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Welcome Back…Session Two!

Greetings from Kathy and Kathleen!

Please create a NAME tent to display …Thanks!

Today's Fun Challenge: What are the Top five words used of 2009? Create your list to share…

Today's agenda 9:00 – 3:30 p.m. ☺

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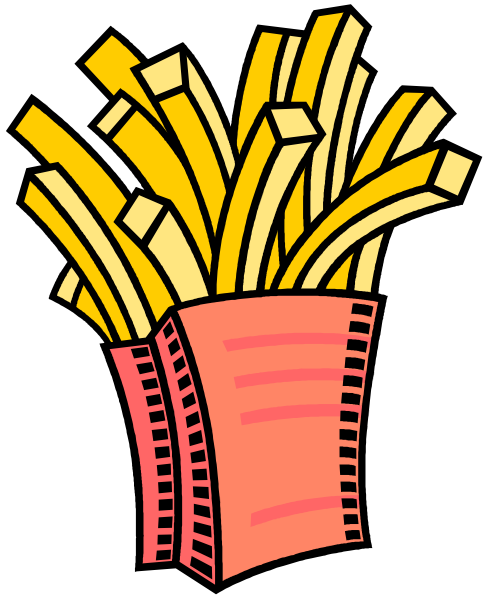
Belief that mathematics is a language and a tool everywhere…

"Supersize" opportunities for students to develop their tools of description, communication and representation



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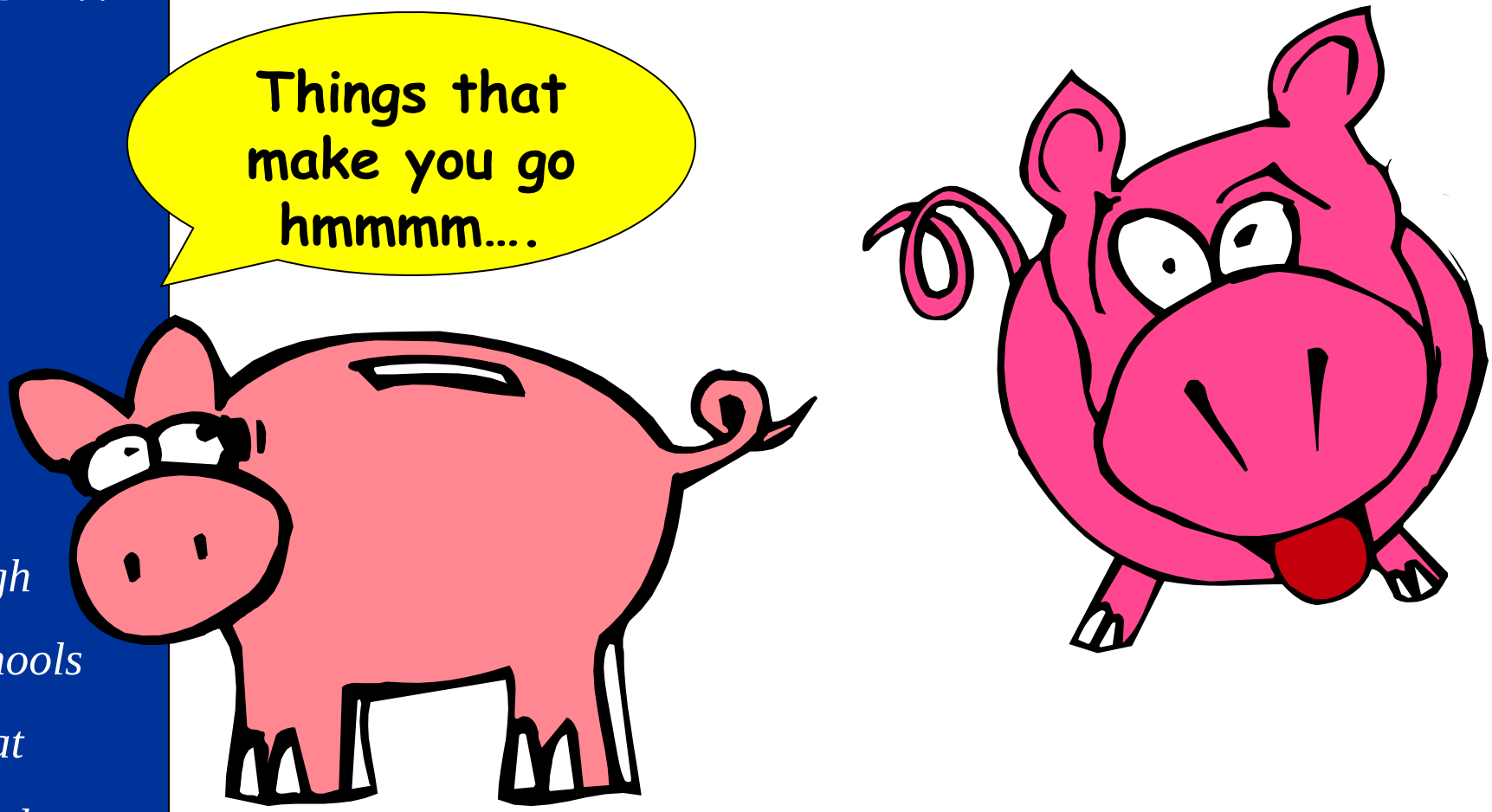
Remember: These guys are innocent!



