
COLORADO

Department of Education

# Teaching Math to English Learners (ELs)

## through the Colorado English Language Proficiency (CELP) Standards

**Rebekah Ottenbreit**
**Office of Culturally and Linguistically Diverse Education**

# Introductions


Raise your hand if you are:

- A math teacher
- Another content area teacher
- An elementary school classroom teacher
- A bilingual education classroom teacher
- An ESL teacher
- A coach
- An administrator
- Here as a co-teaching team
- Here as a school team

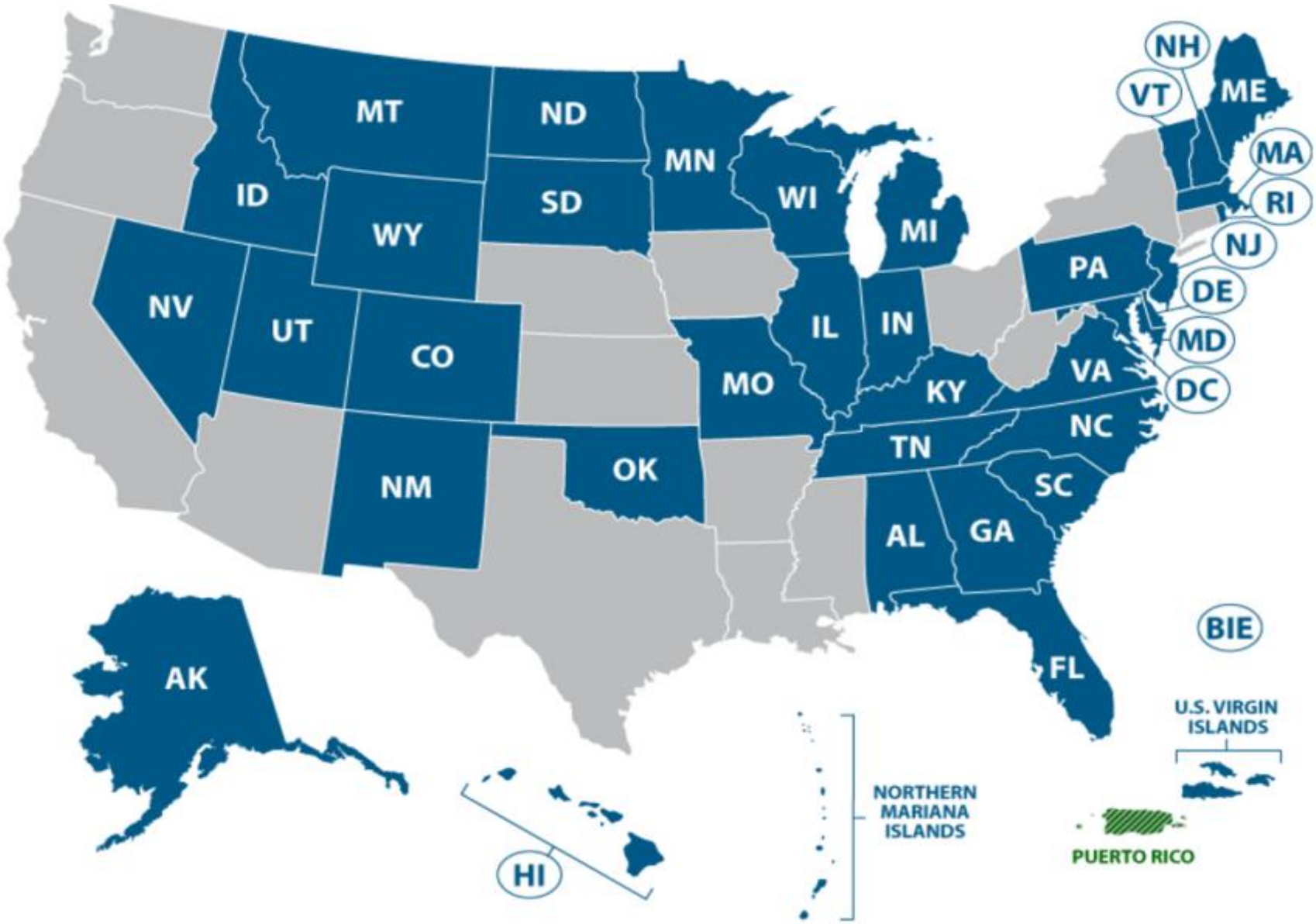
# Outcomes

- Build awareness of WIDA's Can Do Philosophy and the Guiding Principals of Language Development
- Learn strategies to teach the language of math in order to provide access to math content for English Learners and support academic language learning for all students
- *Pick at least one strategy to start using tomorrow*

# WIDA's Mission Statement


*To promote educational equity and academic achievement for linguistically and culturally diverse students through the development and dissemination of curricular, instructional, and assessment products and resources.*

# WIDA Consortium States



# Can Do Philosophy

| WIDA Believes in Language Learners' Assets, Contributions, and Potential | | |
|---|---|---|
| **Assets** | **Contributions** | **Potential** |
| **Linguistic** | Knowledge of multiple languages, varying representation of ideas, metalinguistic and metacognitive awareness, diverse strategies for language learning | Bi- or multilingual practices, abilities which learners utilize to communicate effectively across multiple contexts, multiple ways of expressing their thinking |
| **Cultural** | Different perspectives, practices, beliefs, social norms, ways of thinking | Bi- or multicultural practices as well as unique and varied perspectives, ability to develop relationships in a global society, ability to navigate a variety of sociocultural contexts |
| **Experiential** | Varied life and educational experiences, exposure to unique topics, diverse approaches to learning and expressing content knowledge | Enrichment of the school curriculum, extracurricular, and community opportunities, success in school and beyond |
| **Social and Emotional** | Personal interests and needs, awareness of/empathy for diverse experiences, knowledge and enrichment of community resources | Ability to form and sustain positive relationships, and broker meaningful interactions among peers and others within and beyond school |

