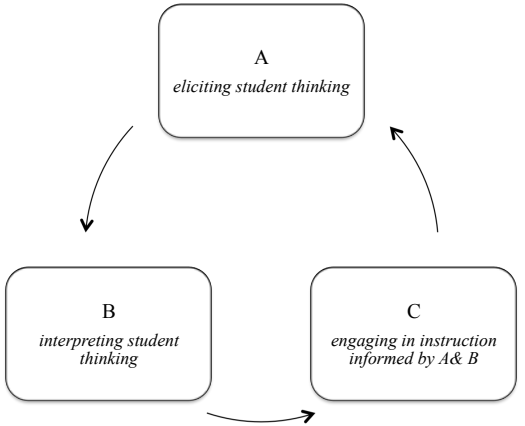
5. Who is interpreting and using the assessment?

   students, teachers, parents, administrators, admissions,


Questions for Understanding Assessment
Purposes of assessment
Who is assessing?
Who being assessed?
What is being assessed?
What tools do we choose for assessing?
How are the results measured?
Who is interpreting and using the assessment data?

What is Formative Assessment?

Black and Wiliam (1998) describe formative assessment as: Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be *better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited*.



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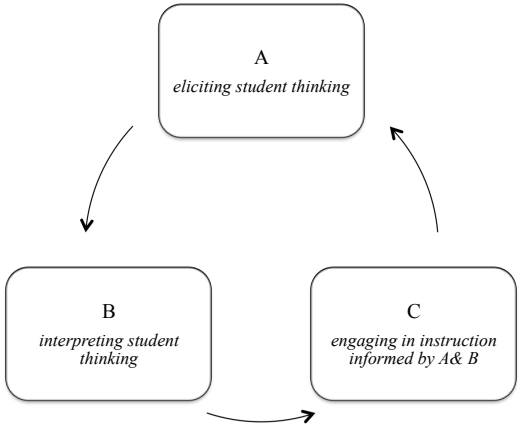