High Schools That Work

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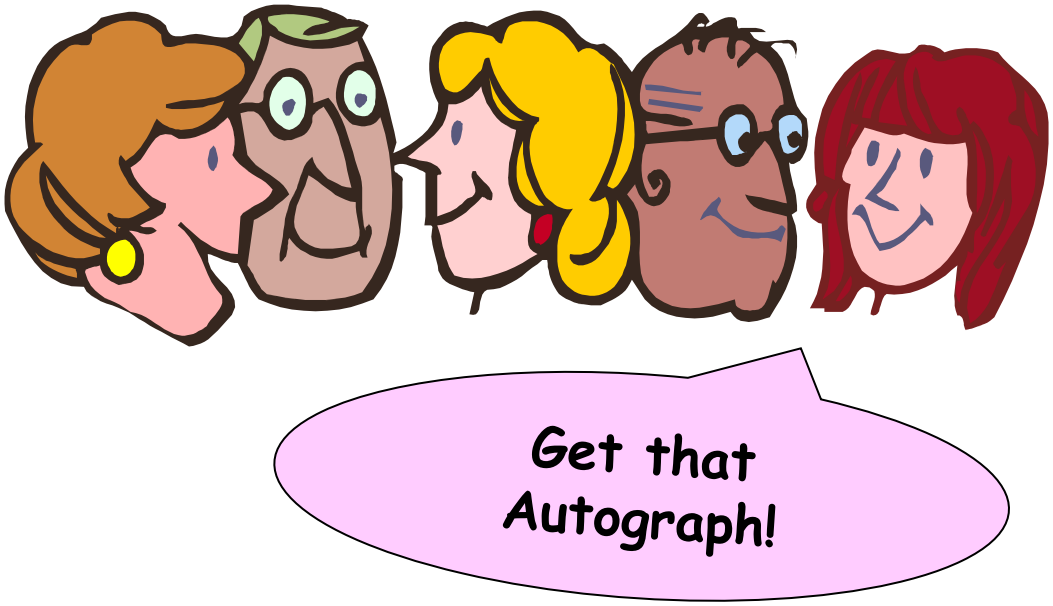
Welcome and Introductions



Workshop Goals

- Participants will review a process of developing math-enhanced research-based lessons
- Brainstorm mathematical enhancement strategies organized around SREB Power Standards
- Share what you've attempted and what works and what is still a mystery
- Investigate and brainstorm new strategies to support students' understanding
- Increase colleague base and network opportunities

PLAN for redelivery of strategies and lesson development with your colleagues… gather all day long!

Hmmm…

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Ground Rules

1. For a good time…participate.
2. Respect the mailman.
3. Really "work" the conversation!
4. Cell phones are turned off or on vibrate.
5. Biology breaks.
6. Lunch scoop
7. Math Anxiety is OK!

Help me thank Our hosts!

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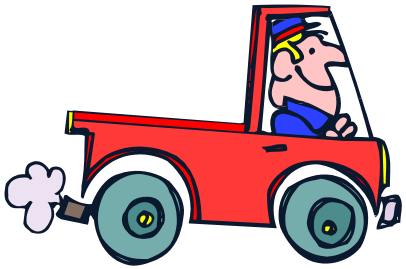
Facilitation Parking Lot

QUESTIONS

SUGGESTIONS

CONCERNS

FOLLOW-UP



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Essential Questions:

- Why is helping students understand math everyone's job?
- What does math look like in the non-math classroom?
- How do math and CTE teachers support student understanding of math?

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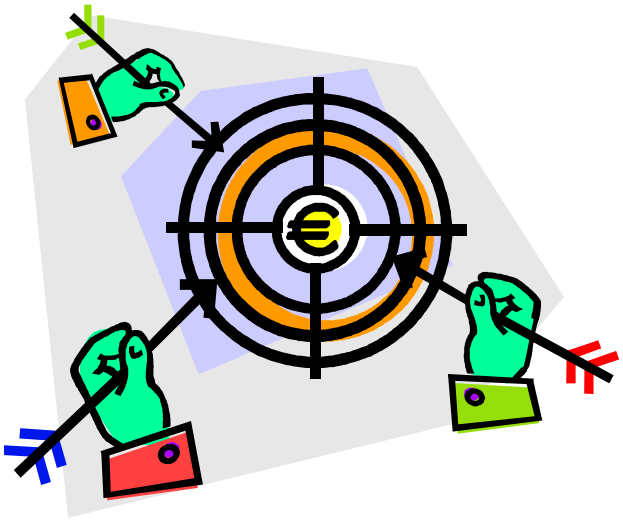
Why the need to focus on numeracy?