WIDA™

## The Cornerstone of WIDA's Standards: Guiding Principles of Language Development

1. Students' languages and cultures are valuable resources to be tapped and incorporated into schooling.

   Escamilla & Hopewell (2010); Goldenberg & Coleman (2010); Garcia (2005); Freeman, Freeman, & Mercuri (2002); González, Moll, & Amanti (2005); Scarcella (1990)

2. Students' home, school, and community experiences influence their language development.

   Nieto (2008); Payne (2003); Collier (1995); California State Department of Education (1986)

3. Students draw on their metacognitive, metalinguistic, and metacultural awareness to develop proficiency in additional languages.

   Cloud, Genesee, & Hamayan (2009); Bialystok (2007); Chamot & O'Malley (1994); Bialystok (1991); Cummins (1978)

# Student Portrait

# Example Student Portrait

WIDA CONSORTIUM

## Gustavo

In his classes, he likes to work in small groups. He said he likes to learn from his peers.

5th Grade Student who immigrated to the United States when he was in 2nd grade from Mexico.

He is outgoing and makes friends easily. He has many friends and enjoys spending time in afterschool sports and clubs.

Gustavo speaks Spanish at home.

Gustavo is often very excited to participate in class. He benefits from emphasis on taking time to think about his responses.

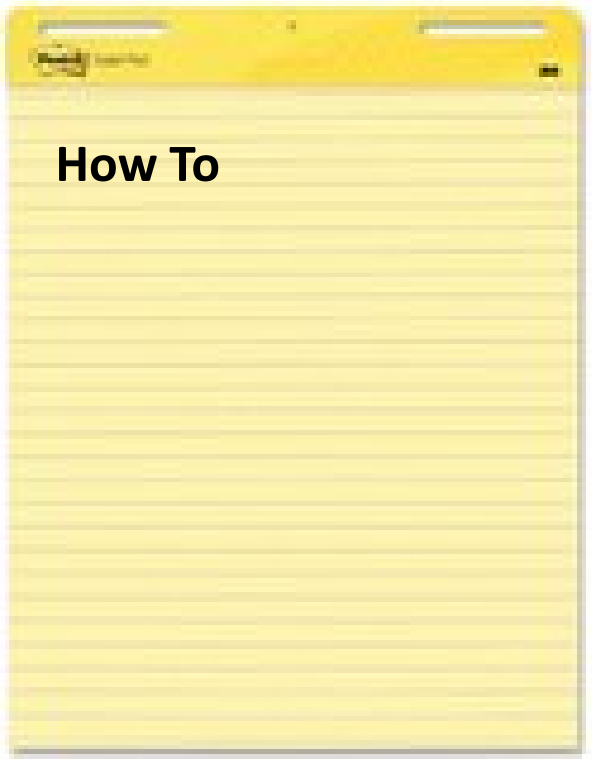
ACCESS Scores
Listening: 5.0
Speaking: 5.1
Reading 3.4
Writing: 3.1

Gustavo can write simple stories and likes to write fiction.

He prefers to read books about sports or animals.

# How to Gather a Student Portrait

- Brainstorm how to gather a student portrait
- Put your ideas on chart paper



# Math in a Cultural Context

**Current Projects:** *Measuring Proportionally: Elders' Wisdom applied to Teaching and Learning Math* and *The Potential Contribution of Indigenous Knowledge to Teaching and Learning Mathematics*

Jerry Lipka, PI: jmlipka@alaska.edu | Amy Topkok, Project Coordinator: aktopkok@alaska.edu | University of Alaska Fairbanks | School of Education

- Long-term and on-going set of interrelated federally funded projects
- Collaboration between Yup'ik elders, teachers, and Alaskan school districts to develop culturally based curricular materials
- Published 10 supplemental math modules from 2nd-7th grds, to date
- Math in a Cultural Context students repeatedly outperform comparable control group students being taught with the regular math curriculum

