

The Business of Math Standards

**Construction Workforce Conference
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Renton Technical College**

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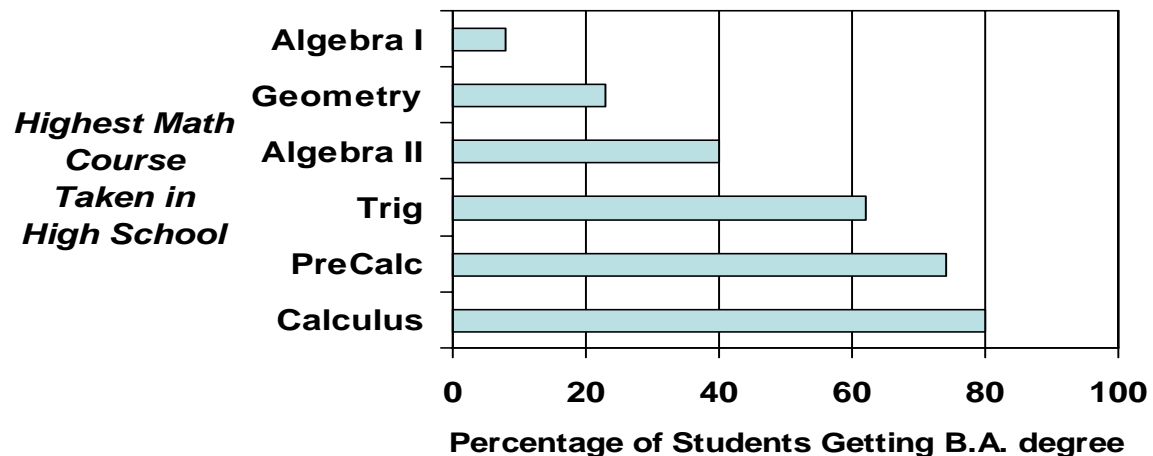
Major Driving Forces for Math Reform

- Concern about amount of pre-college math courses taken at Washington postsecondary institutions by recent HS graduates
- Interest in providing all high seniors with broader range of opportunities at graduation
- A function of Washington's Future

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Why Does Math Matter?

- **Math counts for college**



- **Math counts for careers**

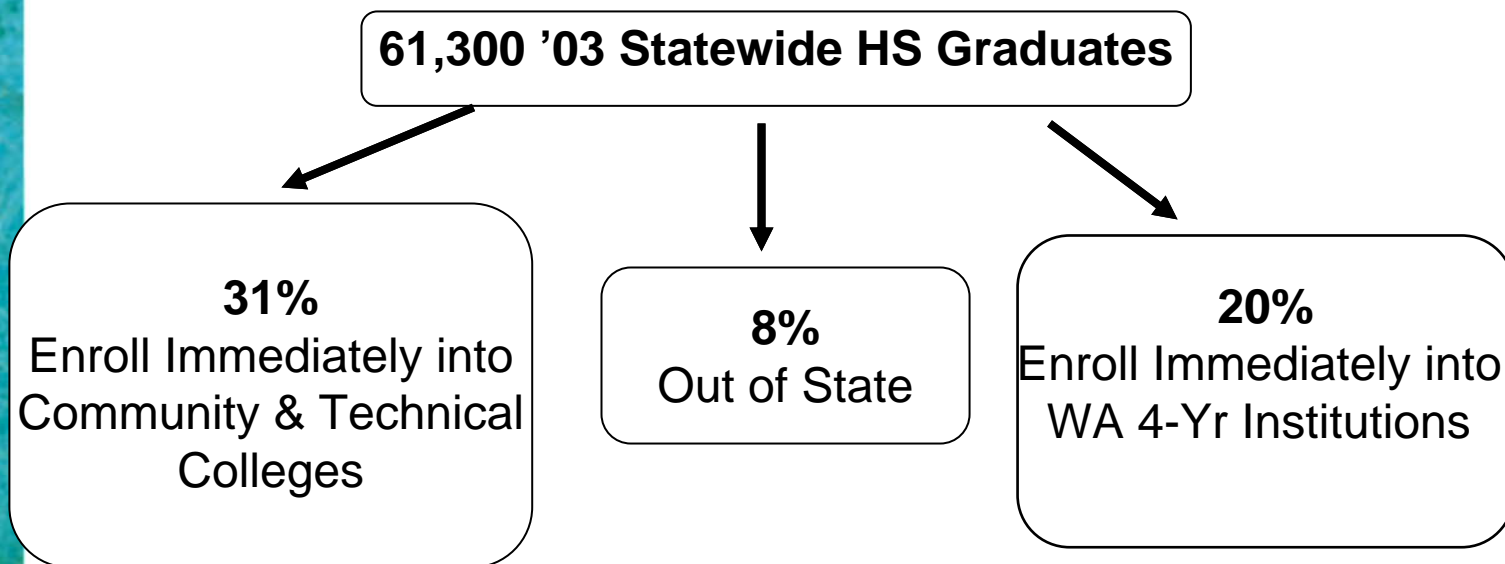
- Algebra II is the threshold math course for most workers in good jobs
- Math as a gatekeeper and source of economic empowerment