- The impact of technology on the workplace
- The need to be a knowledgeable consumer
- The need for an informed citizenry
- Advancements in scientific research



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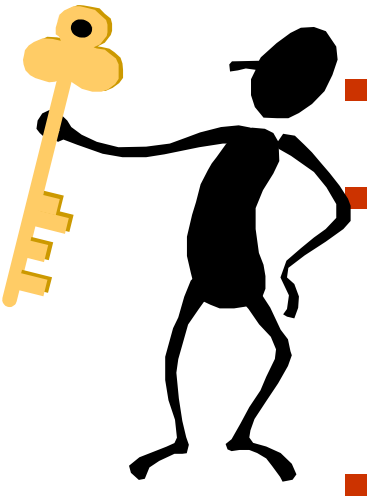
New Generation Workforce

10 *TCTW* Key Practices



- High Expectations
- Challenging Career/Technical Studies
- College-prep Curriculum
- Academic Core and a Concentration
- Work-based Learning
- Integration of Academic and Career/Technical Studies
- Active Engagement
- Guidance and Advisement
- Extra Help
- Data-based Decision Making

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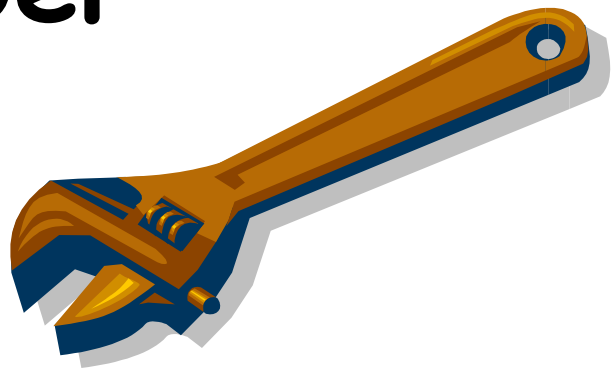
Team Member Roles



- Facilitator: keeps the work moving forward and on-track
- Recorder: captures all the groups' work in written form
- Reporter: verbally shares findings to larger group
- Timekeeper: alerts team to amount of time left when working
- Materials manager: gathers necessary materials for the group

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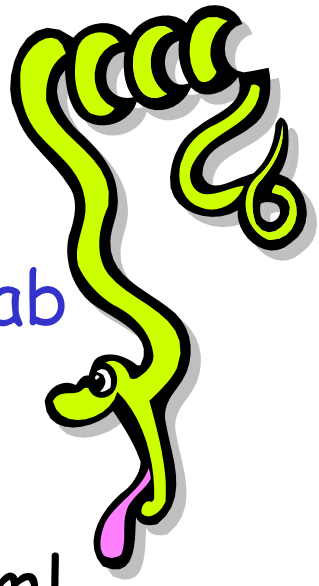
Animal Hospital!



- Your role is of an animal hospital lab technician
- Goal: Prep your animal for surgery and induce anesthesia—how many ml of the recommended solution is needed?
- Hmmmm…
- Will use Pentothal which comes in a powder form—want to use a 2-5 % solution (i.e. 20 mg/ml)
- Anesthetizing an animal demands 10-15 mg of Pentothal per kg of weight
- 1 lb = .45 kg

Warm up those Math minds!

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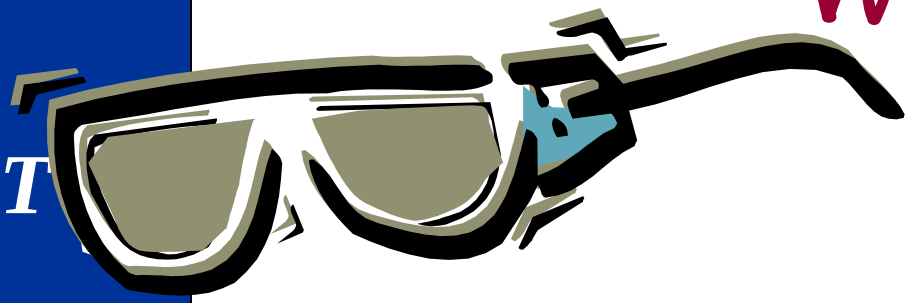

What do you wish to see?

* You hear that your leadership team is conducting walk-throughs to look for mathematics teaching

- Study the best practice lists on pages 3-4 of your planner
- On a provided note card, write four specific examples of what you want visitors to see!

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Goals from our October Session

- CTE Teachers *and* mathematics partners: create and teach five (5) math-enhanced lessons for CTE classroom
- Lessons criteria on page 40
- Make a presentation about your lessons
  - Tell us about the context of each
  - Tell us how your efforts impacted student understanding
  - Provide a copy of Cycle-of-Learning lesson plan for each
  - Bonus: math teachers keep track of contextual examples used…

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What's been cooking since October?

