

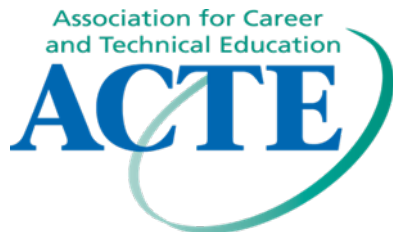


Welcome to the Math-in-CTE Video Series Webinar

- Thank you for joining us! We are waiting for all attendees to log in.
- This webinar is meant to be heard over your computer's speakers. Please check your volume. You will be muted.
- If you are not able to hear, close the Audio Broadcast window, then rejoin the Audio Broadcast by clicking this icon  on the Participant's panel on the right side of your screen.
- If that fails, ask to join the teleconference by clicking this icon  on the Participant's panel on the right side of your screen.
- Please use the Q&A to post questions to the panelists. The last portion of this event has been reserved for Q&A.



Welcome to the Math-in-CTE Video Series Webinar

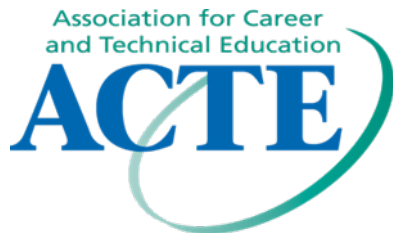
Our Hosts:



Donna Pearson,
Associate Director, NRCCTE
Co-PI, Math-in-CTE Study



Mary Fudge,
Lead Math-in-CTE Facilitator,
NRCCTE



THE MATH-IN-CTE MODEL

Donna Pearson, Associate Director, NRCCTE

Mary Fudge, Lead Math-in-CTE Facilitator, NRCCTE

What is the Math-in-CTE Model?

- Tested model of CTE-academic integration
- Rigorous, scientifically based research
- Conducted from 2003-2005
- 3,000+ students; 136 teachers
- Multiple CTE content areas
- Technical assistance since 2006
- See studies at: www.nrccte.org

What Makes the Model Work?

Core Principles of Integration

- A. Foster and sustain a community of practice
- B. Begin with the CTE curricula and not with the academic curricula
- C. Understand academic skills as essential to the workplace
- D. Maximize the academics in CTE curricula
- E. Recognize CTE teachers as teachers of “academics-in-CTE,” *NOT* as academic teachers

Math-in-CTE Process and Pedagogy

A Process of **Extended Professional Development**

- ❑ Summer PD (5 days) – **Curriculum mapping and lesson creation**
- ❑ Late fall PD (2-3 days) - Lesson creation
- ❑ Early Spring PD (2-3 days) – Lesson creation
- ❑ **CTE teachers partnered with math teachers**
- ❑ **On-going direct and indirect math support**

A Pedagogic Framework

The Seven Elements of a math-enhanced CTE lesson

The Math Teacher Partner

- Serves as a coach
- Helps identify the math that already exists in CTE curricula
- Explains math vocabulary
- Explains how to do math processes and procedures correctly

Benefits for Math Teachers

- Math teachers learn about application of math in the CTE classes
- Math teachers learn to use authentic applications in math classroom
- Math teachers learn to effectively explain the relevance of math in the world of work

Curriculum Mapping for Integration

- Genesis of integration
- A “process” of examining the CTE curriculum (CTE teachers and their math partners):

Where does the math naturally occur?

Where are the opportunities to enhance math?


- An ongoing process of the Community of Practice (not a one-time only event)

Teacher teams growing with the model

Revisiting/revising the maps

CURRICULUM MAPPING

CTE PROGRAM: HEALTH OCCUPATIONS

CTE UNIT/TOPIC	CTE CONCEPTS	MATH CONCEPTS	
Human Structure and Function	Cell, tissue, organ and body systems relationships	Solve linear equations Read and interpret graphs and charts Problem solving involving statistical data Ratio and Proportion	
Health Care and Delivery System	Vital signs; height and weight charts; intake and output; percent of burns; body planes; range of motion	Solving linear equations; reading and interpreting graphs and charts; problem solving involving statistical data; ratio and proportion	 <p>National Research Center for Career and Technical Education</p>

The Seven Elements Framework

1. Introduce the CTE lesson
2. Assess students' math awareness
3. Work through the ***embedded*** example
4. Work through ***related, contextual*** examples
5. Work through ***traditional math*** examples
6. Students demonstrate understanding
7. Formal assessment