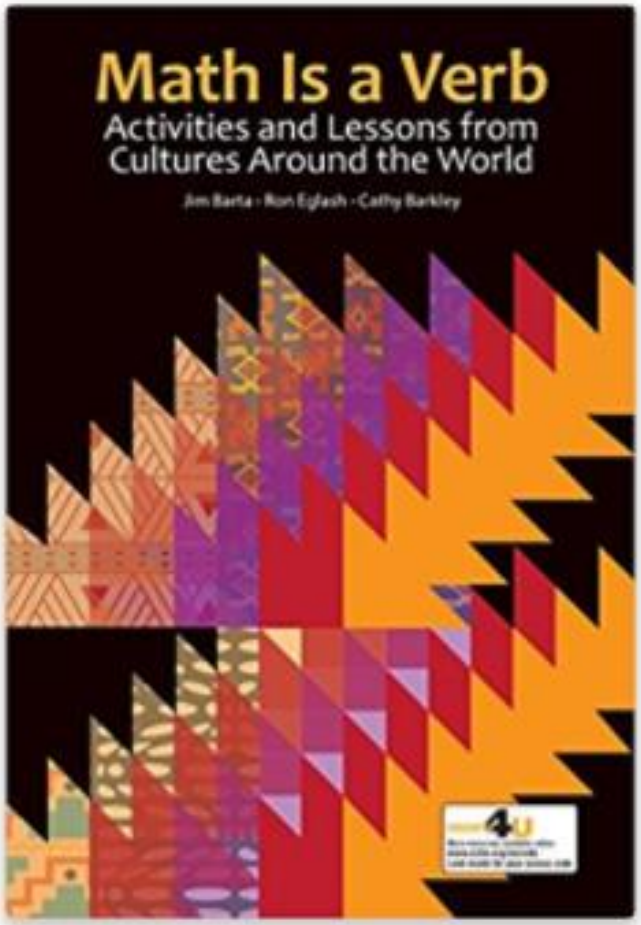
http://www.uaf.edu/mcc/

# Culturally Relevant Pedagogy in Mathematics


https://www.youtube.com/watch?v=EjLOuUhN6xY

# Math is a Verb

- In a Mayan village in Guatemala, students use math as a means to increase the traditional corn harvest
- Traditional symbols stamped on cloth in Ghana spark an exploration of geometry, measurement, and data analysis
- Embroidery patterns from Bulgaria can help younger students learn about patterns, and introduce older students to fractal geometry
- Klappenspiel, a popular classroom game in Germany, provides a fun application of probability analysis



# The Features of Academic Language in WIDA's Standards

The Features of Academic Language operate within sociocultural contexts for language use.

| | Performance Criteria | Features |
|---|---|---|
| **Discourse Level** | **Linguistic Complexity** *(Quantity and variety of oral and written text)* | Amount of speech/written text<br>Structure of speech/written text<br>Density of speech/written text<br>Organization and cohesion of ideas<br>Variety of sentence types |
| **Sentence Level** | **Language Forms and Conventions** *(Types, array, and use of language structures)* | Types and variety of grammatical structures<br>Conventions, mechanics, and fluency<br>Match of language forms to purpose/perspective |
| **Word/Phrase Level** | **Vocabulary Usage** *(Specificity of word or phrase choice)* | General, specific, and technical language<br>Multiple meanings of words and phrases<br>Formulaic and idiomatic expressions<br>Nuances and shades of meaning<br>Collocations |

The sociocultural contexts for language use involve the interaction between the student and the language environment, encompassing the…

- Register
- Genre/Text type
- Topic
- Task/Situation
- Participants' identities and social roles

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# Sociocultural context

Language…

- does not exist in a vacuum
- is closely linked to culture
- involves the interaction between the student and the learning environment

## Topic

Content related subject

## Genre/ Text Type

Use of language, 'packaging'

## Task/ Situation

How students will work

## Register

Formality of language

## Participants' Identities & Social Roles

Type of interaction

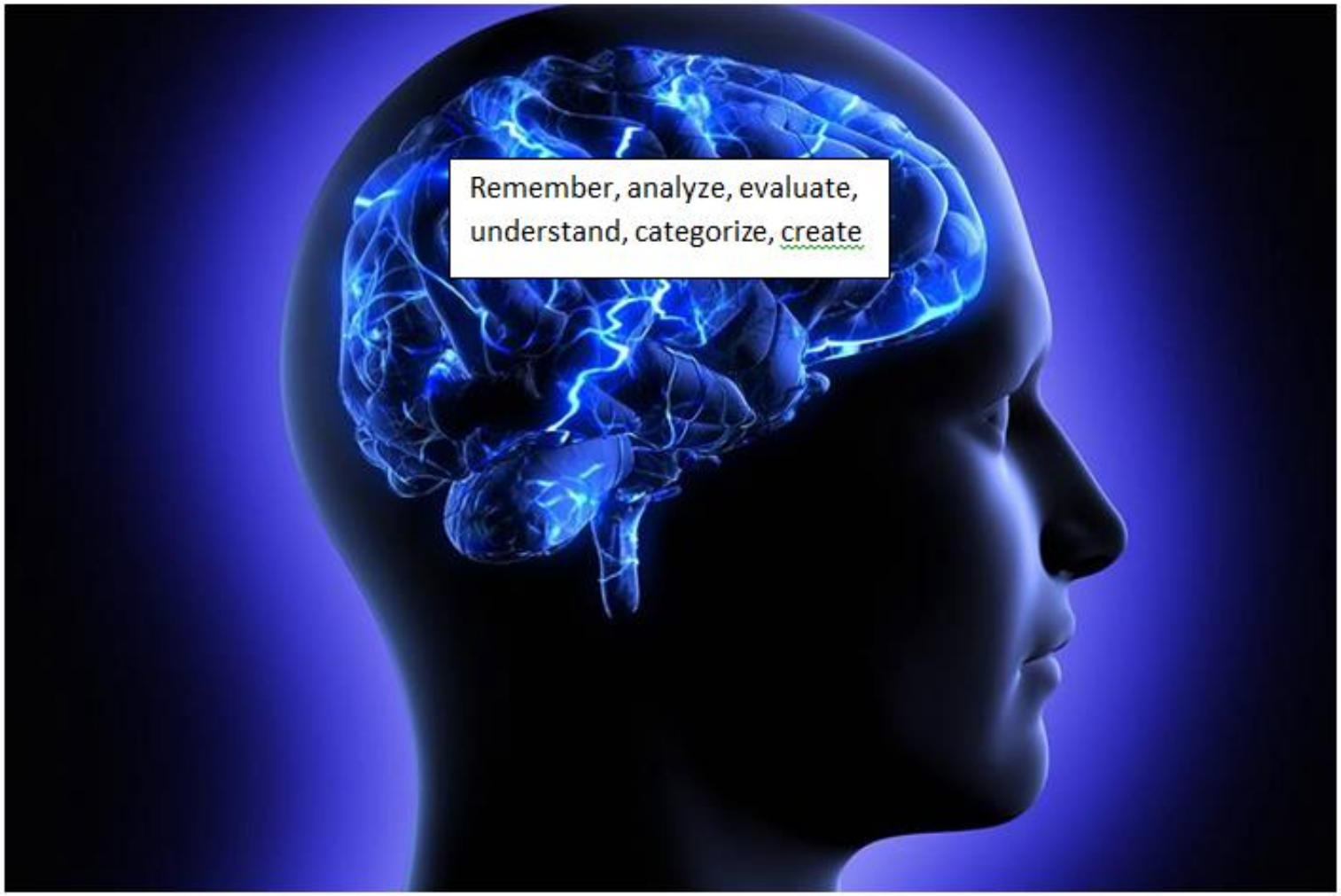
| Standard | | Abbreviation |
|---|---|---|
| English Language Development Standard 1 | English language learners **communicate** for **Social** and **Instructional** purposes within the school setting | Social and Instructional language |
| English Language Development Standard 2 | English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Language Arts** | The language of Language Arts |
| English Language Development Standard 3 | English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Mathematics** | The language of Mathematics |
| English Language Development Standard 4 | English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Science** | The language of Science |
| English Language Development Standard 5 | English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Social Studies** | The language of Social Studies |