Source:
Adelman,
*Answers in
the Toolbox*,
1999

See *American
Diploma
Project* &
Carnevale &
Desrochers,
“Standards for
What?”,
ETS Report,
2003

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College-Going Pattern of High School Graduates



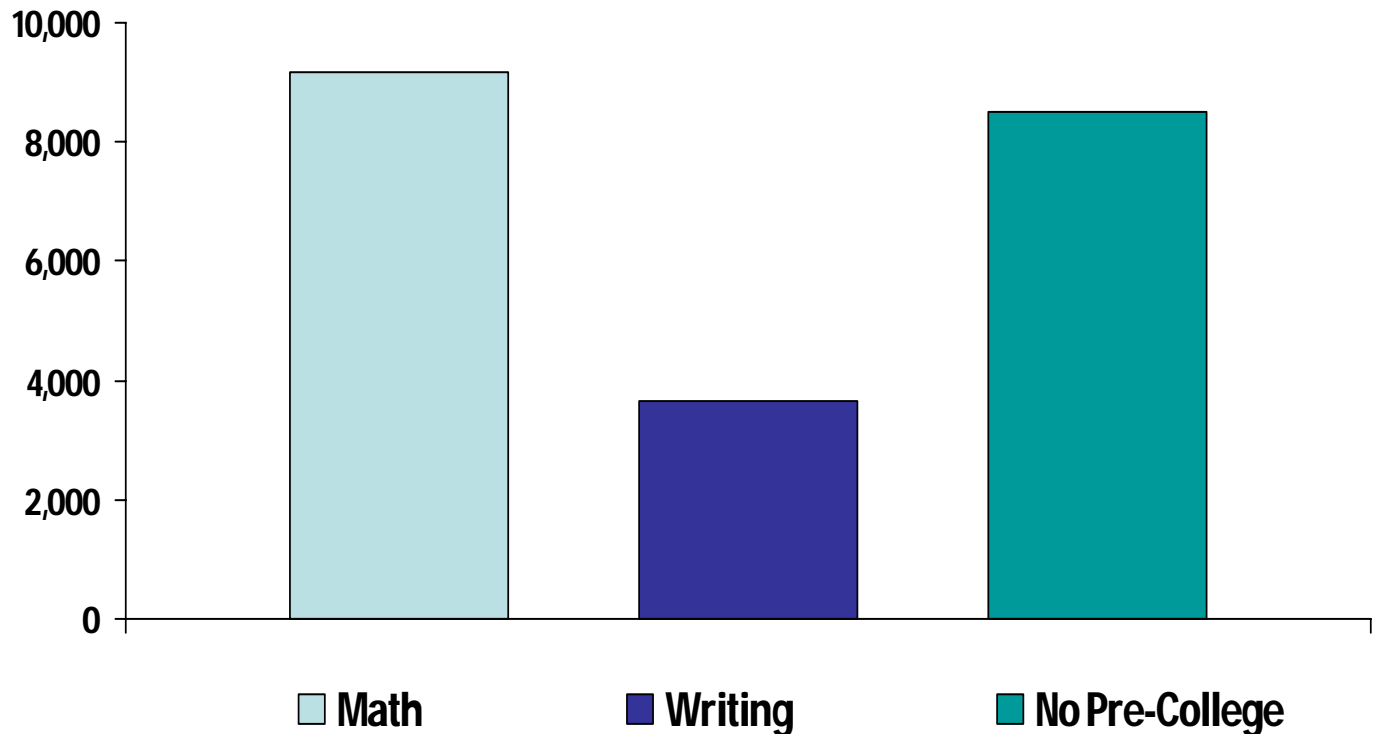
16% more attend community & technical colleges after a delay of 1 or more years