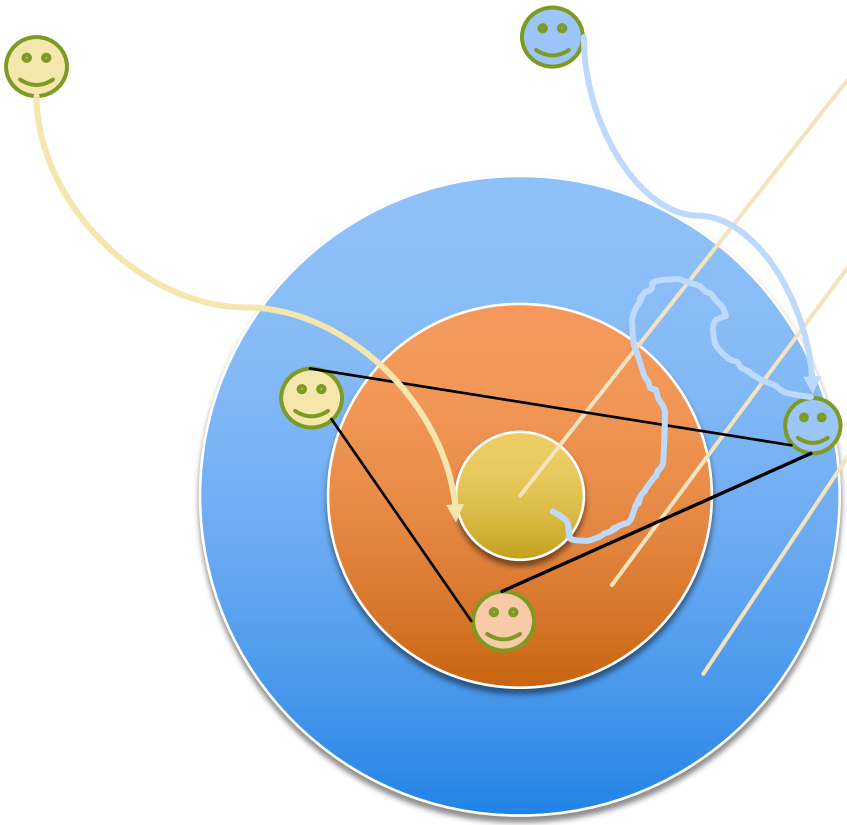

target learning goals

in range

on the board

1. Clarifying learning intensions and criteria for success.
2. Engineering effective classroom discussions and learning tasks that elicit evidence of student understanding.
3. Providing feedback that moves learning forward.
4. Activating students as instructional resources for one another.
5. Activating students as the owners of their own learning.

Key Elements of Formative Assessment

Establishing: Where learners are in their learning, where they are going, how to get there.

1. Clarifying learning intensions and criteria for success.
2. Engineering effective classroom discussions and learning tasks that elicit evidence of student understanding.
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Example of Formative Assessment in Practice

Mathematics Assessment Project: Formative Assessment Lessons (*Classroom Challenges)*.

Peer-Assisted Reflection, Dan Reinholz, USCD

Mathematics Assessment Project

ASSESSING 21ST CENTURY MATH

Welcome to the Mathematics Assessment Project

MARS Mathematics Assessment Resource Service

Home | About | News | Lessons | Tasks | Tests | PD Modules | TRU Framework | Standards

The Mathematics Assessment Project is part of the Math Design Collaborative initiated by the Bill & Melinda Gates Foundation. The project set out to design and develop well-engineered tools for formative and summative assessment that expose students' mathematical knowledge and reasoning, helping teachers guide them towards improvement and monitor progress. The tools are relevant to any curriculum that seeks to deepen students' understanding of mathematical concepts and develop their ability to apply that knowledge to non-routine problems.

▸ More about the Math Assessment Project

▸ Lessons

Formative Assessment Lessons: *Classroom Challenges*

100 lessons for formative assessment, some focused on developing math concepts, others on solving non-routine problems. A Brief Guide for teachers and administrators (PDF) is recommended reading before using these lessons for the first time.

▸ Tasks

Summative Assessment Tasks

A set of 94 exemplar summative assessment tasks to illustrate the range of performance goals required by CCSSM. The tasks come with scoring rubrics and examples of scored student work.

▸ Tests

Prototype Tests

Complete summative test forms and rubrics designed to help teachers and students monitor their progress using a range of task types similar to the 'Tasks' section.

▸ PD Modules

Professional Development Modules

5 Prototype modules that encourage groups of teachers to explore the practical and pedagogical concepts behind the materials, such as formative assessment, collaborative learning and the use of unstructured problems.

NEW

Tools for School and District Leaders

The MathNIC project has released free tools to help schools and school districts be more effective in organizing for improvement, supporting teaching and learning, and communicating with parents and the community. Visit mathnic.org for details.

