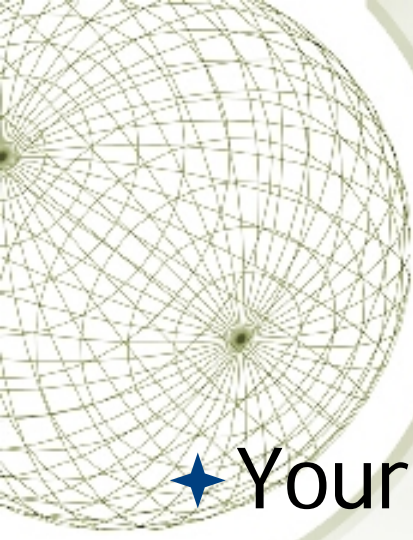


*Making ELL instruction work
for you!*

Matthew S. Winsor Ph.D.
MELL Pre-conference workshop
2009



Overview of Presentation

- ★ Your background
- ★ My background
- ★ MSL
- ★ Making it work for you... Creating an ELL appropriate mathematics lesson

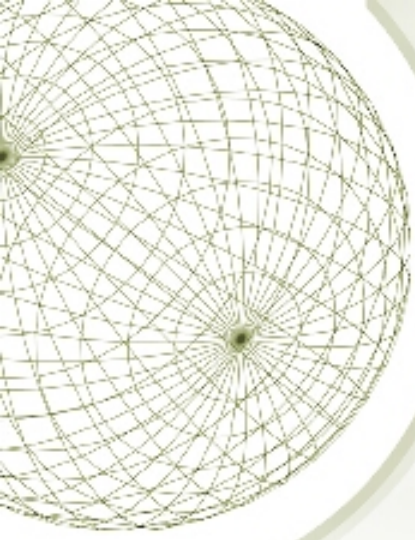


Your Background

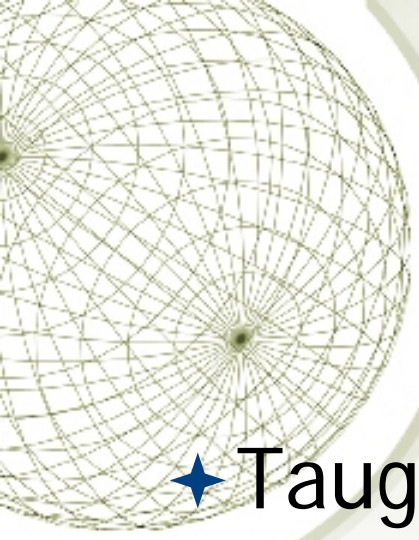
- ★ How many years have you taught ELL?
- ★ How many ELL students do you have in your classes?
- ★ What kind of training do you have to teach ELL?
- ★ Other bits of trivia?

Where is El Paso, TX?



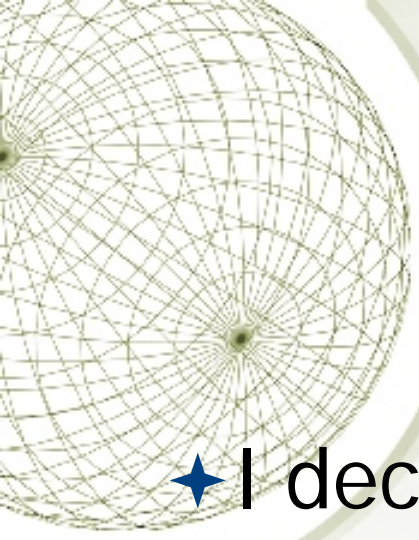


Normal, IL



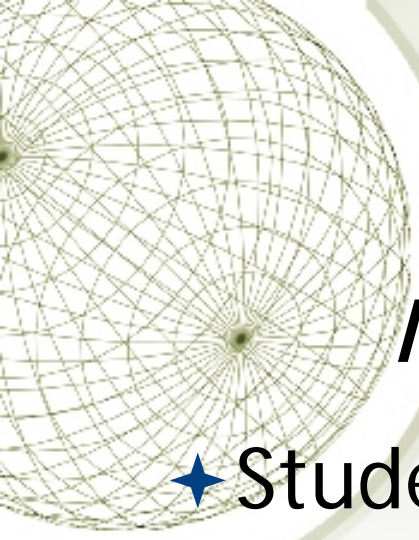
My Background

- ★ Taught at a High school in Southern CA with 56% Hispanic students
- ★ I was hired to teach mathematics to ELL students
- ★ No resources to help me teach ELL students mathematics (No, I do not want to translate the math book!)



