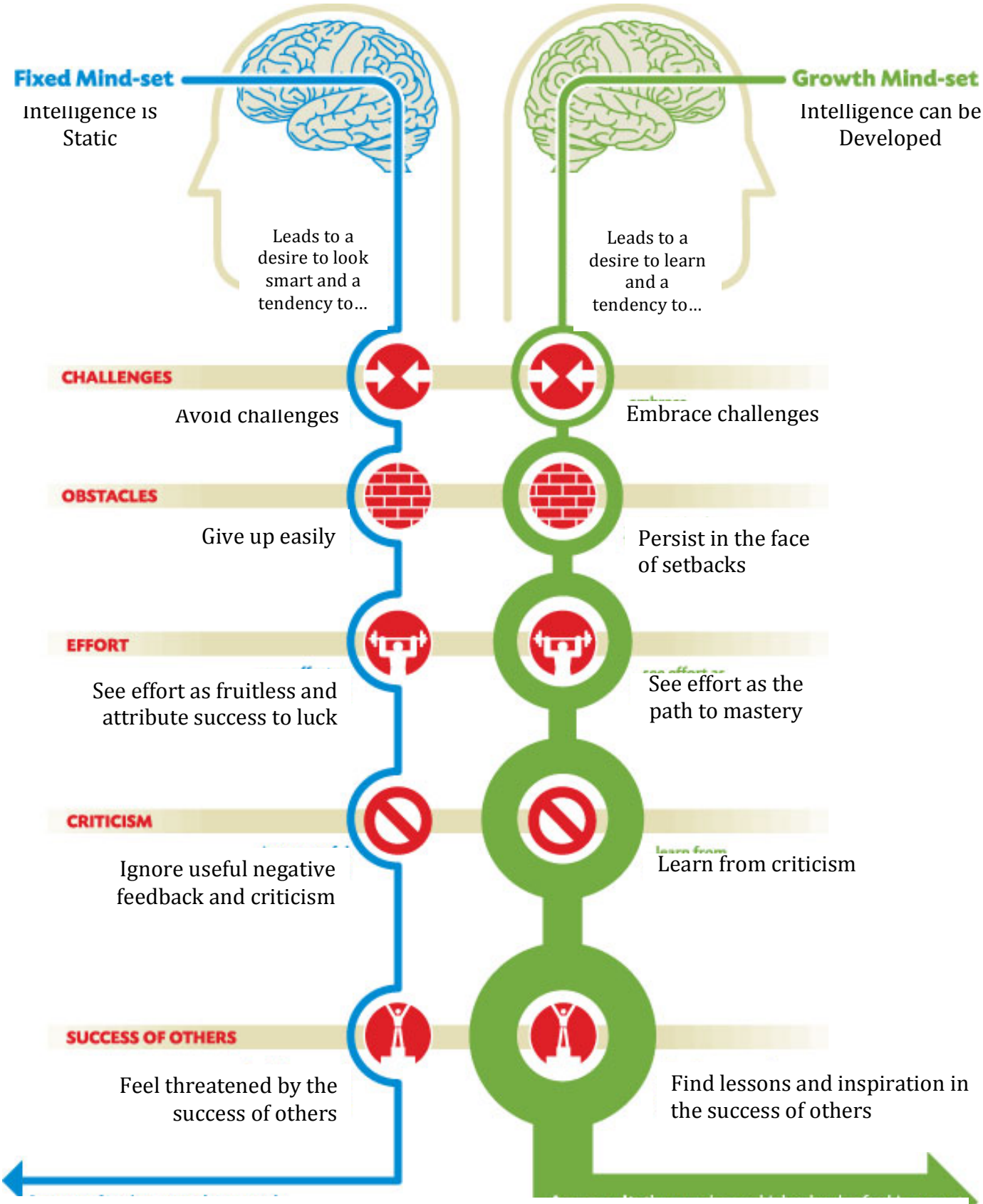
~~Re-Teaching~~

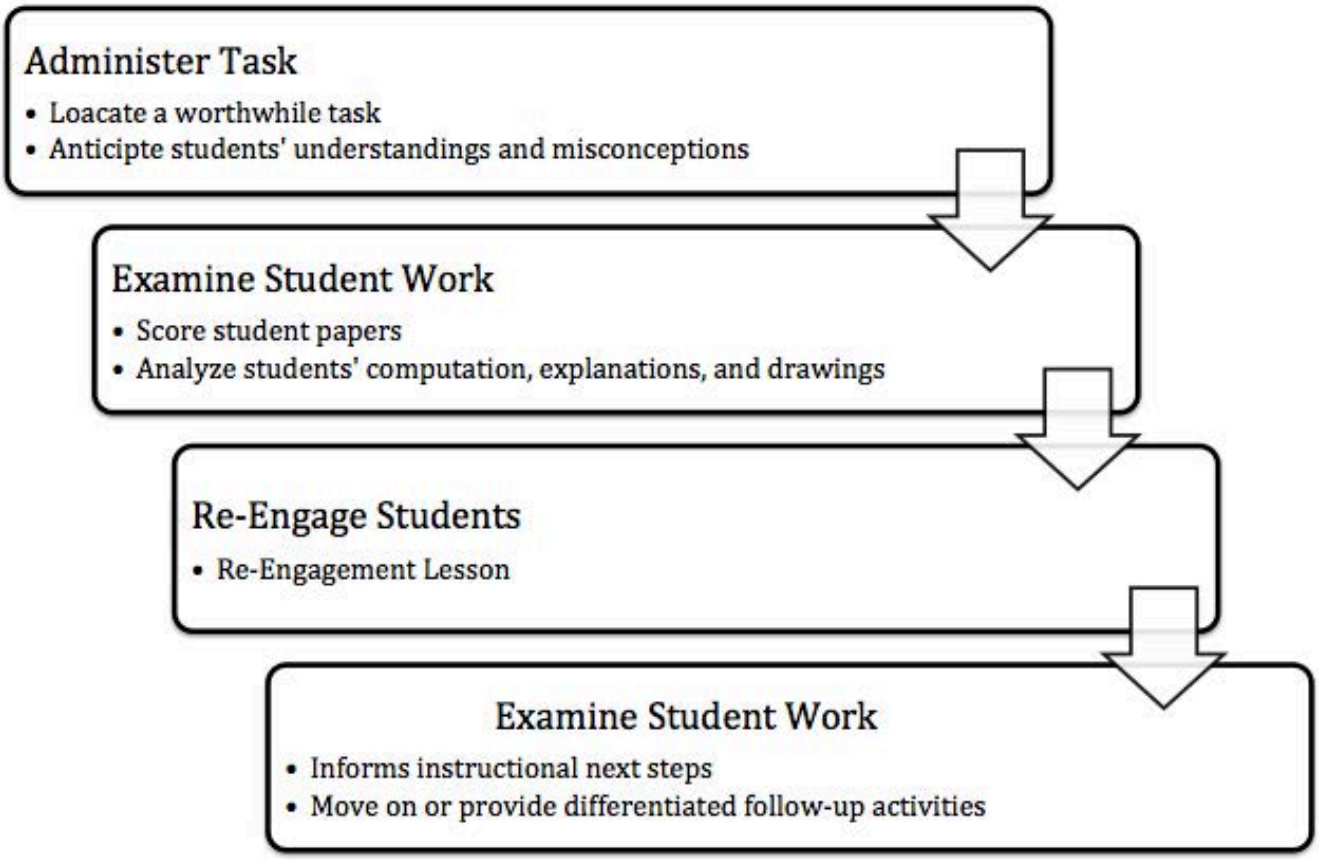
Re-Engagement Lessons

Re-Engagement Lessons Support Growth Mindset



5 Minute Quick Write:

You've just given an assessment to students and notice a couple of common errors. What are your next steps?