Source:
State Board for Community & Technical Colleges, Research Report 04-1, November 2004

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Pre-College Course-Taking By Area

Forty nine (49) percent of 2003 high school graduates who enrolled in two-year colleges needed a remedial math class



High School graduates, 2003-04, directly entering WA 2-year colleges

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Detail by District

Pre-College Enrollments at Washington's Community & Technical Colleges

- www.sbctc.ctc.edu/education/precollege.asp
(updated each fall)

Pre-College Enrollments at Washington's Public Baccalaureate Institutions

- www.sesrc.wsu.edu/remedial/

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What are the Critical Challenges / Obstacles to Math Reform in Your Local Area / Business Sector?

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Transition Math Project –

**A New Project in
Washington State
Designed to Ensure Successful
Math Transitions**

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What is TMP?

A new collaborative, public-private K-16 statewide initiative designed to help foster successful student transitions from high school to college and the workforce.

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Critical Features

- Built on and aligned with education reform efforts and existing work
- Developed through a collaborative, system-wide process of public engagement
- Focused from the beginning on implementing, not just defining, standards

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What has TMP Accomplished to Date?

Defined clear and consistent expectations (*must-have* competencies) for college readiness in math:

- College Readiness Expectations
- 11/12 GLEs (*draft*)

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College Readiness Standards

- Reasoning/
Problem-solving
- Communication
- Connections
- Number Sense
- Geometry
- Algebra
- Functions
- Probability/
Statistics

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Student Attributes

- Responsibility
- Persistence
- Intellectual Curiosity
- Attending to details
- Contributing to group problem-solving

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What has TMP Accomplished to Date?

Developed practical math-related messages and communications materials for students and parents

- *Why Math? Flier*
- *Got Math? Brochure*
 - TMP Website
- Broadcast and Narrowcast Outreach

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5 Demonstration Projects

- EWU – Spokane Community College – Spokane Falls Community College
- Big Bend Community College
- Columbia Basin College
- Olympic College
- Pierce County Career Consortium

www.transitionmathproject.org/demo_projects.asp

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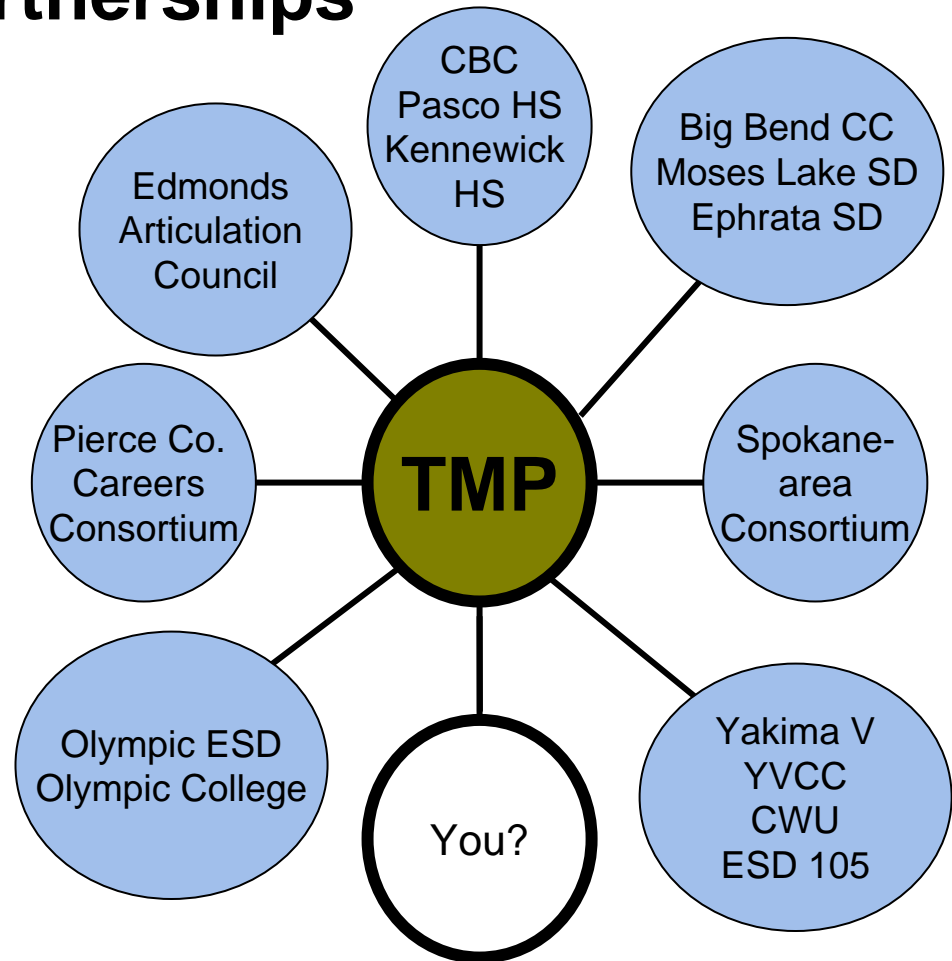
What's Next: Implementation