# Activity

Compare and contrast your two favorite candies.

# Cognitive Functions

Thinking, not language dependent



# Language Functions

*How the student functions in the language*
*The language that the student needs in order to do the content*

***WIDA "Key Uses" depicted in green**

## Students will use language to:

- Compare and contrast
- Persuade, **argue**, justify, defend, blame
- Question, ask for, request
- Express like or dislike, compliment or complain
- **Recount**, retell
- Summarize, paraphrase
- Predict
- Agree or disagree
- Describe
- **Explain**
- **Discuss**
- Advise, suggest, warn
- Offer
- Inform
- Speculate
- Clarify
- Apologize
- Name, list

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Site Index | CDE Offices | Staff Directory

Search

SchoolView | Data & Accountability | Programs & Supports | Teaching & Learning | Policy & Funding

- Standards and Instructional Support
  - 2009/2010 Colorado Academic Standards
  - Colorado Academic Standards Review and Revision
  - Communication Resources
  - Standards Implementation Support
  - District Sample Curriculum Project
  - PLC-Bytes and Webinars
  - Extended Evidence Outcomes
  - Career and Technical Education
- The Arts
- Colorado English Language Proficiency
- Comprehensive Health
- Mathematics
- Physical Education
- Reading, Writing, and Communicating
- Science
- Social Studies
- World Languages
- Computer Science
- Elementary Education Resources (P-6)

Home / Standards and Instructional Support

# 2020 Colorado Academic Standards


## State Board completes review and approval process

The State Board of Education approved revisions to the Colorado Academic Standards in the ten content areas of comprehensive health and physical education; dance; drama and theatre arts; mathematics; music; reading, writing, and communicating; science; social studies; visual arts; and world languages by July 1, 2018, in alignment with state law. In addition, the State Board of Education adopted new voluntary secondary computer science standards.

Final versions of the 2020 Colorado Academic Standards will be available in August, following copy editing and website updates. These final versions will include amendments introduced by the State Board during the approval process for three content areas: comprehensive health and physical education; reading, writing, and communicating; and social studies. The links to proposed revisions by content area listed below are not the final versions. To read more about the review and revision of the Colorado Academic Standards, along with previous drafts, committee meeting summaries, and public feedback, see a complete listing of resources for all the content areas.

Districts will have two years to review and revise their local standards as needed with implementation scheduled for the 2020-21 school year, which is the first year the Colorado Measures of Academic Success (CMAS) assessments will reflect the content of the 2020 standards.

http://www.cde.state.co.us/standardsandinstruction/casreview

# Colorado Academic Standards

# Mathematics

http://www.cde.state.co.us/standardsandinstruction/casreview-spring2018committeerecommendations-ma