- Two minutes: personal reflection:---What was attempted? What helped students? What needs investigation?
- Two minutes: Organize by Cluster---look for table tents, math talents partner with someone from school
- Two minutes: Share among Cluster Colleagues (note guide page 5)
- Two minutes: Determine (1) a successful example (2) most mysterious

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14 minute break

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Numeracy Strategies by Power Indicators

Cluster Chatter: Share and post techniques, tools, example problems that work!

- Use page 6 to review the Power Indicators
- Talk with your Cluster Colleagues about things that have worked with your students….

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Students as Customers

Yeah Man

Reflect on our numeracy work based on students' interests, experience, environment & feedback

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Get into their heads…

1. "A number with three digits is always bigger than a number with two digits" (insist 3.24 is bigger than 4.6…why?)
2. " A fraction represents two numbers" (think of a fraction as two numbers, since they see two digits)
3. Which fraction is bigger: 1/3 or 1/6? Misunderstanding of denominator)

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Numeracy Strategies by Power Indicators

Cluster Chatter: Share and post techniques, tools, example problems that work!

- Use page 6 to review the Power Indicators
- Talk with your Cluster Colleagues about things that have worked with your students…
- Record personal favorites on page 7

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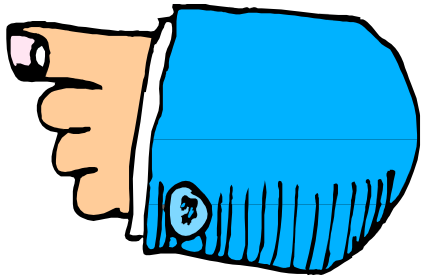
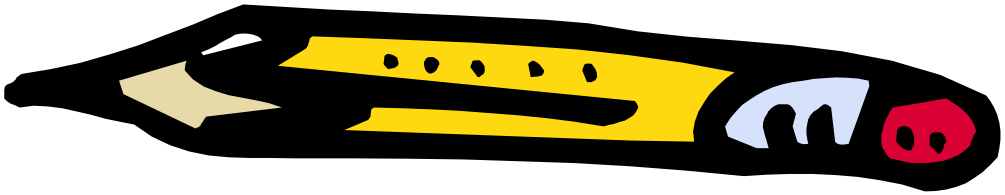
Moving among Representations



- Experience it: Using a provided newspaper, find an article or data that you can use to complete any of the "Rule of Four"
- Feel free to work with someone
- Bonus: You can also choose to represent the data in a picture…
- Be ready to share with the large group



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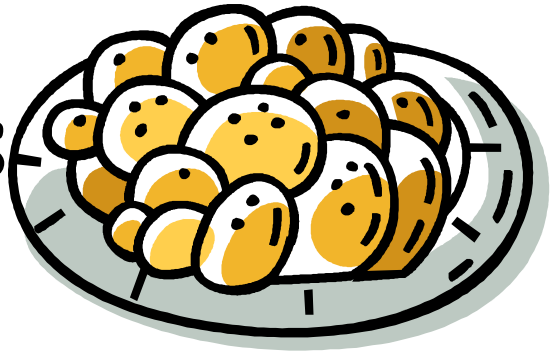
Collaborative Cookies



- As a school team, investigate the scenario of sharing a black-and-white cookie—a cookie with a circular top, covered on one half with chocolate icing and the other half with vanilla icing
- Four people wish to divide the cookie with the following stipulations:
  - Each person must get an equal share of the cookie
  - Each person's share must be half black and half white
  - Each person's share must be in one piece
  - No part of the cookie is allowed to be wasted
- Assume the cookie has a radius of one unit
- Use the provided "persistence pack" to record and share work…

Make cookie monster proud! ☺

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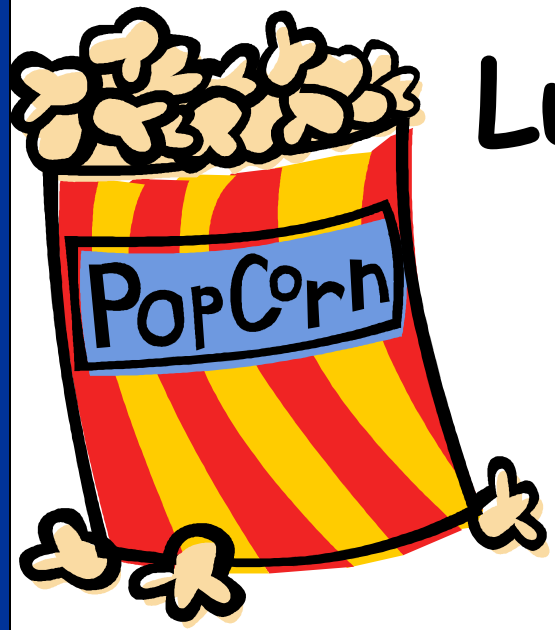

Lunch break

See you at 12:30 p.m.