Core Parameters:

- Cross-sector partnership
- Faculty to faculty
- Address CR standards, GLEs
- Built on local needs, energy
- Connections, synergy

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Phase II Model: Possible Partnerships



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Next Steps for TMP

- Implement College Readiness Math Expectations across the state by supporting and extending additional local high school, college and business & labor partnerships
- Address math placement testing issues (alignment with standards, improved outreach)
- Demonstrate the impact of this work on student course-taking and performance in high school and college math courses

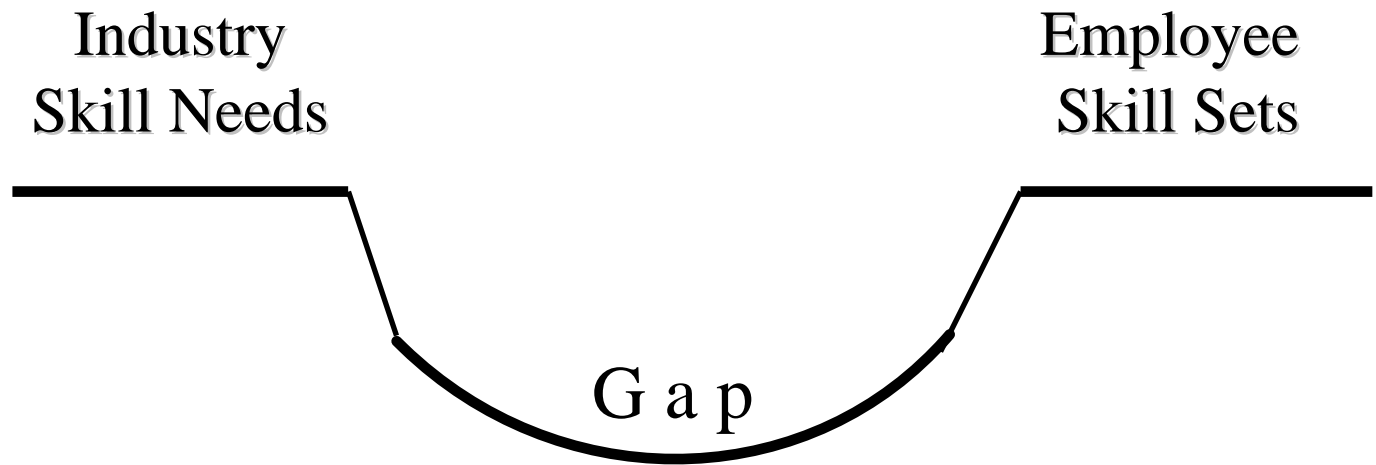
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The Role of Skill Standards

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SKILLS GAP Between

- what industry needs for productive employees
- how well prepared potential employees are



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Underlying Reasons for the Skills Gap

- New jobs--and whole new industries--are emerging
- Workers change jobs more often
- Work is more knowledge-based
- Labor markets are international
- Skill demands are escalating:
 - foundation skills
 - technical skills
- Changing demographics and labor pool
- Need for continuous learning—training and re-training

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What are Skill Standards?