# The Language of Math

**Find and highlight language in the CAS:**

- 1 color for content vocabulary

**AND**

- A 2nd color for cross-content vocabulary

**AND**

- A 3rd color for language functions

**OR**

- 1 color for all vocabulary

**AND**

- A 2nd color for language functions

**Content Area: Mathematics**

**Standard: 2. Patterns, Functions, and Algebraic Structures**

**Prepared Graduates:**

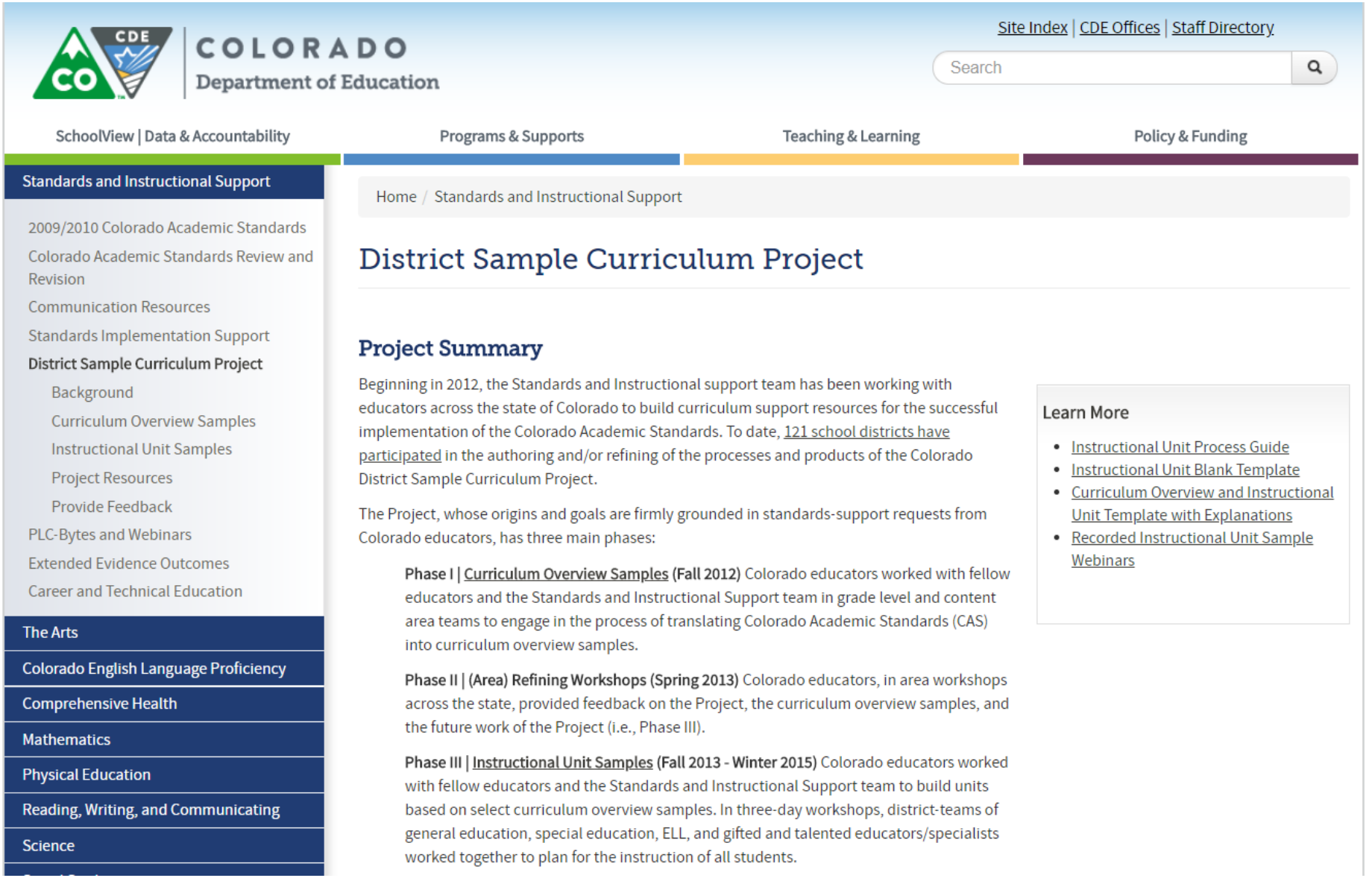
- Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data

## Grade Level Expectation: Fifth Grade

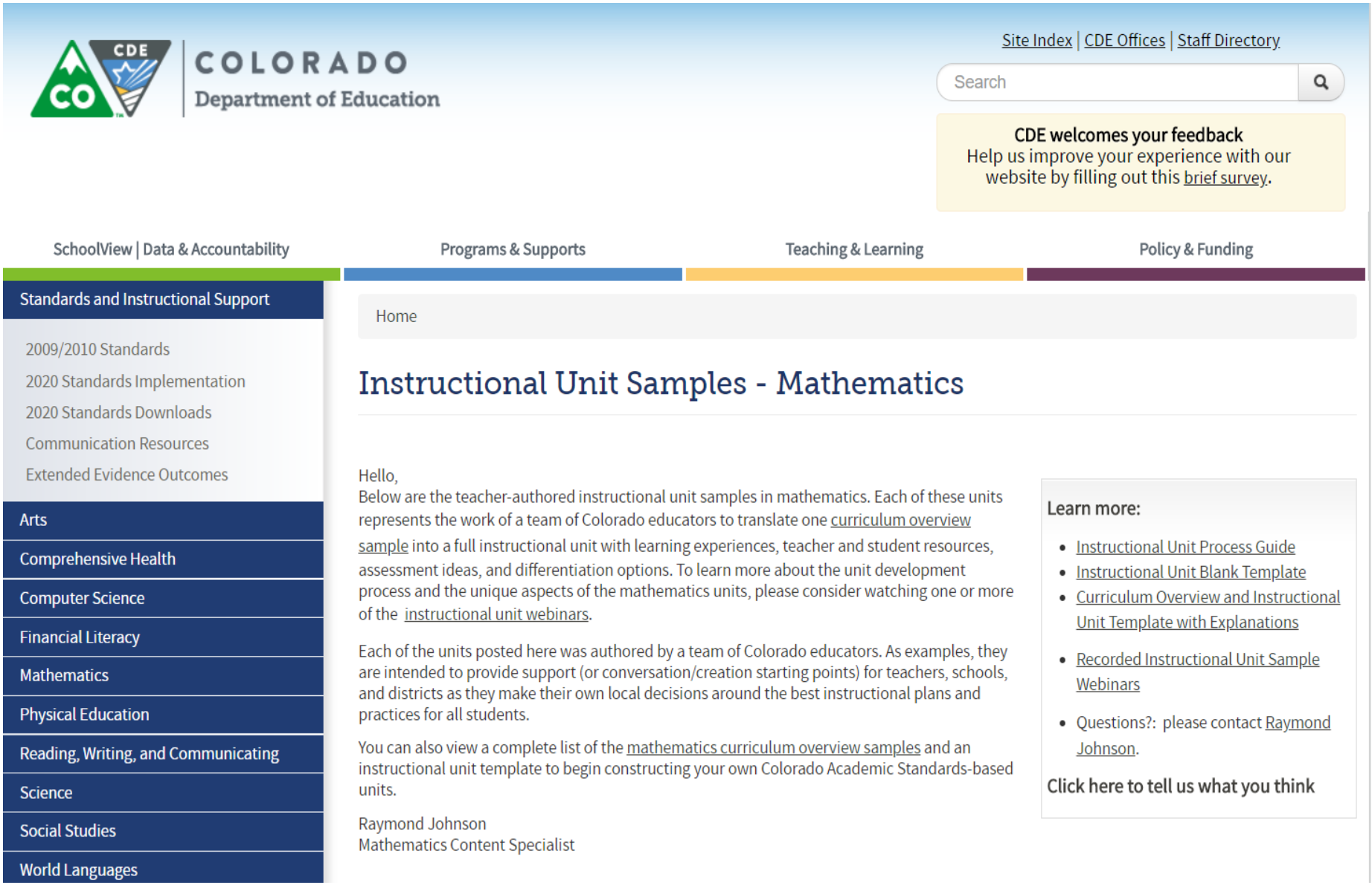
**Concepts and skills students master:**