Changing the Paradigm in Practice

Old Models

- A *box* of curriculum
- Short term “training”
- Little or no support after the “sage on the stage” goes away
- Replicable by individual teachers (assumed)

New Models

- Process not an event
- Communities of practice and teacher leadership
- On-going support of teacher development
- Teams of committed teachers working together over time

Math-in-CTE Video Series Webinar

Panelists from Arlington Public Schools (VA):



Jim Egenrieder,
STEM Education
Specialist,



Kris Martini,
Director of
Career,
Technical, and
Adult
Education, APS



Jeffrey Elkner,
Information and
Communication
Technology
Teacher

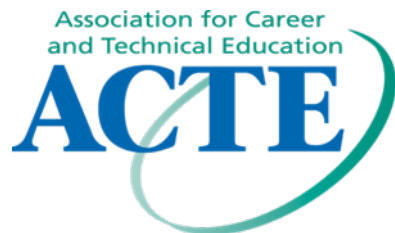


Isaac Zawolo,
Math Teacher,
HILT (High
Intensity
Language
Training)
Institute



J.C. Parry,
Aviation
Technology,
Engineering,
and Computer-
Aided Drafting
Teacher

Joshua Folb,
Math Teacher,
Arlington Public
Schools



Math-in-CTE in Northern Virginia

One-minute history

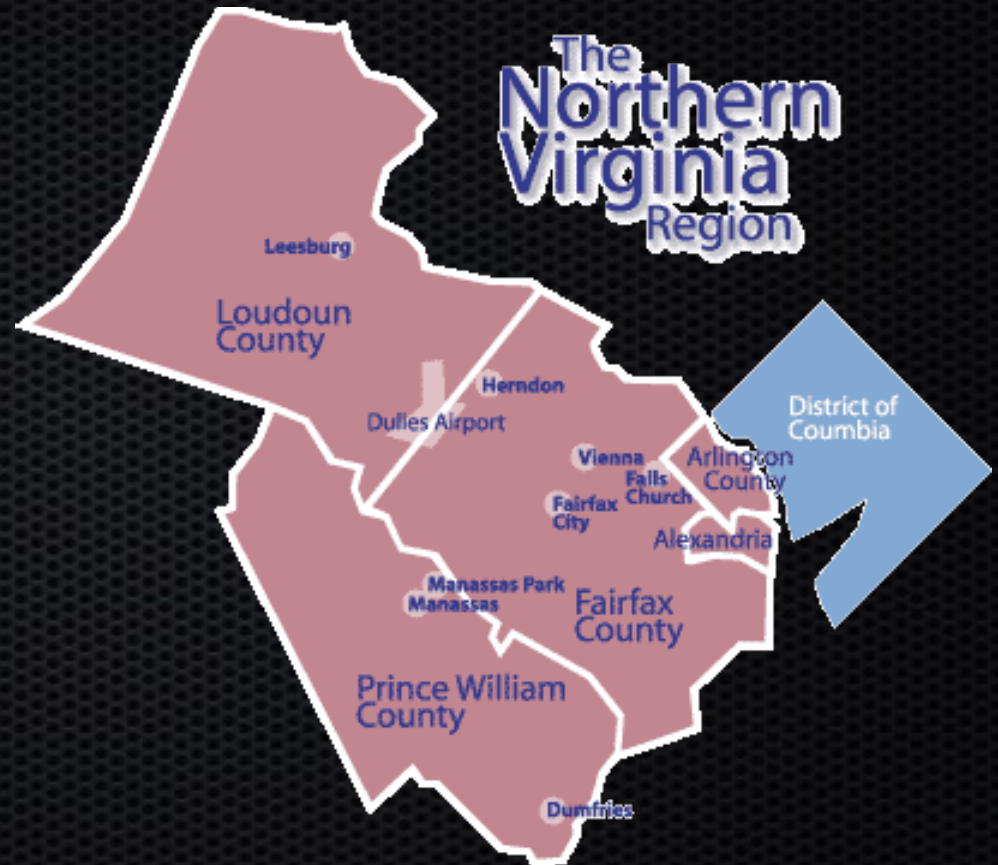
Strategies for smaller implementations

CTE Teacher Perspectives

Math Teacher Perspectives

Outcomes

goo.gl/4c7pG



Our Math-in-CTE Involvement

American Youth Policy Forum

Explorations in 2007-08 - Jumpstart

Implementation in Summer 2009

Outreach to Date:

- Automotive and IT in 2009-2010
- Engineering, Aviation, Architectural, Electricity in 2010-2011
- FACS, Technology Ed. in 2011-2012
- Business, additional FACS, and Culinary in 2012-2013



Arlington
Public
Schools
ARLINGTON, VA

CTE in Arlington Public Schools

A nighttime photograph of a city skyline with numerous lit-up buildings. In the foreground, a road curves through the scene, with long, bright orange and red light trails from moving vehicles, suggesting a long-exposure shot.