ANY GUESSES: TOP FIVE WORDS OF 2009?

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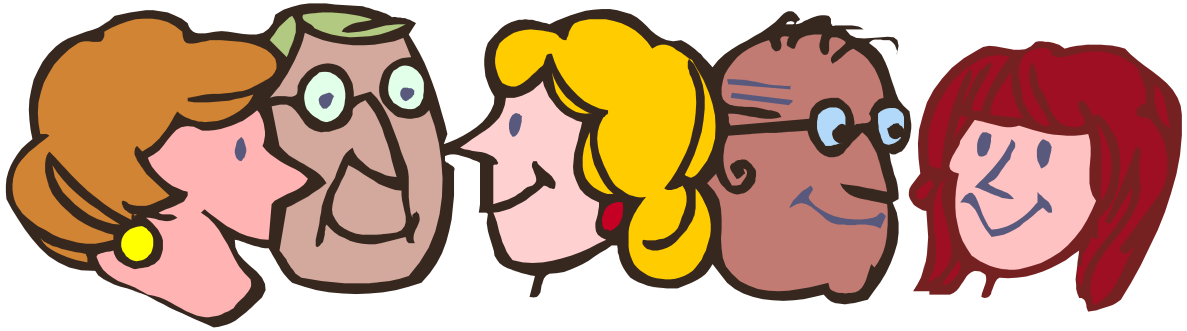


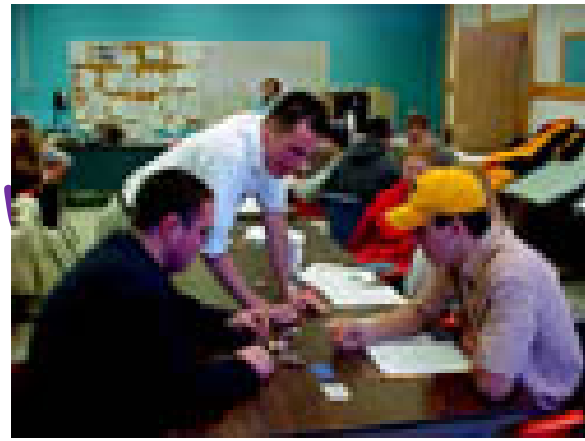
Developing Enhanced Lessons!

- School teams (CTE & Math) put your talents together
- Build "bridges" to enhance math
- Review the process, develop key enhancements, record work on chart paper and be ready to share…

Jot thoughts starting on pg. 8

Overview *Enhancement* Process

- The seven elements of a math-enhanced lesson on pages 28-29
- "Marriage" of the Cycle of Learning and the seven elements on page 30
- Most effective lessons include: authentic problems, varying levels questions, literacy strategies and bridging of vocabulary



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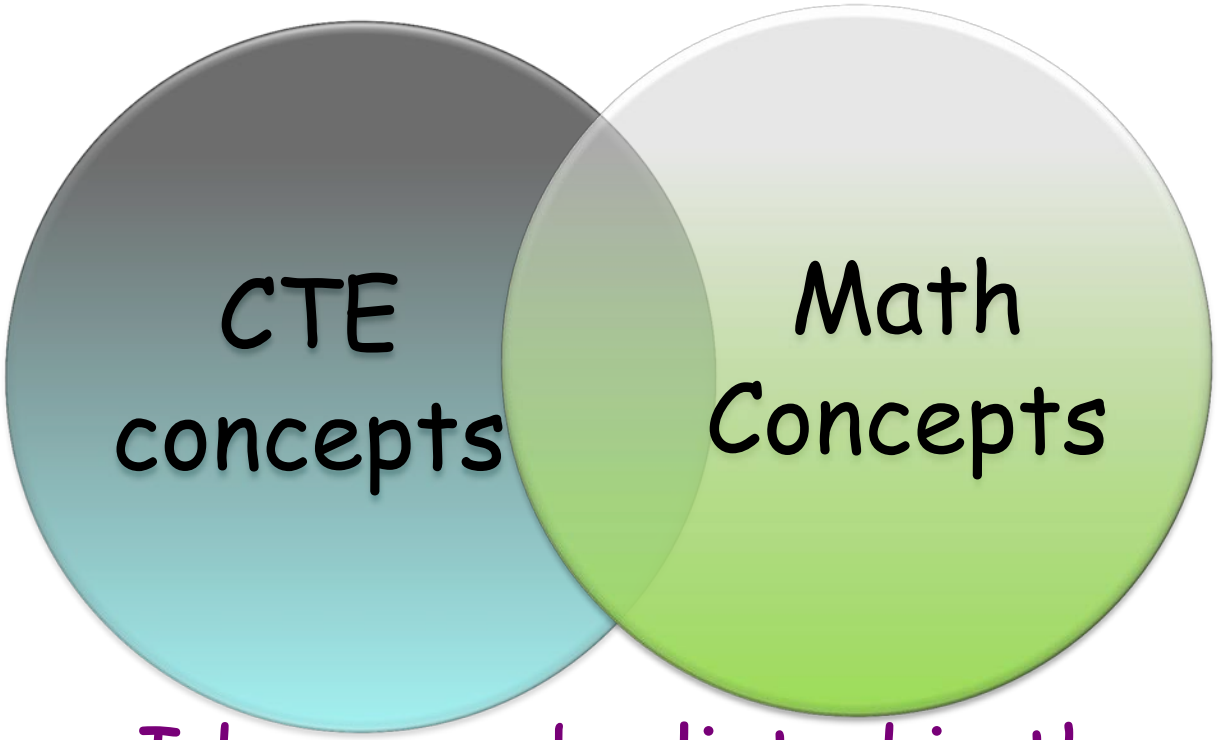
Use the Venn Diagrams to record ideas for connections