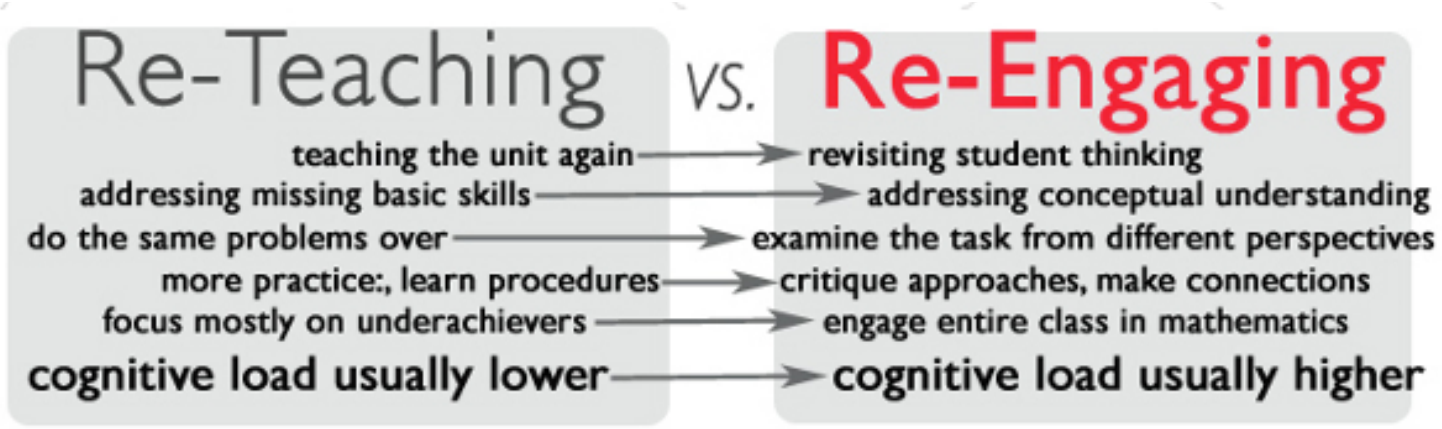


Reference: Using Formative Assessment to Drive Learning The Silicon Valley Mathematics Initiative: A Twelve-year Research and Development Project By David Foster and Audrey Poppers Nov. 2009.

Re-Engagement vs. Re-Teaching

Re-engagement lessons are lessons that are specifically designed to engage students in thinking about mathematical concepts in new ways. They support conceptual understanding, build students' repertoire of strategies, and develop mathematical communication skills.

- Directly **tied to the results** of an assessment
- Teachers engage students in a process of examining student work that **presents students' learning** along a continuum of little success to demonstrated success.
- Students re-engage with core mathematical concepts in order to **deepen their understanding and build a conceptual foundation** for further mathematics.
- Students are given the opportunity to **connect mathematical concepts**.
- Leads to **greater success in problem solvin**g because students won't have to rely on memorizing procedures.
- Lessons are developed from a **careful analysis** of student understandings, strategies, and misconceptions.
- **Followed up with appropriate next steps**: Differentiated mini-lessons, full lessons, activities, and warm-ups (5 min), number talks.



Setting the Stage

Before your first Re-Engagement lesson, classroom structures need to be in place.

- Classroom environment supports mathematical communication and risk-taking
- Word Walls support mathematical and academic vocabulary
- Sentence Frames support mathematical communication
- Silent signals

Re-Engagement Lesson Steps

1. Select Task

- Identify: learning targets/objectives and strategies you would like to see; how students will communicate understanding (show, say, do); criteria for evidence of understanding (rubric)

- Select a worthwhile task
  - Contains 3 questions types: Access, Core, Ramp
  - Core: Must address the core math and capture a potential range in student performances
  - Access: All students must be able to demonstrate some level of success
  - Ramp: goes conceptually deeper than the core math, probes for deeper understanding, requires students to provide evidence/justification
  - Best indicator of future success on related mathematical ideas

2. Complete the Task as a Student Would

- Anticipate how students could be successful, consider multiple ways students might approach the problems, and at which points the students might struggle

3. Complete Task Anticipation Sheet

- The MARS Task Anticipation Sheet is divided into three sections: areas where students are likely to be successful; areas where they are likely to struggle; and the proposed plan for teaching.
- These answers frame the mathematical ideas and process to be learned and assessed, and focus attention upon evidence of student thinking that will appear in their work.

Task Anticipation Sheet

Task Name:_____ Tot Pts. _____

In anticipating the student work where will students show success?

What parts of the task will students be successful?	In terms of knowing and doing mathematics what does this indicate?

In anticipating the student work where will students struggle?

What parts of the task will students be unsuccessful?	In terms of knowing and doing mathematics what does this indicate? What understandings or skills do the students need to learn?

Considering strengths and weaknesses from students, what are plans for future teaching?

What are the implications for future instruction?	What specific instruction or lesson experiences will you design for students?

Measures of Central Tendency - Mean, Median, Mode, and Range

Mean

To find the mean, add all numbers in your data set then divide the sum buy the quantity of addends.

The mean is not valid when the data set contains outliers or is skewed. Report the median instead.

Notes About the Mean

Median

The median is the exact center of a data set.