- 26 square miles
- 21, 872 students
- 3 high schools
- 5 middle schools
- 4 altern. programs
- shared technical center

CTE in Arlington Public Schools (cont.)

- 533 CTE Program Completers
- 279 (52%) Advanced Diplomas
- 217 (41%) Standard Diplomas



Our typical approach to a Math-in-CTE session:

8am - Gather in 223 (Career Center)

Set up technology, coffee, discussion.

8:30am – Updates, announcements, reintroductions, resources

9:00am - Reintroduce and review the processes

9:20am - Lesson rewrites and refinements as needed

11:00am - Lesson presentations and reflections

11:30am – Continued work with colleagues (and lunch)

1:00pm – Status Reports, Questions and Answers

1:30pm - Continue with lesson re-writes and refinements

3:00pm - Presentations

3:30pm - Adjourn and open lab (until 5pm)

Our Resources

Lessons previously submitted: [LINK](#)

Teaching Schedule:

Click this link to see the Calendar: [LINK](#)



Reporting: Use these reports to evaluate each lesson you teach (these are similar to the forms provided on your flash drive):

- [Pre-lesson report](#) (completed by Math teacher)
- [Post-lesson report](#): (completed by CTE teacher)

Preparing a new Math-in-CTE lesson?

Use this [Google Docs template](#).

Calendar of Continuing Professional Development

Session 1. August 22-25 (4 days)

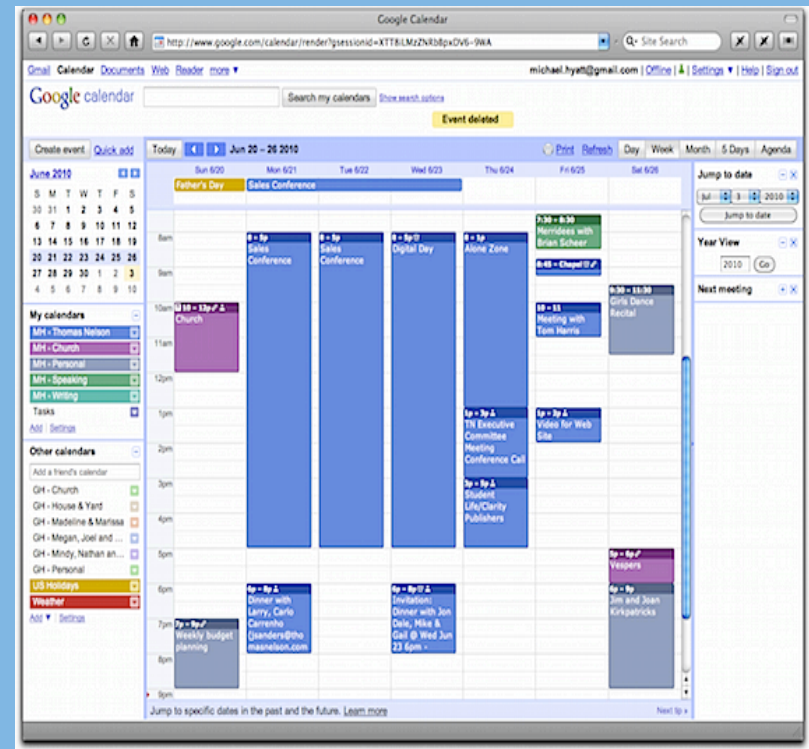
Session 2. October 20 (1 day)

Session 3. November 17 (1 day)

Session 4. January 19 (1 day)

Session 4. March 15 (1 day)

Wrap-up - June 2012 (1 day)



Review of Math-in-CTE Core Principles

1. Develop and sustain a community of practice.
2. Begin with the CTE curriculum, not with the math curriculum.
3. Address the math in CTE as an essential workplace skill.
4. Maximize the math in CTE curricula.
5. Support CTE teachers as “teachers of math-in-CTE,” not as math teachers.