- Skill Standards are agreed upon, industry-defined knowledge, skills and abilities required to succeed in the workplace.
- Skill Standards include criteria for what people must know and be able to do to be successful, including the level of performance required.

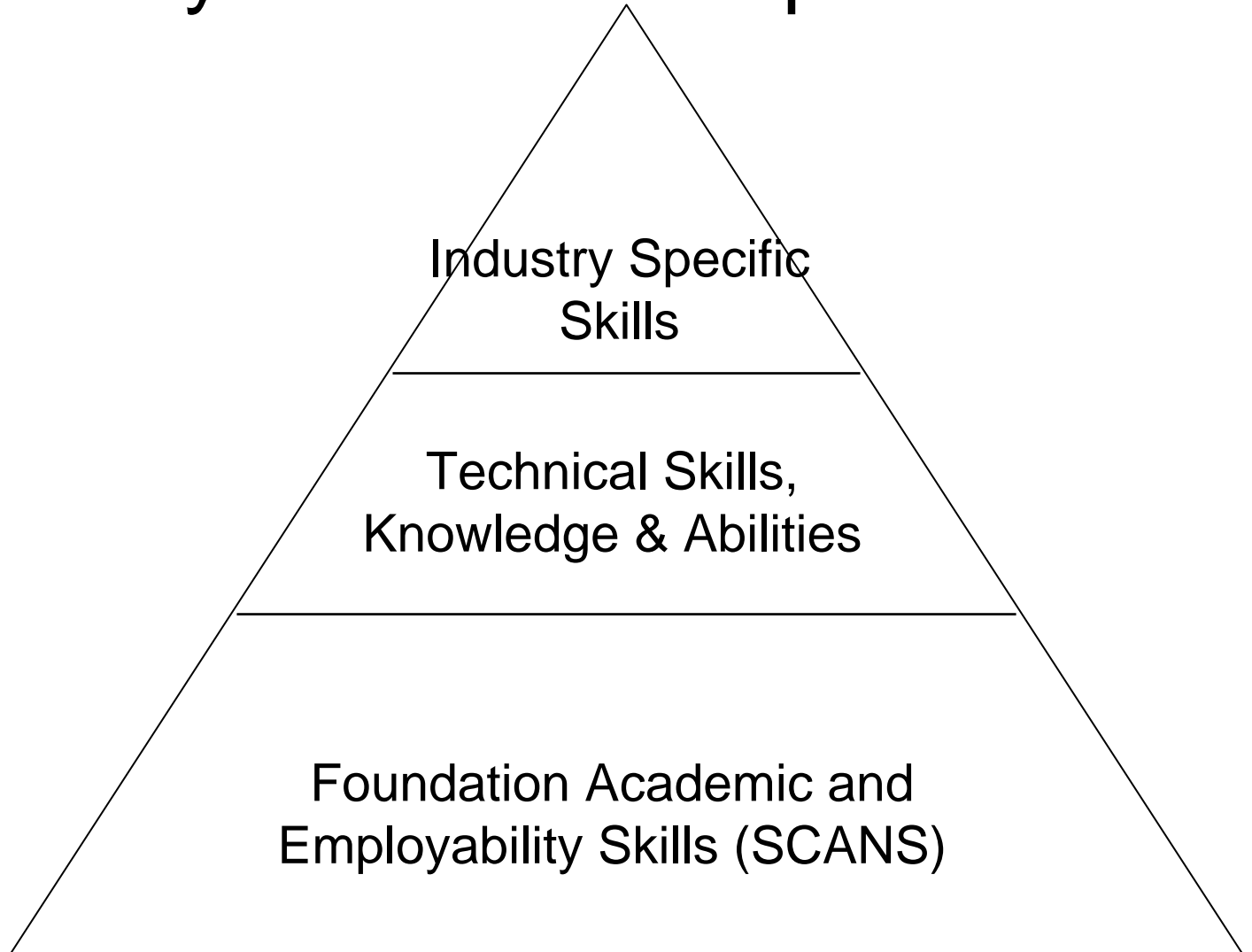
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Components of a Skill Standard