I needed HELP!

- ★ I decided to research the issue
- ★ I examined the research regarding how one learns mathematics and how one learns a new language.
- ★ The similarities between the fields of research would provide an answer to my dilemma.




Learning language and mathematics: Similarities

- ★ Students learn a new language and mathematics more effectively when:
 - ◆ They write to communicate what they have learned
 - ◆ They learn in groups
 - ◆ The learning is set in context



What is the Context?

- ★ Chastain (1988): most important clue to deduce the meaning of a word or sentence
- ★ Bourque & Jacques (1995): when context is meaningful, students see the need to know and communicate is genuine



Mathematics as a Second Language

- ★ By synthesizing the research, I created an approach for teaching ELL students mathematics which I called Mathematics as a Second Language (MSL)



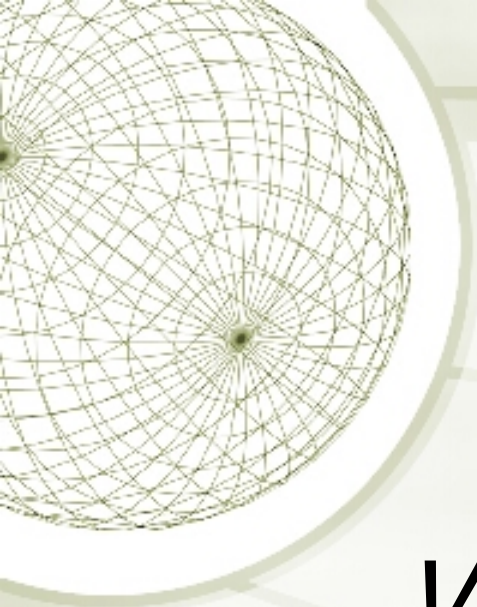
Components of MSL

- ★ Vocabulary Activities
- ★ Journals
- ★ Group Work
- ★ Projects



Creating a Culture of the Classroom

- ★ For MSL to work, there has to be certain conditions in the classroom that promote learning.
 - ★ Everyone participates
 - ★ There are no wrong answers, only opportunities for learning
 - ★ Students determine the correctness of the mathematics
 - ★ Teacher serves as a resource and a guide



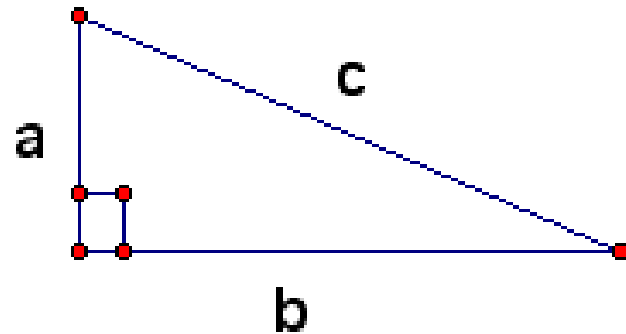
Vocabulary Activities

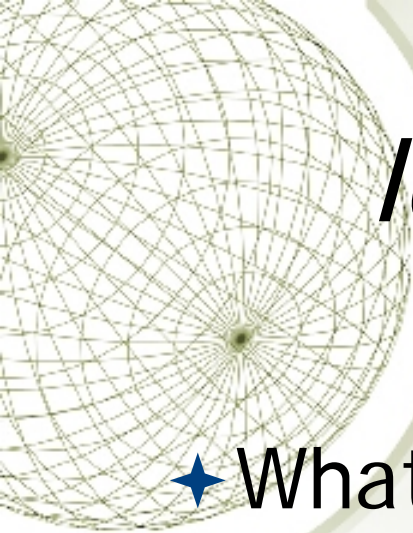
Word Squares (Vocabulary)