7 Elements of Math Integration in CTE

1. Introduce the CTE lesson.
2. Assess students' math awareness as it relates to the CTE lesson.
3. Work through the math example embedded in the CTE lesson.
4. Work through related, contextual math-in-CTE examples.
5. Work through traditional math examples.
6. Students demonstrate their understanding.
7. Formal assessment.



and our Lesson Format: [Google Docs template](#)

Perspectives of CTE Teachers

Jeff Elkner

Computer Science and
Information Technology



J.C. Parry

Aviation
Architectural and
Engineering Drawing



Perspectives of Math Teachers



Isaac Zawolo



Outcomes

- **Participants**
- **Graduate credits**
- **Re-certification points**
- **Lessons**
- **Curriculum maps**
- **Community of practice**

Year	Participants by Subject	Participants by Academic Level	Lessons Published
2009 - 2010	Business and IT - 4 Automotive Tech.- 4 Math - 9	NOVA - 5 High School - 9 Middle School - 3	IT - 11 AT - 9
2010 - 2011	Health Sciences - 2 Engineering/Tech Ed - 3 Business and IT - 1 Math - 5	High School - 8 Middle School - 3	Health - 4 Engin. - 8 Bus. - 3
2011 - 2012	Business and IT - 2 Family/Consumer Sci. - 3 Engineering / Tech Ed. - 5 Math - 6	High School - 3 Middle School - 13	Bus. - 4 FACS - 4 Tech Ed - 5 (to date)
TOTAL	44 Participants (total) or 14 teams (34 unique)	NOVA - 5 High School - 17 Middle School - 6	48 (to date)

More information:

Isaac Zawolo - Isaac.Zawolo@apsva.us

JC Parry - JC.Parry@apsva.us

Jeff Elkner - Jeff@Elkner.net

Jim Egenrieder - Jim@STEMeducation.us

Kris Martini - kris.martini@apsva.us

These slides: goo.gl/4c7pG

Math-in-CTE Video Series Webinar

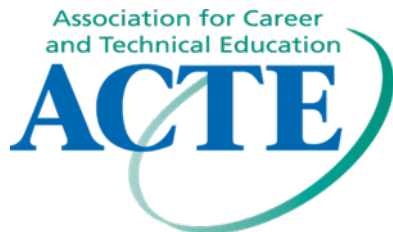
Panelists from Oregon:



Tom Thompson,
Educational Specialist, Industrial and
Engineering Systems,
Oregon Department of Education



Kristin Gunson,
CTE Regional Coordinator, Lane
Education Service District, Oregon