1. Number patterns are based on operations and relationships

| Evidence Outcomes | 21st Century Skills and Readiness Competencies |
|---|---|
| **Students can:**<br>a. Generate two numerical patterns using given rules. (CCSS: 5.OA.3)<br>b. Identify apparent relationships between corresponding terms. (CCSS: 5.OA.3)<br>c. Form ordered pairs consisting of corresponding terms from the two patterns, and graphs the ordered pairs on a coordinate plane.[1] (CCSS: 5.OA.3)<br>d. Explain informally relationships between corresponding terms in the patterns. (CCSS: 5.OA.3)<br>e. Use patterns to solve problems including those involving saving and checking accounts. (PFL)<br>f. Explain, extend, and use patterns and relationships in solving problems, including those involving saving and checking accounts such as understanding that spending more means saving less (PFL) | **Inquiry Questions:**<br>1. How do you know when there is a pattern?<br>2. How are patterns useful?<br><br>**Relevance and Application:**<br>1. The use of a pattern of elapsed time helps to set up a schedule. For example, classes are each 50 minutes with 5 minutes between each class.<br>2. The ability to use patterns allows problem-solving. For example, a rancher needs to know how many shoes to buy for his horses, or a grocer needs to know how many cans will fit on a set of shelves.<br><br>**Nature of Mathematics:**<br>1. Mathematicians use creativity, invention, and ingenuity to understand and create patterns.<br>2. The search for patterns can produce rewarding shortcuts and mathematical insights.<br>3. Mathematicians construct viable arguments and critique the reasoning of others. (MP)<br>4. Mathematicians model with mathematics. (MP)<br>5. Mathematicians look for and express regularity in repeated reasoning. (MP) |




http://www.cde.state.co.us/standardsandinstruction/samplecurriculumproject




http://www.cde.state.co.us/standardsandinstruction/instructionalunits-math

# Linking Content to Language

| **Critical Language…** | |
|---|---|
| EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend the critical language in the following statement: *"Mark Twain exposes the hypocrisy of slavery through the use of satire."* | The Academic and Technical (Tier 2 and Tier 3) ***vocabulary, semantics, and discourse*** p<br>accessing and demonstrating understanding of the content, concepts and skills of the u<br>▪ Cross-discipline *and* discipline-specific language and discourse patterns (the la<br>▪ Extended, reasoned, logical, precise, connected discourse<br>▪ Language of instruction<br>▪ Language of academic texts (receptive & productive)<br>▪ Language of assessment |
| **Academic Vocabulary:**<br>**Cross-content** | Cross-discipline language and discourse patterns (e.g. migration, direction, mapping, examine, analyze) |
| **Technical Vocabulary:**<br>**Content** | Discipline-specific language and discourse patterns (e.g., longitude, latitude) |