Teorema Pitagórica

Pythagorean Theorem

Para un triángulo recto,
 $a^2 + b^2 = c^2$





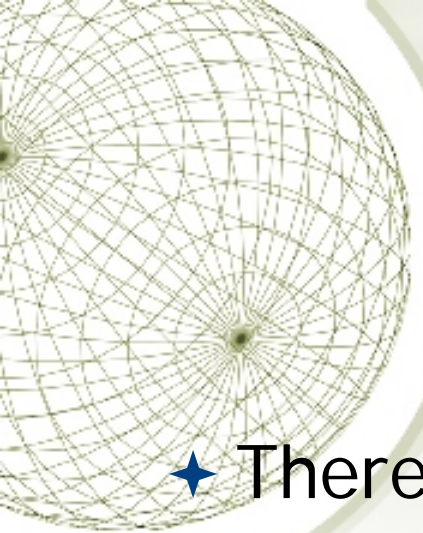
Identifying Vocabulary for Word Squares

- ★ What terms/phrases are necessary for students to know in order to successfully engage in the mathematics?



Create Your Own Word Square

- ★ Create your own word square for mathematical terms commonly used in your classroom.
- ★ Suggestions for terms: function, fraction, parabola, ratio, proportion, integer...



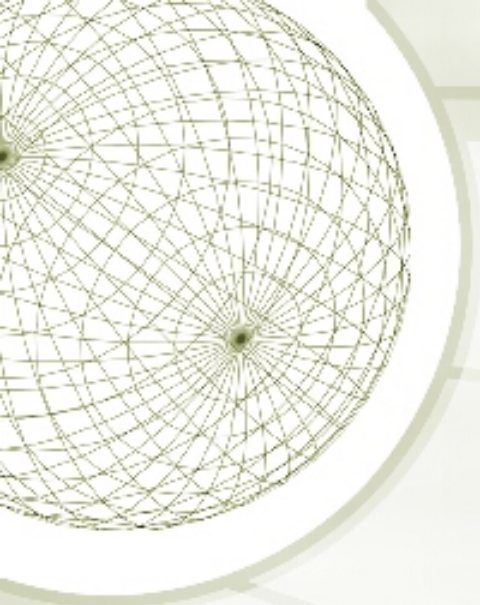
Introducing Vocabulary

- ★ There is some question about when teachers should introduce vocabulary.
- ★ Front loaded vs. In context
- ★ In context allows students to understand the concept before naming it.
- ★ Front loaded good for words that are essential to know before the lesson starts.



Benefits of Word Squares

- ★ Had to do more than just memorize a definition. Students had to understand the concept in order to put it in their own words.
- ★ Students could keep their Word Squares the rest of their school career. This helped my students when they had another teacher who was not trained in ELL methodology.

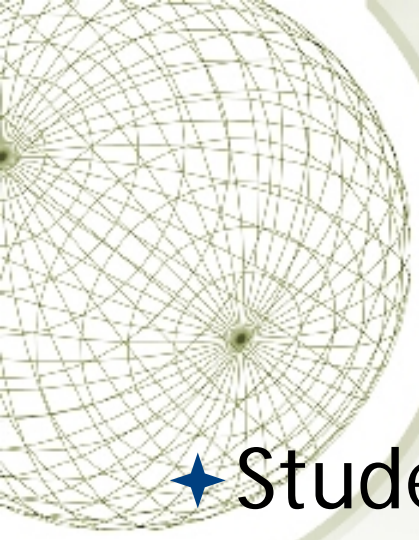


Group Work



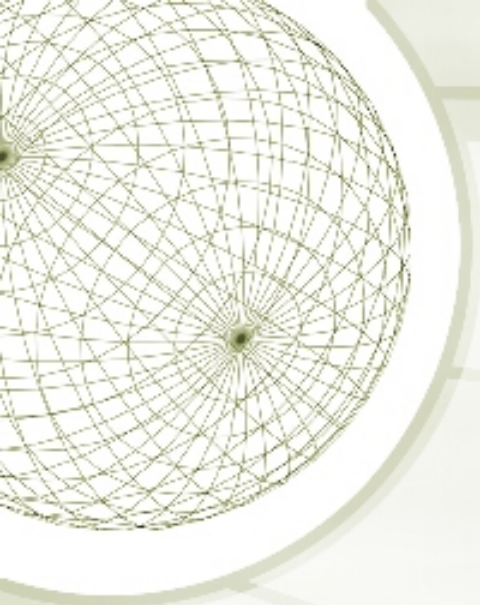
Group Work

- ★ Three important factors of group work:
 - ★ Groups should not be homogenous in their language ability
 - ★ Groups need to change periodically
 - ★ ELL students need to learn how to participate in groups. (Creating the Culture of the Classroom)