Ideas can be listed in the intersection on your diagrams ~ Build a different diagram for each power standard

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Bridging Tool: Authentic Scenarios/Problems

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What is a Scenario?

A real-life situation that engages learners in solving problems or performing tasks to demonstrate knowledge and skills in context

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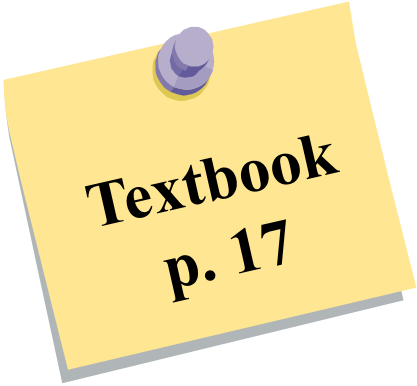
Authentic Problems- problems presented in context



Guidelines for Developing

1. Apply desired math content.
2. Use a non-contrived scenario.
3. Include real-world numbers with appropriate units of measure.
4. Remain faithful to the selected occupational area.
5. Include some extraneous data.
6. Avoid hand-holding or step-by-step guidance.

See Examples of non-authentic problems

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Bridging Tool:

Identify opportunities to bridge the language of mathematics to increase understanding

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Reinforce Numeracy through Literacy Strategies

- Identify literacy strategies that support priority readiness indicators
- Develop one graphic organizer (pgs. 13-14)
- Other example strategies in your planner, pages 15-16

Bridging Tool: Develop practice problems

Record on Page 17
Examples on Pages 18-21

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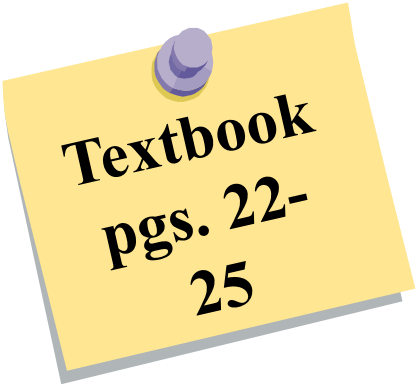
What does varying levels mean?



Getting to mastery at the proficient level is the key!

Basic

Proficient

Advanced

Stem Questions from Bloom's

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Build Bridges into daily lessons…

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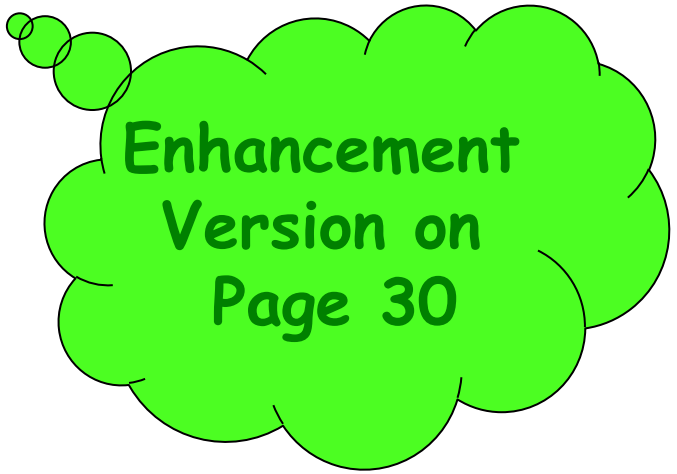
What is the Cycle of Learning?