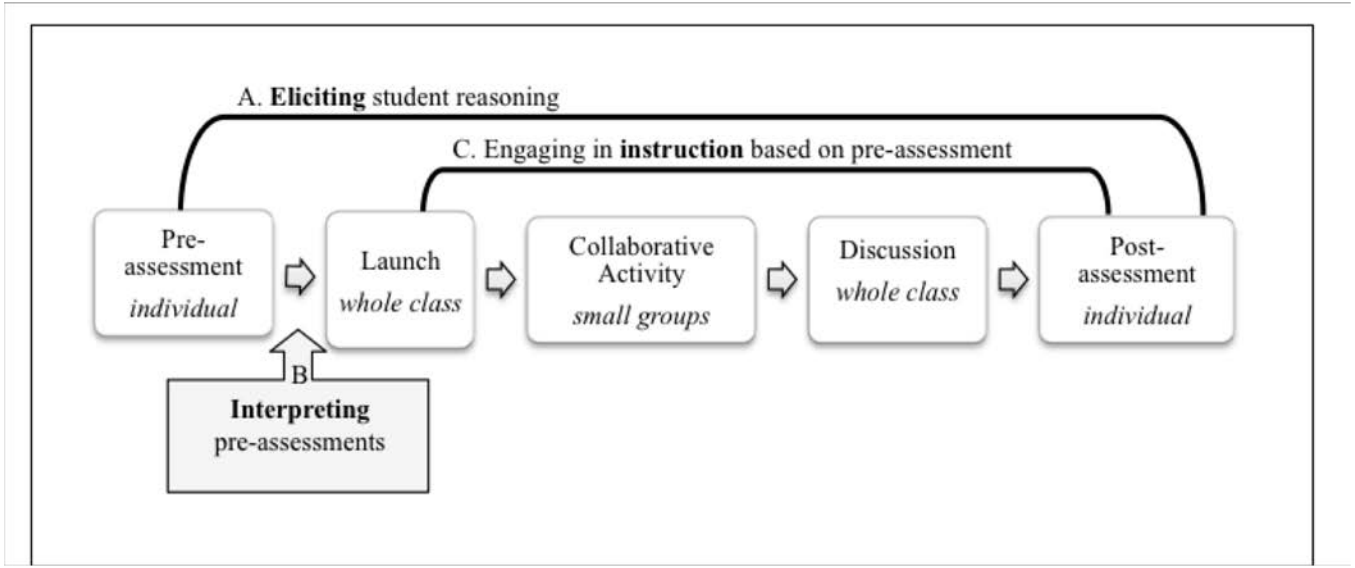
ICMI Awards

Hugh Burkhardt and Malcolm Swan have received a prestigious award from ICMI for the team's work in Math Education.
Read more…

RFA/CRESST Report

The *Classroom Challenges* are central to Research for Action's report on the MDC's Influence on Teaching and Learning.

Formative Assessment Lesson Framework



A. Plumber

A plumber charges a fixed fee for coming to your house, then charges a fixed amount per hour on top of this.

x = the time the job takes in hours.

y = the total cost of the plumber's time in dollars.

How much does the plumber charge for a 3-hour job?

B. Cycling

A cyclist travels along a direct route from town A to town B.

x = the distance of the cyclist from town A in miles.

y = the distance of the cyclist from town B in miles.

How far apart are the towns?

C. Movie subscription

You get two movies free, but then you get charged at a fixed rate per movie.

x = the number of movies seen.

y = the total money spent in dollars.

What is the fixed rate per movie?

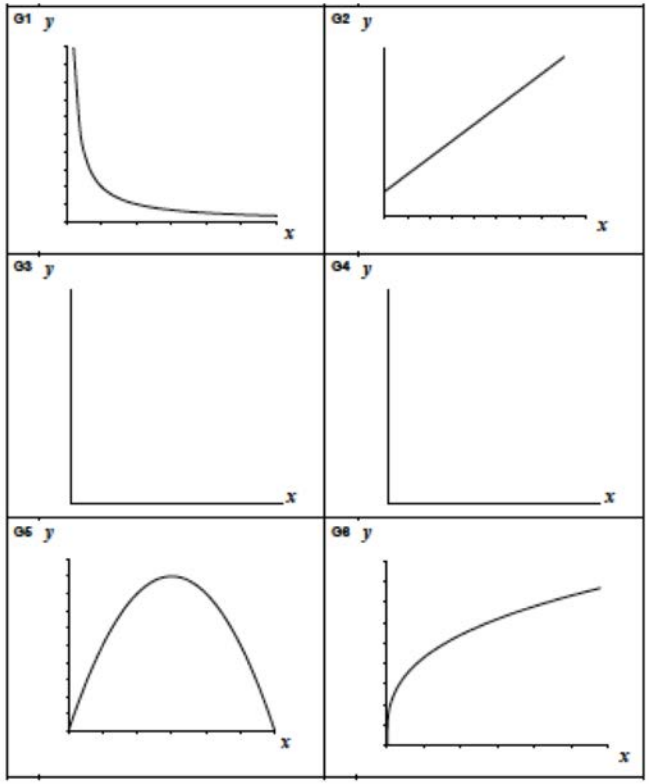
D. Internet café

An internet café charges a fixed amount per minute to use the internet.

x = the number of minutes spent on the internet.

y = the cost of using the internet in dollars.