1. Critical work functions/key activities
2. Performance Indicators
3. Knowledge and Skills
 - Academic & Employability
 - Occupational/Technical
 - Industry Specific

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Pyramid of Competencies



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Skill Standards and Math

- Skill standards process uses a survey to gather leveling information on the 37 SCANS skills
- Math, Arithmetic, Reasoning, Critical Thinking, Problem Solving
- Math is in the foundational section of the Pyramid of Competencies

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Mathematics

- 1** Utilizes mathematical techniques / formulas / processes; Records results
- 2** Summarizes mathematical data; Translates mathematical data
- 3** Manipulates techniques / formulas / processes; Interprets mathematical data
- 4** Organizes mathematical data; Determines variables / constants
- 5** Creates new mathematical applications; Forecasts mathematical outcomes / events; Evaluates mathematical data / applications

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Problem Solving

- 1 Identifies the problem
- 2 Understands the complaint/discrepancy;
Appropriately refers complaint/ discrepancy
- 3 Examines information/data; Analyzes possible causes/reasons; Recommends action plan
- 4 Generates/evaluates solutions;
Devises/implements plan of action
- 5 Evaluates/adjusts plan of action; Judges effectiveness/efficiency of solution

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Creative Thinking

- 1** Makes connections between old and new; Recognizes patterns/relationships
- 2** Paraphrases / summarizes / generalizes existing ideas; Demonstrates creative thinking process while problem solving; Utilizes brainstorming techniques
- 3** Develops creative solutions; Applies creative solutions to new situations
- 4** Generates unique solutions; Formulates new ideas / plans / approaches; Organizes new processes/procedures
- 5** Judges / validates creativity; Actively pursues creative expression

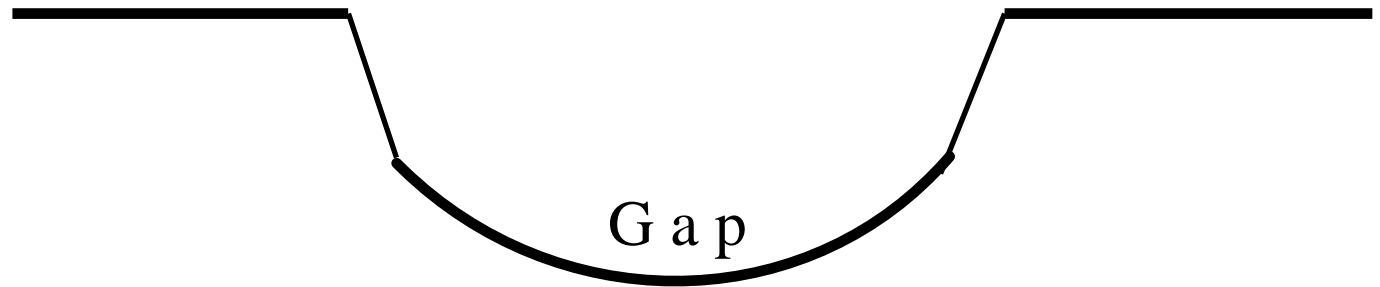
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EXPECTATIONS GAP Between

- What high schools expect
- What colleges and employers demand

High School
Expectations

Employee Skill Sets
College Readiness



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Skill Standards – TMP Standards

- Skill Standards model does not relate to math courses such as Geometry and Algebra
- Consistent feedback from workforce development experts that Algebra II is necessary for success in the workplace, but that is not enough
- TMP Standards fill the information gap

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Employment Needs of Washington's Economy

Study proposed by AWB-IWDES with research support from WSU-SESRC

Assess the foundational knowledge and skill requirements of future living wage jobs in the Washington State economy, and how those requirements relate to secondary school curriculum.