- Get started
- Engage
- Explore
- Explain
- Practice together
- Practice in pairs
- Practice alone
- Evaluate
- Close



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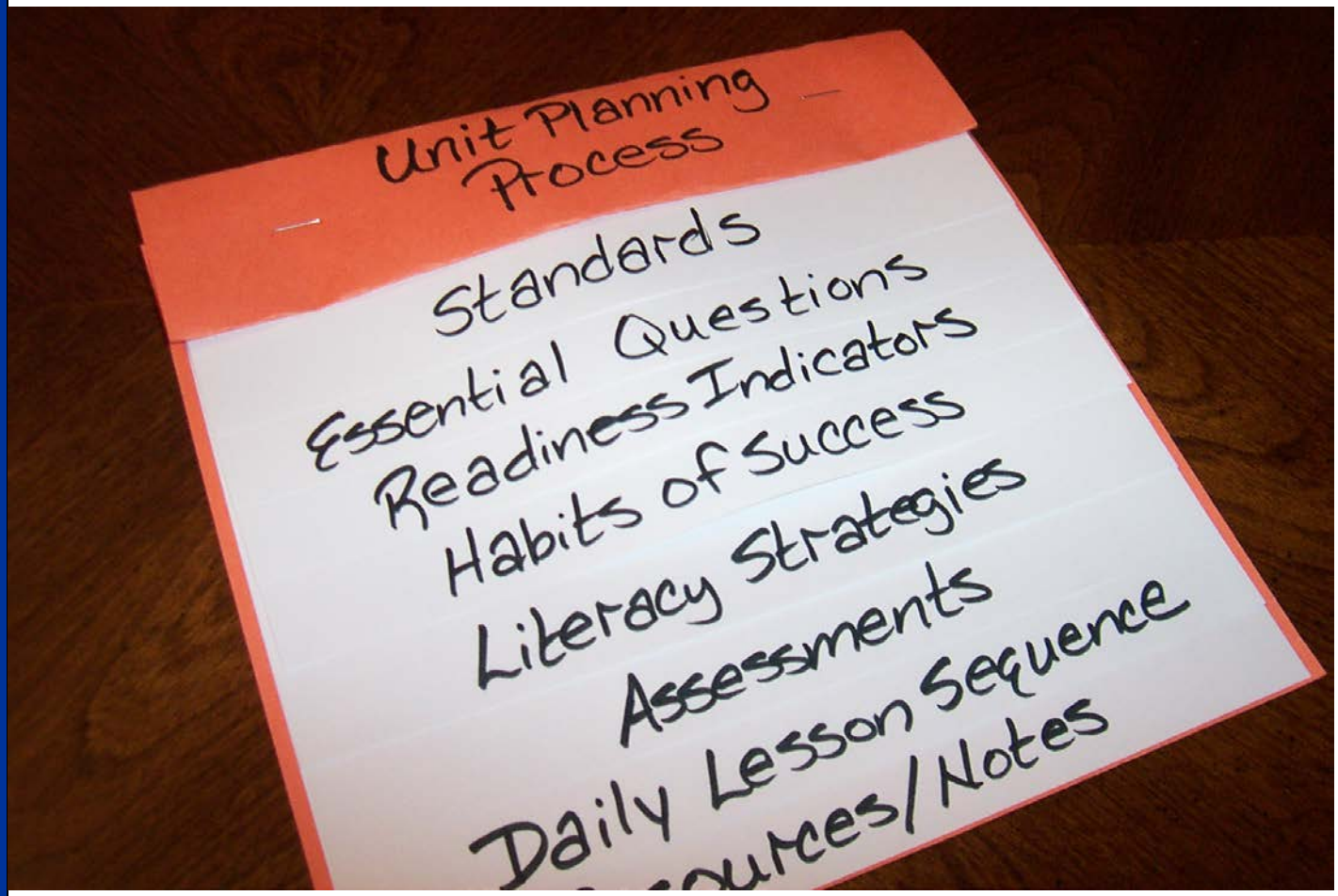

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Plan each day's lesson
Getting Started
Engage
Explore
Explain
Practice Together
Practice in Teams
Practice Alone
Evaluate Understanding (daily, weekly, post-assessment)
Close

All on one tab

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First: Getting Started

- Quick
- All students can be successful.
- Not new learning.
- Establishes routine.

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Second: Engage

- Introduces focus for the day
- Provides relevance for the lesson
- Provides motivation for learning

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Third: Explore

- Creates personal learning
- Sets the stage for content
- Allows for interaction
- Creates investment in content

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Fourth: Explain

- Multiple types
- Short bursts of new content
- Within context of exploration
- "Teacher talk"

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Fifth: Stages of Practice

- Practice together
- Practice in small groups
- Practice alone

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Sixth: Evaluation

- Formative assessment usually
- Indicates mastery or re-teaching
- Usually brief
- Often informal

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Seventh: Closing activities

- Bring closure to each class
- Enhance retention

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The Cycle can take more than one day!

- Sample two day cycle:

Day One	Day Two
Getting Started	Getting Started
Engage	Engage
Explore	Practice in teams
Explain	Practice alone
Practice together	Evaluate
Closure	Closure

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School Team Lesson Challenge!

As a school team….