Benefits of Group Work

- ★ Students' use of mathematical terms increased
- ★ Communication became more mathematical
- ★ Students' mathematical understanding increased



Journals



Journals

- ★ Students would write in their journals at the end of each class
- ★ Students either:
 - ★ Responded to prompts
 - ★ Had a “free write”



Journals

- ★ Tried to have students write in their journals at least four days per week.
- ★ On Fridays, students would evaluate each other's journals



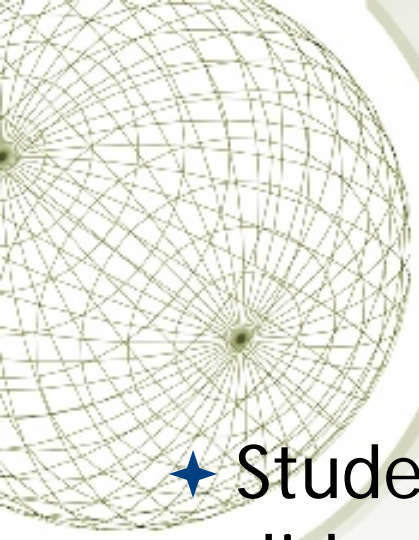
Rubric for journals

Score	Rationale
0	No work
1	Cannot understand entry
2	Some understanding of entry, perhaps off topic
3	Complete understanding of entry, on topic



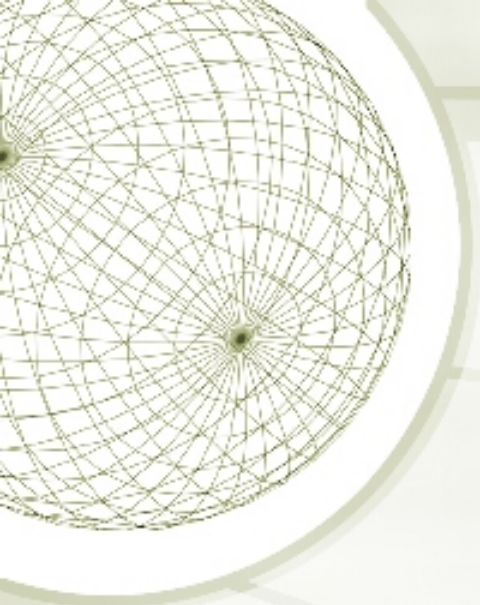
Let's practice!

- ★ Take five minutes to respond to the journal prompt below:
 - ★ Describe the sign rules for integer multiplication. Give a justification for the rule of multiplication of a negative and a positive number.
- ★ Exchange your journal entry with a neighbor. Evaluate your neighbor's journal using the rubric. Justify your evaluation (score).



Benefits of Journals

- ★ Students had to decide what they knew and did not know about the mathematics topic
- ★ Improved mathematical communication
- ★ Students increased their use of English
- ★ Encouraged mathematical discussions among students



Projects



Projects

- ★ Real-life contexts for projects (stock market or social issues).
- ★ Had to report the results of their project to their peers.
- ★ Worked in groups to complete the project



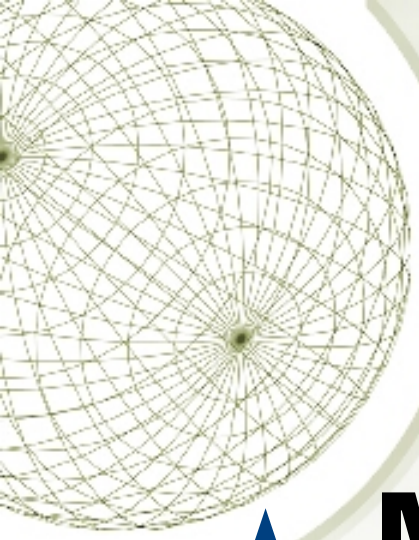
Projects

- ★ Usually took a week or more to complete (stock market project lasted one month)
- ★ At the beginning of the projects, I shared the rubric I was going to use along with examples of projects to practice evaluating with students.