To find the median, order numbers from leats to greatest then find the number in the middle. If two numbers are in the middle, find the average of the two numbers.

Report the median instead of the mean when when the data set has outliers or is skewed.

Notes About the Median

Mode

The mode is the number(s) that occur(s) most often.

To find the mode, identify which number occurs most often (use inspection, a bar chart or line plot).

Notes About the Mode

Range

The range tells us how far the highest data point is from the lowes data point.

To find the range, find the difference between the highest and lowest data point.

The range is affected by outliers.

Notes About the Range

Task Analysis

Task _____

Range: _____
Mode: _____
Median: _____
Mean: _____

1. Fill in the line plot.
2. Sort by score.
3. Look for patterns of understandings and misconceptions for each score.

Task Name:

Points	Understandings	Misunderstandings

Task Analysis Sheet

Task Name:_____ Tot Pts. ___

In analyzing the student work where did students show success?

What parts of the task did students demonstrate success?	In terms of knowing and doing mathematics what does this indicate?

In analyzing the student work where did students struggle?

What parts of the task were students being unsuccessful?	In terms of knowing and doing mathematics what does this indicate? What understandings or skills do the students need to learn?

Considering strengths and weaknesses from students, what are plans for future teaching?

What are the implications for future instruction?	What specific instruction or lesson experiences will you design for students?

Adapted from the Silicon Valley Math Initiative's Re-Engagement Resources

Re-Engagement Lesson Plan

Task Name: **Grade:**

Has it been a long time since students completed the task? Do your students suffer from short-term memory loss? Refresh them to make the analysis richer.

1. Display problem
2. Give students a few minutes to answer the question. Do not answer any questions about the solution method or correctness of the answer.

No refresher necessary? Then go straight to analysis.

1. Display the question.
2. Display student exhibit(s).
3. Ask probing questions. Pair-Share to help students form responses before class discussion.
4. Repeat each exhibit.

Posing Questions to Prompt Thinking

- Present misconceptions and have students talk through their own wrong thinking. They need time to process their own thinking and self-identify errors.
- Guide/prompt with questions until students arrive at the correct answers.
- Extend the problem/pattern and ask if the method works with a different quantity in the question.
- Make up answers or solution methods when necessary.
- Start with broad questions.
- Push kids to thoroughly articulate their thinking.
- Ask questions about what the student is representing with the different numbers/drawings/notation in their solution.
- "What was this student thinking?"
- "How does this student's explanation show that they understand?"
- "Turn to your partner and discuss the reason why you think the answer was presented this way."
- "Do you agree with the answer?" Followed by, "Tell me more about what you think."
- "What do you think this person was thinking about when they wrote this answer?"
- Show part of an answer, erase part of the student response then ask, "What do you think the student wrote next"?

Lesson Sequence	**Student Exhibits** *Create your own when necessary*	**Teacher Dialogue** *Record any guidance questions, notes to help in lesson presentation.*
Entry Problem Analysis Use a student sample of the entry problem . You will start with this simple problem to bring all the students along. Entry problems are problems that all students should be able to experience success in answering and may be an expectation from a previous grade level in the same domain/cluster. Ask students to: 1. Think individually about what the student was thinking. 2. Share as a class. This allows students to clarify and articulate the mathematical ideas.		
Core Choose a student sample from the core problem . Core problems are the grade level expectations. Ask students to: 1. Think about what the student was thinking, share with a pair or group. 2. Next, do a class discussion to help students make sense of another person's strategy, try on a new strategy, and compare strategies.		

	Student Exhibits	Teacher Dialogue
Ramp Ramp problems push students' to extend their reasoning to a broader context. Students are required to think more deeply. • Display the ramp problem. • Ask students to solve the ramp problem individually. • Students share solutions in pairs/groups. _____ Choose an *incorrect* student sample from the problem . Ask students to: 1. Think about what the student was thinking, share with a pair or group. 2. Next, in your class discussion help students analyze misconceptions and discuss why they don't make sense. In the process students can let go of misconceptions and clarify their misconceptions. _____ Choose a *correct* student sample from the *already scored* tasks to share with whole class. 1. Discuss as a class how this correct strategy compares to the incorrect strategy from above and how it could be modified to get the right answer. 2. Discuss students' new solutions as compared to the correct sample.	*Create your own when necessary*	*Record any guidance questions, notes to help in lesson presentation.*