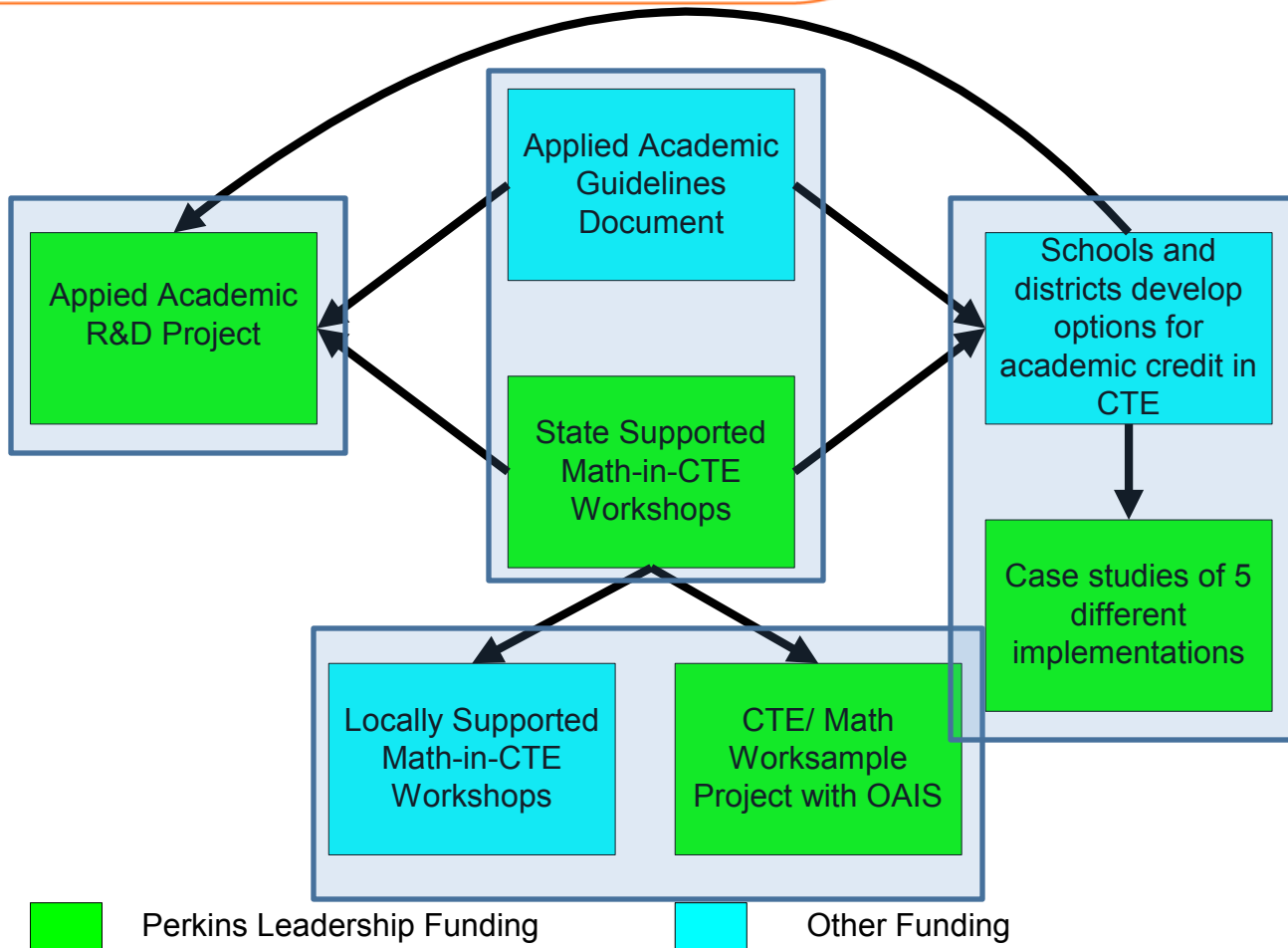


Math-in-CTE as Catalyst

Tom Thompson – Oregon Dept. of Education

Kristin Gunson – Lane Education Service District

Abbreviated History



Early Work

- Applied Academic Guidelines
 - Aligned with new diploma requirements
 - Provided a process
 - <http://www.ode.state.or.us/search/page/?id=1695>

Early Work

- Math-in-CTE workshops
 - Technical assistance from NRCCTE
 - Built regional and local partnerships
 - Established a cadre of trainers
 - Over 15 regional workshops to date

Expansion – Sharing Lessons

<http://www.clackamascareers.com/math/>

<http://www.ctemathlessons.com/>

Expansion – Providing Credit

- Salem-Keizer SD
- North Marion HS
- Mt. View HS
- Beaverton SD
- Case studies

Here's a sample project:

Engineering Math
NORTH MARION MANUFACTURING

Technician:

Math standards required to complete project: H.1A.2; H.2A.2; H.1G.4; H.1G.5; H.2G.1; H.2G.2; H.2G.3; H.3G.4
Oregon Skill Sets: MNZ01.01.01.01; MNZ01.01.03.01

Project #5: Designing the "Perfect Greenhouse".