How many minutes will $8 buy?



Formative Assessment Lesson

1. **Take turns** matching a situation, a graph and an equation. Do **NOT** divide up the work.

2. *If you place a card,* explain why that situation, graph, and equation match. *Other group members* ask questions until they agree.

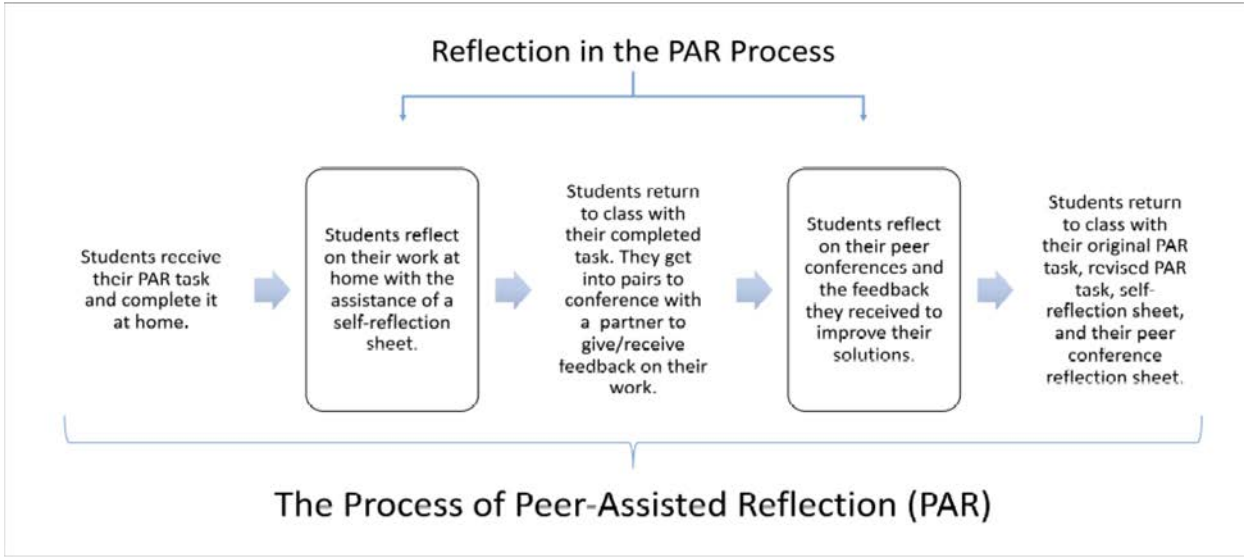
3. If you think the graph could be improved in any way, say how it should be changed. (For example, you may think that it should be discrete points rather than a continuous line.)

4. Use the **equation card** to label the axes on the **graph card** with units and scale AND answer the question on the **situation card**.

5. Arrange the matched cards side by side (not on top of one another) so I can see them as I walk round.

- Everyone in your group should agree on and be able to explain your choice.

Peer-Assisted Reflection (Reinholz; Kwon)



Formative Assessment Recap

The goal of formative assessment is IMPROVE INSTUCTION. It is a classroom level intervention – aimed at creating better, more effect instruction that is response to the learners

Teachers and students are all called on to interpret the results and use them to make decisions about how to move students closer to learning goals.

Challenges to effective formative instruction:

1. Requires a change in contract between teachers and students
2. Depends on teachers ability to interpret and respond to student thinking and adjust instruction based on that.
3. Requires student participation in revealing their understanding and encourages moving forward.
4. Honors incomplete understanding as the norm for everyone.

Using Formative Assessment to promote equity

- Level playing field through clarity of expectations
- Respects and builds on student knowledge
- Student agency through self-assessment and decisions about how to move toward learning goals
- Promotes student's relationship with teacher, peers, and content