**https://www.cde.state.co.us/standardsandinstruction/instructionalunitsamples**

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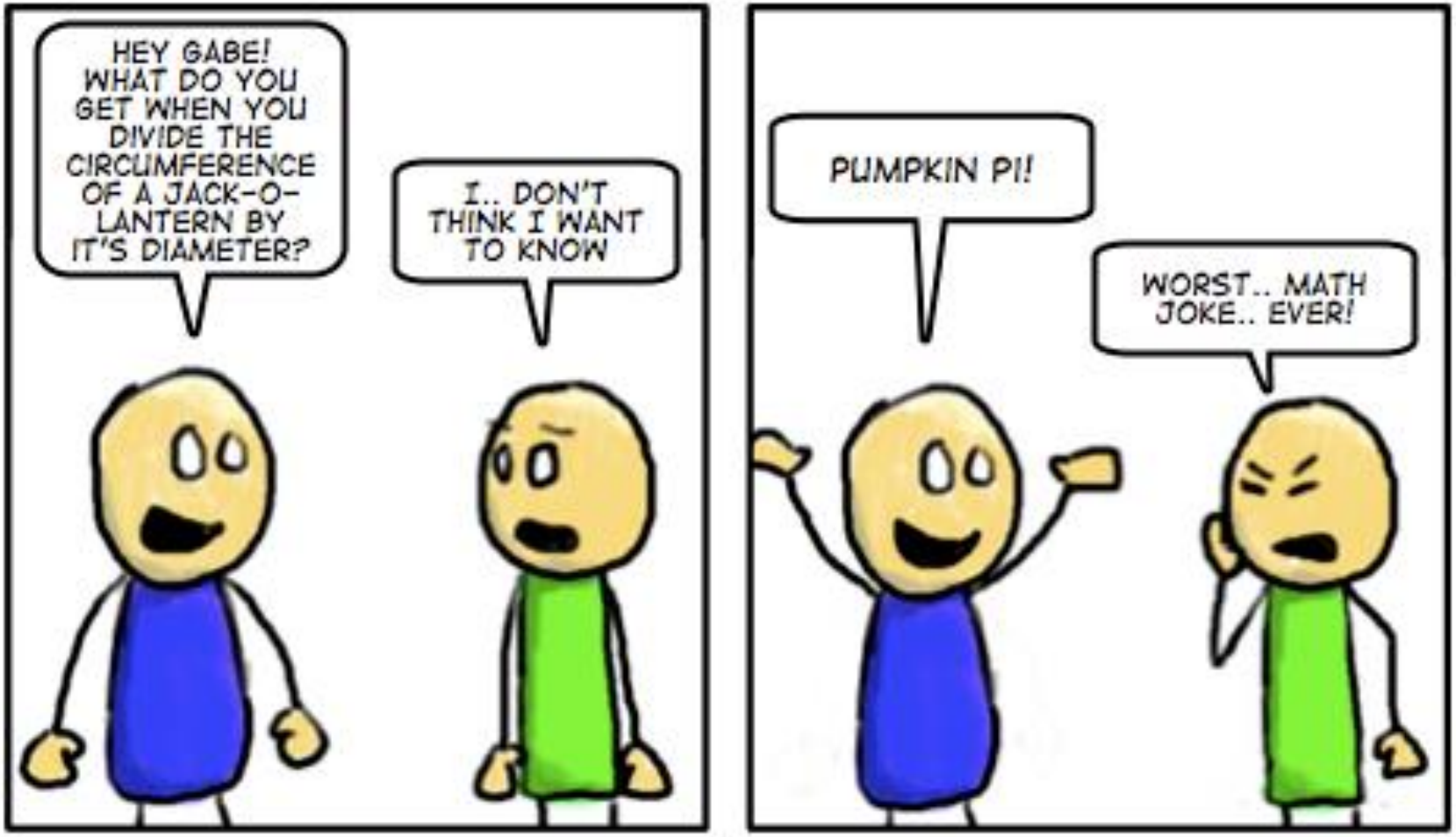
# The Word/Phrase Level

- **General** vocabulary
  - **Cross content** vocabulary
    - before, describe, combine
- **Specific** vocabulary
  - **Content** vocabulary
    - least common denominator
- **Technical** vocabulary
  - **Content** vocabulary associated with a specific content area topic
    - ratio, integrals, Pythagorean theorem

| General | Specific | Technical |
|---|---|---|
| in all | total | sum |

# The Word/Phrase Level

- Multiple Meaning words
  - kitchen table vs multiplication table
  - a round shape vs rounding up or down
  - balancing equations vs balancing on one foot
  - recount vs recount
- Word Forms
  - noun vs verb:  triangle has 3 angles vs the road angles to the right
  - slang:  “play the angle”
- Formulaic and idiomatic expressions
  - hand vs hand in
- Nuances and shades of meaning
  - hold onto vs cling to
  - show your work vs list every single step
- Collocations
  - “solve an equation” not “fix an equation”

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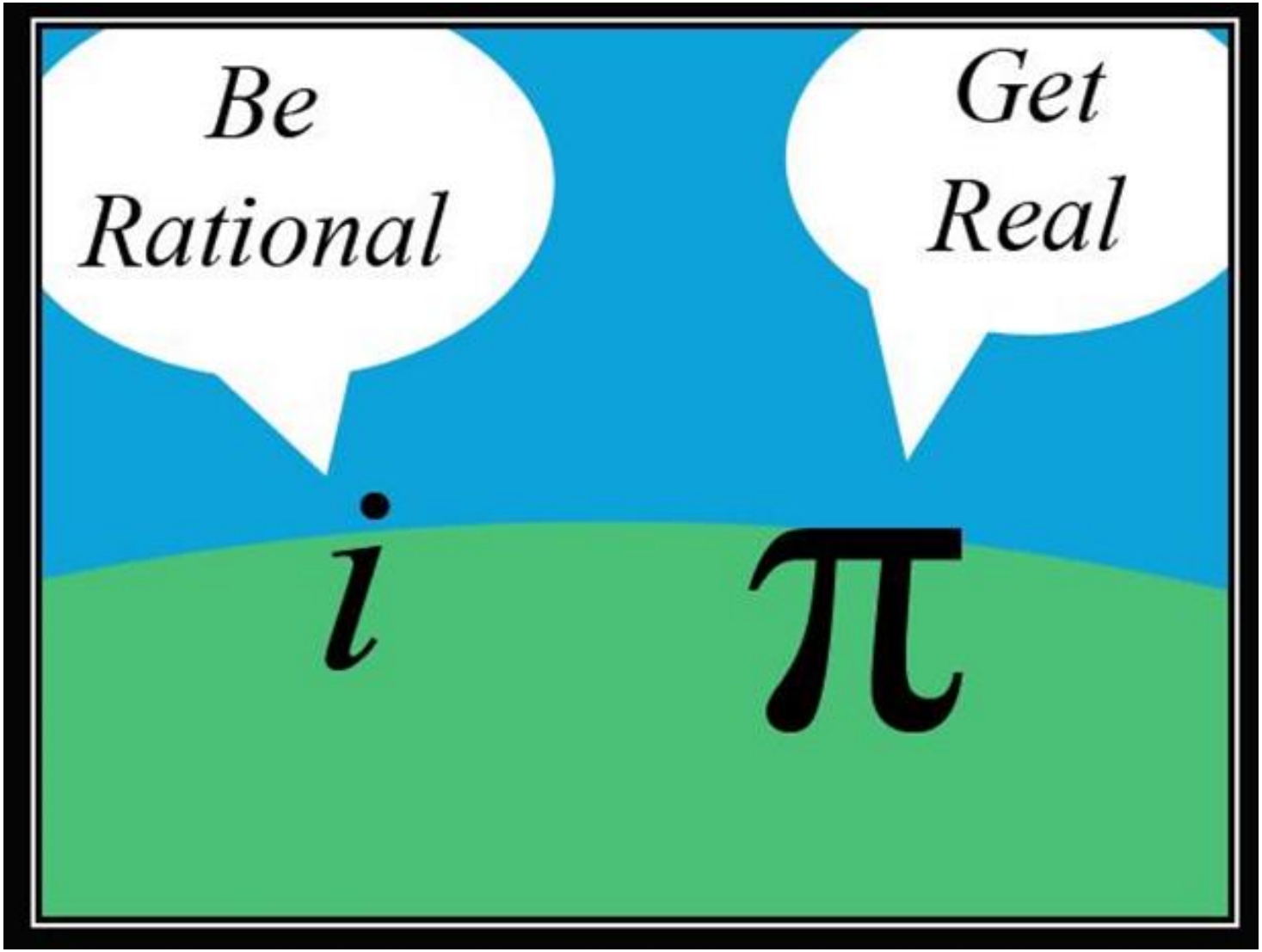