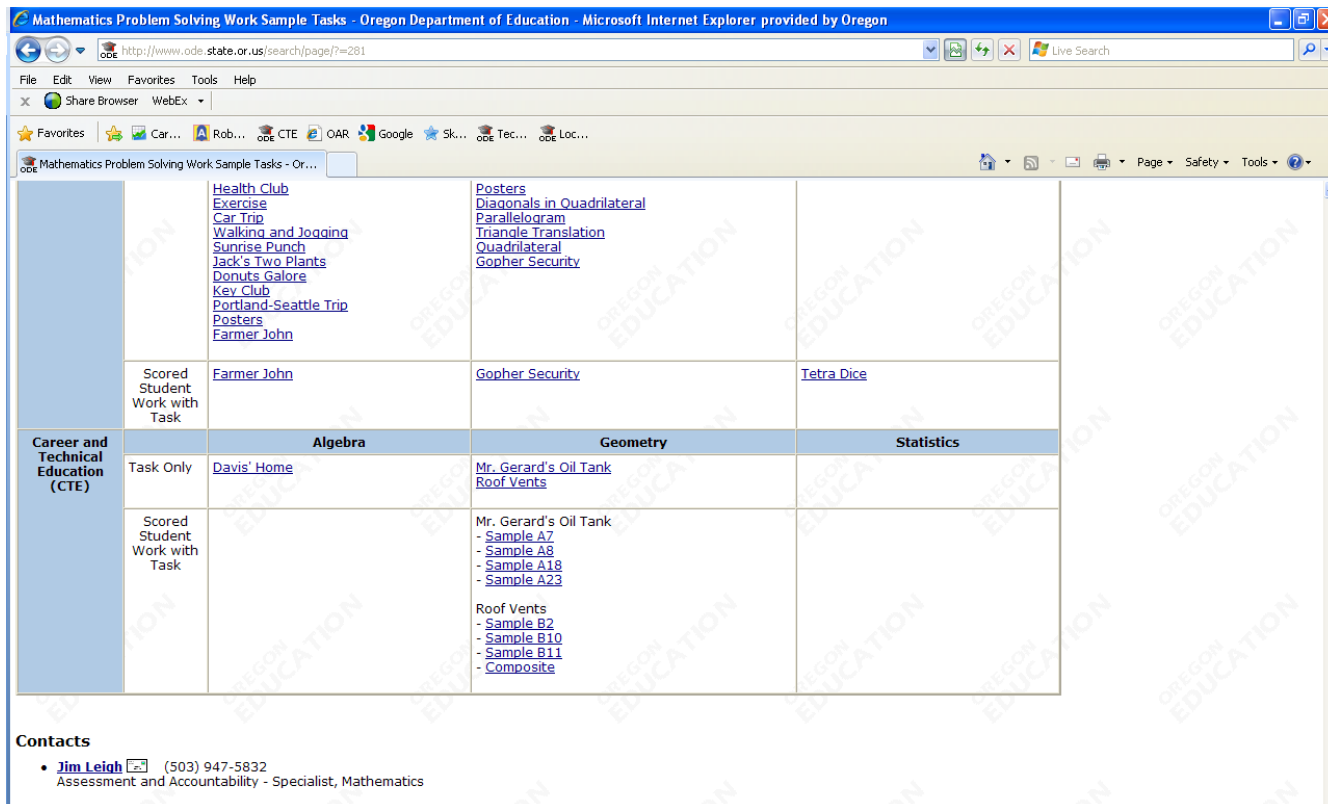
Introduction: You have a client that has recently learned that there is a "boatload" of money to be made by growing tomatoes and mushrooms simultaneously... in a greenhouse! The key is to design the perfect greenhouse to be able to meet the requirements necessary to make this happen. He has given you the following list of "rules". You make your money by designing a facility to meet these rules:

Expansion – Math Teachers

- Research and Development Project
 - Reverse the role of the partners
 - Develop a course that meets state requirements
 - Identify a process

Expansion – Statewide Assessment

<http://www.ode.state.or.us/search/page/?=281>



Mathematics Problem Solving Work Sample Tasks - Oregon Department of Education - Microsoft Internet Explorer provided by Oregon