Benefits of Projects

- ★ Students got a glimpse of the usefulness of mathematics in everyday life.
- ★ More mathematical communication in the classroom (Do you have the business section of the paper? My stocks are down 3%.)




Did MSL Work?

★ Maybe!



Did MSL Work

- ★ MSL seemed to promote communication about mathematics (student initiated conversations about mathematics and mathematical reasoning)
- ★ MSL seemed to help students use the language of mathematics more efficiently



What if you don't speak the language?

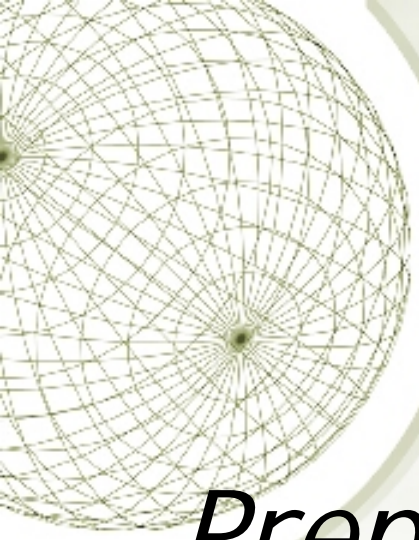
- ★ Group Work

- ★ ELL Student assistants in each group
- ★ Glossaries in the second language
- ★ Bilingual aides
- ★ Foreign language teachers
- ★ Learn a new language

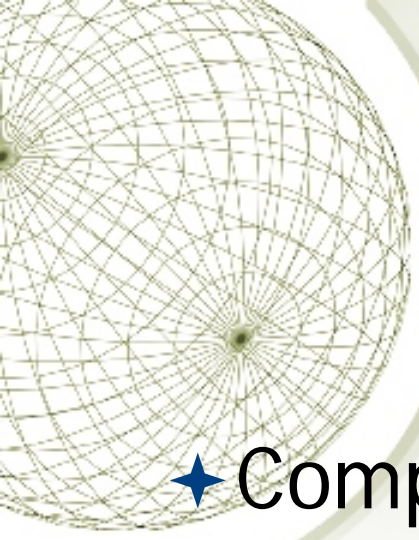


What does PSSM say about students' mathematical communication? (p. 60)

- ★ Organize and consolidate their mathematical thinking through communication;
- ★ Communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- ★ Analyze and evaluate the mathematical thinking and strategies of others;
- ★ Use the language of mathematics to express mathematical ideas precisely.

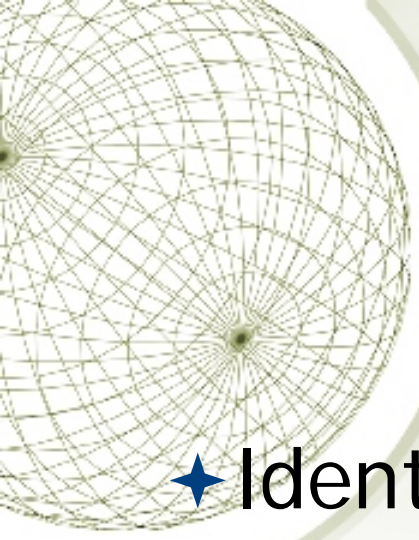


Preparing an ELL Appropriate Mathematics Lesson



Hot Wheels Activity

- ★ Complete the Hot Wheels Activity
- ★ As we work together on the activity, please identify:
 - ★ Important mathematics
 - ★ Important vocabulary
 - ★ How groups should work together
 - ★ Journal prompts for students



Important mathematics

- ★ Identify the important mathematics



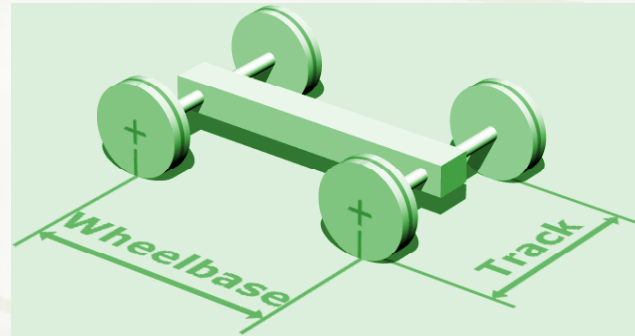
Vocabulary

★ What important terms/phrases did you identify?

