# (1) Questions to ponder

How did you arrive at your answer?

Talk me through your thinking

What would happen if ...?

Can you find another way to solve that?

Can you convince me?

Can you find another way to explain that?

How did you know to try that strategy?

Did someone get the same answer but by a different way of reasoning?

How is \_\_\_\_\_\_ related to \_\_\_\_\_?

How do you know your solution is correct?

Can you convince someone who disagrees with you?

Does that always work?

# (2) Formative Assessment Strategies

Assess prior knowledge (Range Questions)

Can you put in your own words what \_\_\_\_\_ said?

Use student self-reflection strategy (thumbs up/down/sideways)

Questioning: Engaging, Clarifying, Refocusing

Implement gallery walks

Round robin activities to review/assess

I have...Who has?

Action Feedback:

- Would it help if you...
- Show me how you might solve it a different way
- Show me a graph/table that represents this problem
- Put your pencil where you are stuck

4 corners: Students go to individual corners to discuss representations/solutions

Observation Protocols

Exit cards/Ticket to Leave

# **Partner Task Flow Chart**





# Relationships and **Convergences**

Found in: I. CCSS for Mathematics (practices) 2a. CCSS for ELA & Literacy (student capacity) **2b. ELPD Framework** (ELA "practices") 3. NGSS (science and engineering practices)

## Notes:

I. MPI-MP8 represent CCSS Mathematical Practices (p. 6–8).

- 2. SPI-SP8 represent NGSS Science and Engineering Practices.
- 3. EPI-EP6 represent CCSS for ELA "Practices" as defined by the ELPD Framework (p. 11).
- 4. EP7\* represents CCSS for ELA student "capacity" (p. 7).

### Stanford GRADUATE SCHOOL OF **EDUCATION**

## Understanding Language Language In the Content Areas

## Suggested citation:

Cheuk, T. (2013). Relationships and convergences among the mathematics, science, and ELA practices. Refined version of diagram created by the Understanding Language Initiative for ELP Standards. Palo Alto, CA: Stanford University.

**MPI.** Make sense of problems and persevere in solving them

Math

MP2. Reason abstractly and quantitatively

MP6. Attend to precision

MP7. Look for and make use of structure

**MP8.** Look for and express regularity in repeated reasoning

> EP7\*. Use technology and digital media strategically and capably

**MP5.** Use appropriate tools strategically

SP2. Develop and use models

MP4. Model with mathematics

**SP5.** Use mathematics and computational thinking

**EPI.** Support analysis of a range of gradelevel complex texts with evidence

MP3 and EP3. Construct viable and valid arguments and critique reasoning of others

**SP7.** Engage in argument from evidence

**SPI.** Ask guestions and define problems

Science

SP3. Plan and carry out investigations

**SP4.** Analyze and interpret data

**SP6.** Construct explanations and design solutions

## SP8. Obtain, evaluate, and

communicate information

**EP2.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

**EP4.** Build and present knowledge through research by integrating, comparing, and synthesizing ideas from text

EP5. Build upon the ideas of others and articulate their own clearly when working collaboratively

> **EP6.** Use English structures to communicate context specific messages

http://ell.stanford.edu/teaching\_resources/science

# DIY iPad Stand<sup>1</sup>

- → PVC Parts List (16 Pieces)
  - Four <sup>1</sup>/<sub>2</sub>" Tees
  - Four  $\frac{1}{2}$ " 90° Elbows
  - Three  $\frac{1}{2}$ " tubes 3  $\frac{3}{4}$ " long
  - Four  $\frac{1}{2}$ " tubes 1  $\frac{3}{8}$ " long



• One  $\frac{1}{2}$ " tube - 2  $\frac{1}{2}$ " long





<sup>1</sup> Many thanks to our colleague Rosey McQuillan for sharing this DIY iPad Stand. Follow Rosey and her good work on Twitter @romquill

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