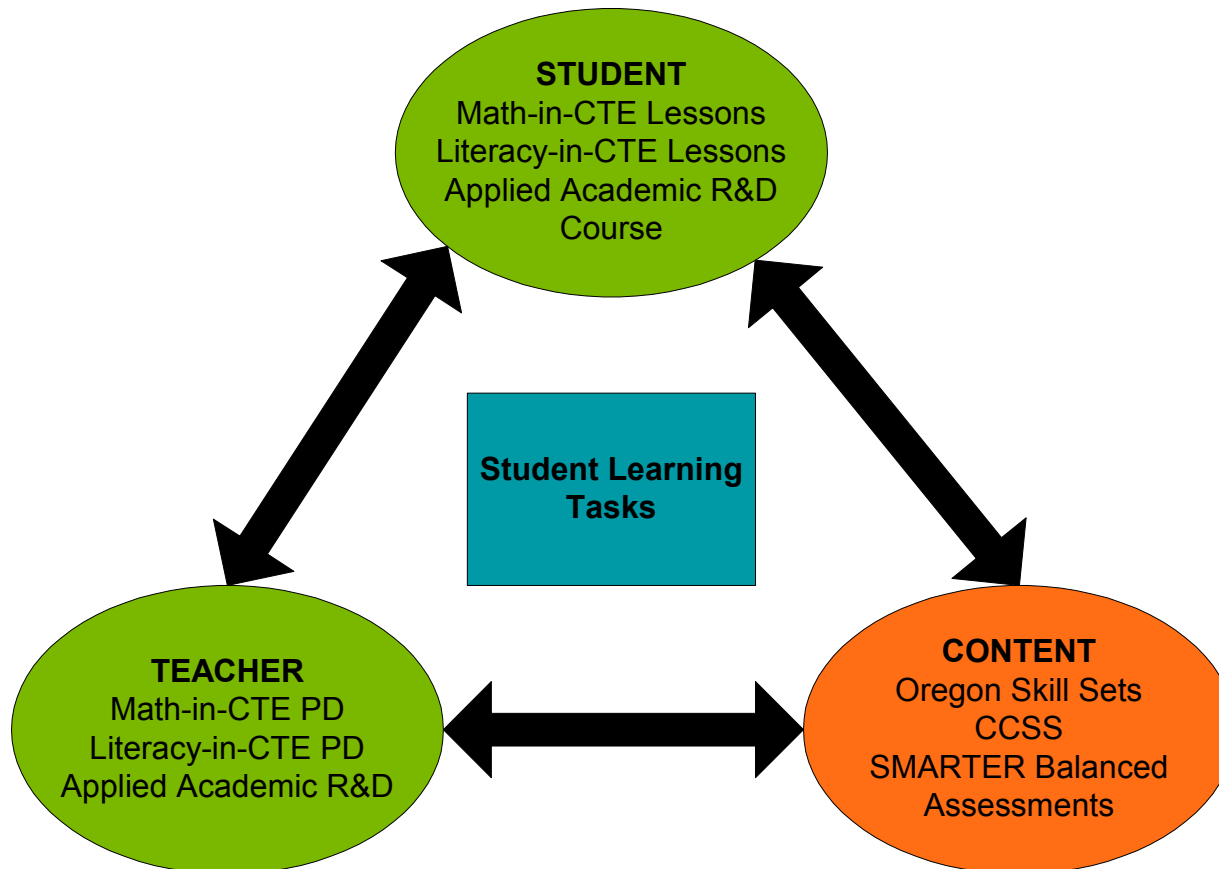
http://www.ode.state.or.us/search/page/?=281

	Health Club Exercise Car Trip Walking and Jogging Sunrise Punch Jack's Two Plants Donuts Galore Key Club Portland-Seattle Trip Posters Farmer John	Posters Diagonals in Quadrilateral Parallelogram Triangle Translation Quadrilateral Gopher Security	
Scored Student Work with Task	Farmer John	Gopher Security	Tetra Dice
Career and Technical Education (CTE)	Algebra	Geometry	Statistics
Task Only	Davis' Home	Mr. Gerard's Oil Tank Roof Vents	
Scored Student Work with Task		Mr. Gerard's Oil Tank - Sample A7 - Sample A8 - Sample A18 - Sample A23 Roof Vents - Sample B2 - Sample B10 - Sample B11 - Composite	

Contacts

- [Jim Leigh](#) (503) 947-5832
Assessment and Accountability - Specialist, Mathematics

Instructional Core



Links to CCSS

- Focus on assessment
 - Leverages work done in Math-in-CTE
 - Meets a district and state need
 - Alignment with Smarter Balanced Consortium
 - Community college grant

Thank you

Questions and Answers

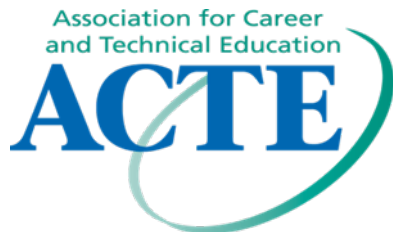
- Type your question in the text box at the bottom of your screen
- Click “Send” to *All Panelists*

A screenshot of a Q&A interface. The window title is "Q&A". Below the title bar, there is a tab labeled "All (0)". The main content area is empty. At the bottom, there is a section labeled "Ask:" with a dropdown menu currently set to "All Panelists". Below the dropdown is a text input field with the placeholder text "Select a participant in the ask menu first and type your question here. There is a 256 character limit." To the right of the text input field is a "Send" button.

Thank you for joining us!

To learn more about Math-in-CTE and watch the videos in this series, please visit us at www.nrccte.org.

Questions about this presentation or want to be notified when the archived webinar is ready?
Email us at nrccte@louisville.edu.



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