**The Social Dimension**:

*Setting Class Norms*

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“As students begin to collaborate, a set of student-developed class norms can be a valuable touchstone. For students whose past experiences have made them skeptical that their ideas, and not the teacher’s, are the ones that matter, it can be especially important to see that the norms are student-driven – the authentic result of their ideas and what they need to engage in challenging learning…the standards are theirs to uphold.”

***Reading for Understanding:*** *How Reading Apprenticeship Improves Disciplinary Learning in Secondary and College Classrooms* (2012)

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**YOU are the math student!**

* + What makes you comfortable in a math classroom?
	+ What are some things the math teacher can do to support your learning?
	+ What are some things classmates can do to support one another’s learning?
	+ What would get in the way of your learning?

**The Personal Dimension**:

*Personal Math Histories*

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Everyone has a history with math. For some students, math has had mostly positive associations, with supports from which to build an even stronger identity as a proficient math student. For others, being able to reshape a negative math identity often depends on reflecting on personal moments or experiences that created math barriers. When students reflect on and share their personal math histories, they have an opportunity to view themselves and their classmates more generously as “math students in progress”, with math identities they can understand and change.

***Adapted from Reading for Understanding:*** *How Reading Apprenticeship Improves Disciplinary Learning in Secondary and College Classrooms* (2012)

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**Think-Pair-Share:**

* What math experiences stand out for you? High points? Low points?
* What has supported your development as a math student? What has discouraged it?

**The Cognitive Dimension**:

*The Big Picture and Breaking Things Down*

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“Even if you are really hungry, you can’t eat a whole pizza at once. You have to eat it a little bit at a time, in slices. Understanding text is similar to eating pizza. Though you may want to read a large amount at once, you may not be able to understand it unless you take it in bits and pieces.”

***Reading for Understanding:*** *How Reading Apprenticeship Improves Disciplinary Learning in Secondary and College Classrooms* (2012)

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**Framework for Patient Problem Solving with Word Problems**

|  |  |
| --- | --- |
| What is the question asking you to find?  |  |
| What information does the problem give you? |  |
| Which math operations do you need to perform? + - x ÷ |  |
| What is the solution?  |  |
| Does your answer make sense? Explain. |  |

The **National Debt of the U.S.** is the amount of money that the Federal Government owes to other countries and institutions. In 2015, the National Debt of the U.S. was 16.8 trillion dollars. At that time, the U.S. Federal Government owed 1.3 trillion dollars to China, 1.1 trillion dollars to Japan and 2.6 trillion dollars to other countries. What was the combined total, in trillions of dollars, which the U.S. owed to China and Japan in 2015?

|  |  |
| --- | --- |
| What is the question asking you to find?  |  |
| What information does the problem give you? |  |
| Which math operations do you need to perform? + - x ÷ |  |
| What is the solution?  |  |
| Does your answer make sense? **Explain.** |  |

Sachiko is driving from Renton to Los Angeles. Her car gets 23 miles to the gallon. The total distance from Renton to Los Angeles is 1,140 miles. If Sachiko breaks her trip up evenly over three days, how many miles will she drive per day?

|  |  |
| --- | --- |
| What is the question asking you to find?  |  |
| What information does the problem give you? |  |
| Which math operations do you need to perform? + - x ÷ |  |
| What is the solution?  |  |
| Does your answer make sense? **Explain.** |  |

Alyce, Jon and Kim worked together on a painting job. Jon worked 8 fewer hours than Alyce. Kim worked twice as many hours as Jon. If the total hours worked on the job was 72, how many hours did Jon work?

|  |  |
| --- | --- |
| What is the question asking you to find?  |  |
| What information does the problem give you? |  |
| Which math operations do you need to perform? + - x ÷ |  |
| What is the solution?  |  |
| Does your answer make sense? **Explain.** |  |

**The Knowledge-Building Dimension**:

*Schema*

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“Schema is a concept that students should understand and own. They can think of schema as a personal library of knowledge – based on a lifetime of reading and experience – that they already have and can draw on, add to daily, and revise if they need to as they learn more. This information is organized, and filed for future retrieval. When students encounter new information or experiences, their minds automatically try to figure out how the new information fits with the schema they already have: What do I know that is like this? What pattern am I seeing?”

***Reading for Understanding:*** *How Reading Apprenticeship Improves Disciplinary Learning in Secondary and College Classrooms* (2012)

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