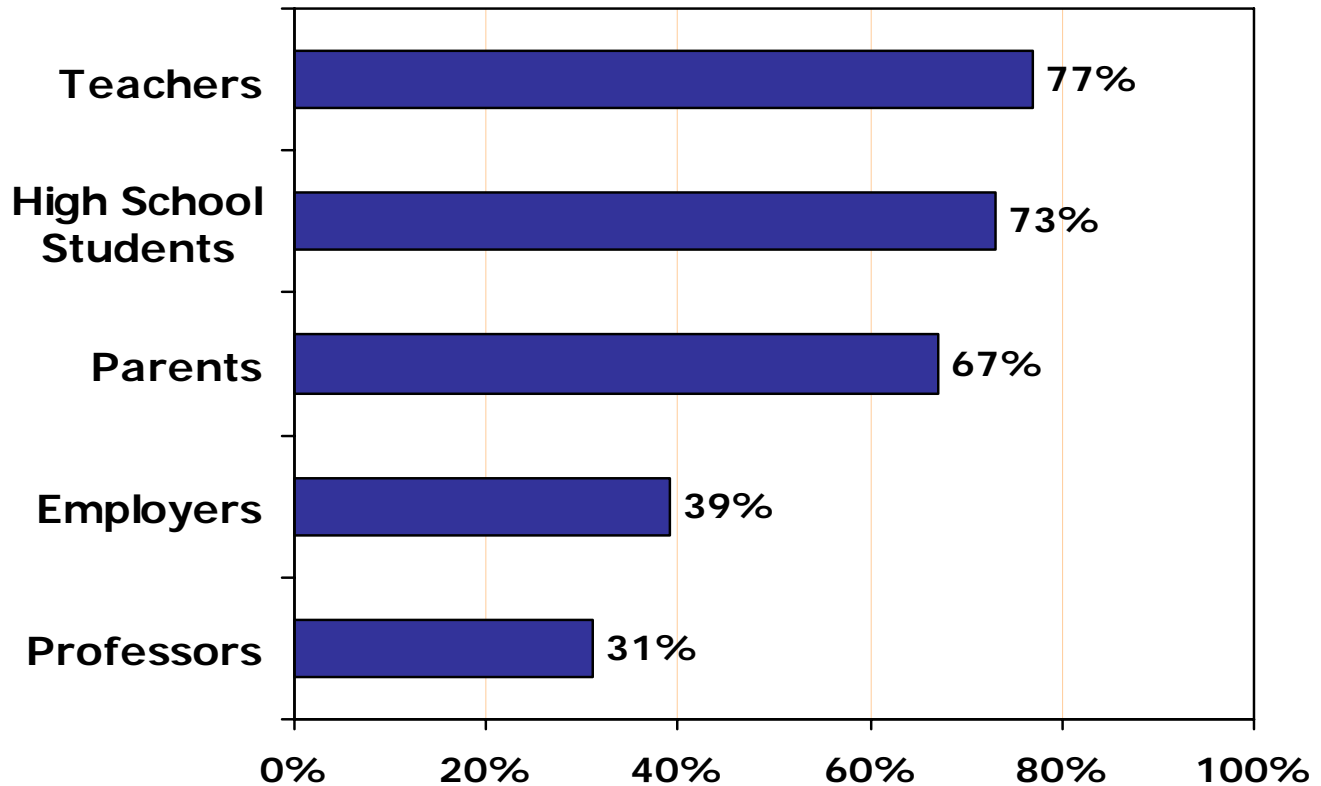
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Research Design Elements

- 11 Major Industry Sectors
- 25 Occupational Groups: Growth, living wage
- Telephone Interviews – 150
- Connecting and Translating Workplace Knowledge / Skills to High School Curriculum:
 - Reading
 - Writing
 - Math
 - Communications
 - Integrated Knowledge and Skill areas

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Big gap between what students, teachers *think is necessary* and what colleges and employers need



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Business Math Examples Process

- Select Clusters
- Identify 3-4 business / labor representatives from the cluster
- 3-4 business/labor representatives plus one math instructor meet together

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Business Math Examples Process

1. Identify real workplace activities
2. Identify tasks and skills required for those activities
3. Identify the sub-set of tasks and skills that require math / math thinking
4. Math instructor input re: how to create a word problem
5. Collaboration
6. Output: Rich math examples

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For More Information:

Interested in Participating In TMP?

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