- Prep time: 30 min.
- Prepare a CTE math-enhanced lesson
- Include all enhancements
- Record all work on flipchart paper for display
- Thank you!

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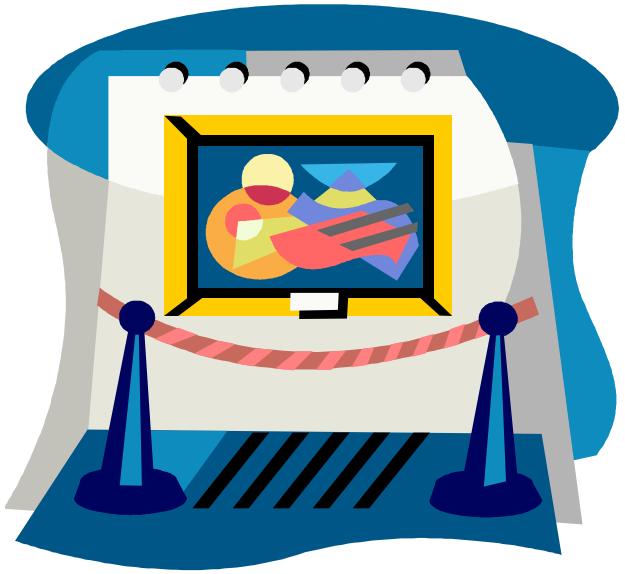
Structured Sharing: Peer Review

Gallery Walk the posted lessons to provide feedback

Use back of note card to make comments



Give a hand…all of them!

- Challenge: each table will "cash in" their hands:
  - Commendation for a team's efforts
  - Suggested addition to the enhancements.. Piggyback! ☺

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Keep the momentum!

Where do we go now?

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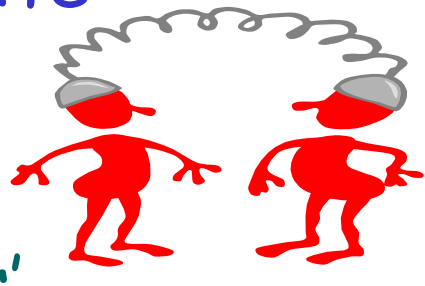
Things to consider when enhancing mathematics…

Have fun with dialoguing and write down mathematical thinking…



Consider math anxiety

Time to understand each others' curriculum

Developing vocabulary by using it!!

Growth and sharing in teaching strategies

Ask for support and for feedback!

Intentional and deliberate!

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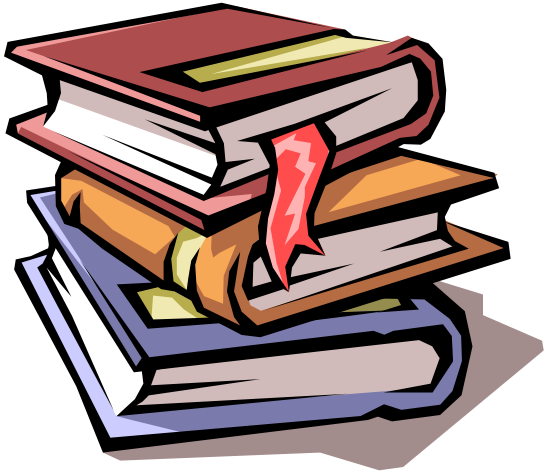
School Team Action Planning

- How do you plan to implement what you have learned when you return to school?
- What planning steps are you going to take?
- Identify strategies to model (page 31) and how you will redeliver the math-enhanced lesson process (page 31)
- Strategize about school-wide efforts (page 32) …ask Kathleen for Numeracy Actions



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Goals for our March Session

- CTE Teachers *and* mathematics partners: create and teach three math-enhanced lessons for CTE classroom
  - Be ready to share lesson specifics!
- Research and bring 1-2 numeracy enhancement strategies to add to our collection…
- Develop and bring a draft numeracy plan for feedback and idea sharing!

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Keep "super-sizing" that Numeracy!

Kathleen McNally

Kathleen.mcnally@sreb.org

See you in March!

Thank you for the awesome opportunities you provide across South Carolina!
Have a great holiday!

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A Good Scenario . . .

- Supports construction of knowledge
- Uses substantive content
- Integrates academic and technical knowledge
- Provides for elaborated communication
- Includes presentation to an audience beyond school

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Scenario Template

You are a (insert a real-world role). You are faced with (insert a problem). You must (insert what must be done to solve the problem). Once you have decided on a course of action, you will (insert an opportunity for presentation to an authentic audience).

Problem: Customer wants to modify vehicle. You're concerned it will affect its safety. The modifications will affect size, weight and maximum speed. You tell customer you'll research effects these changes will have on stopping distance and advise

TRADITIONAL

-Explain effects of weight & speed on braking distance
-How brakes function

CONTEXTUAL

-Students in a team form testable hypothesis based on math, physics, & auto technology