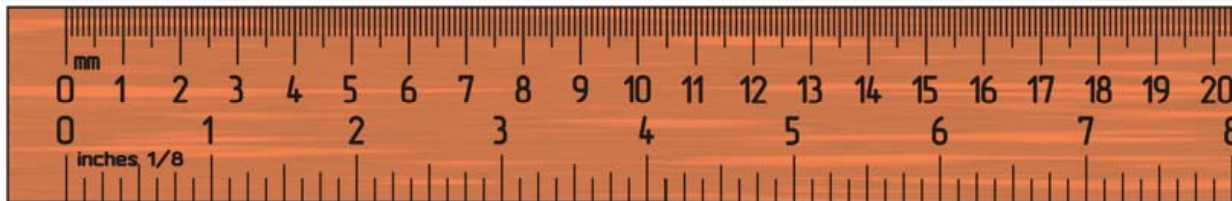
Setting context with important vocabulary



Hot Wheels



Wheelbase

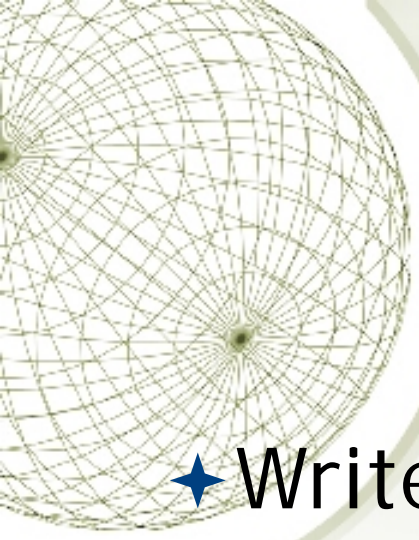


Ruler



Group Work

- ★ How can you structure group work to help ELL students in you class?



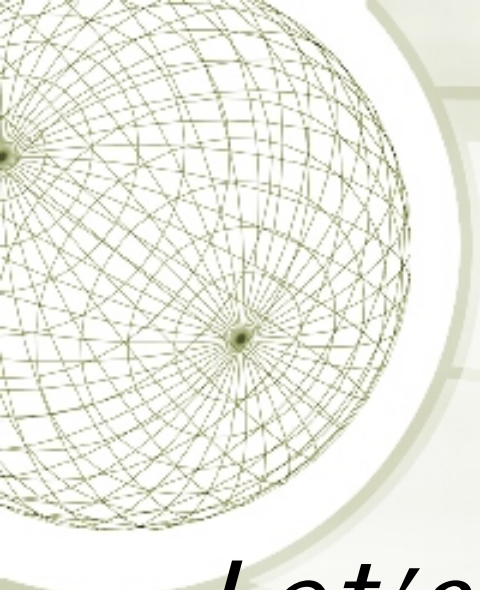
Journal Prompt

- ★ Write a journal prompt for your students.

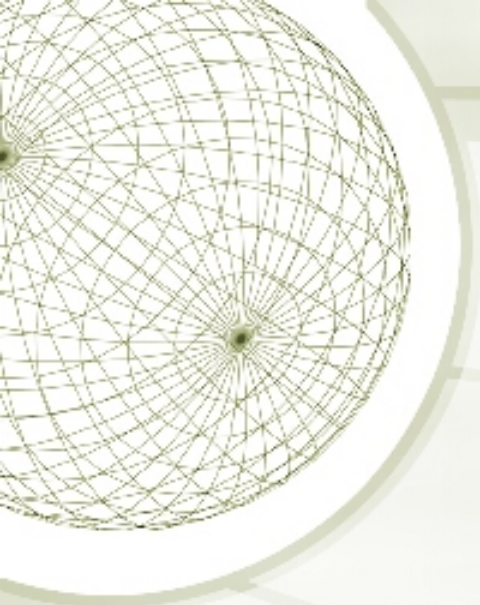


IMPORTANT

- ★ You have to use the strategies that you feel comfortable with!



Let's try it with your lesson!



¡Gracias!