http://www.memecenter.com/search/math%20jokes


**"Of course you have problems! You're a math teacher."**



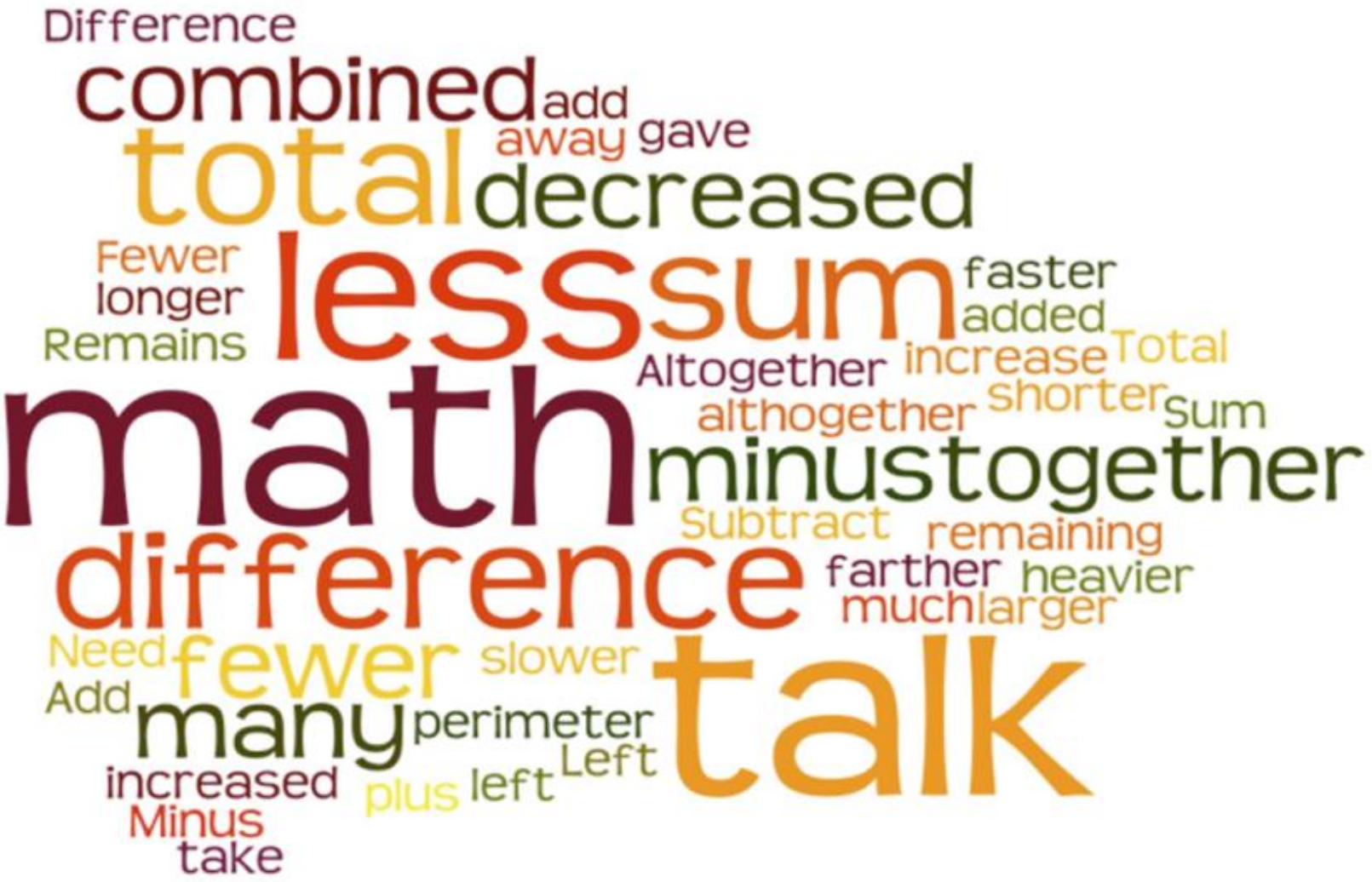
https://s-media-cache-ak0.pinimg.com/736x/bf/6b/81/bf6b8136e3e087ee640c682819d3fbe5.jpg

# Multiple Meaning Words

## Everyday Meaning vs Math Meaning

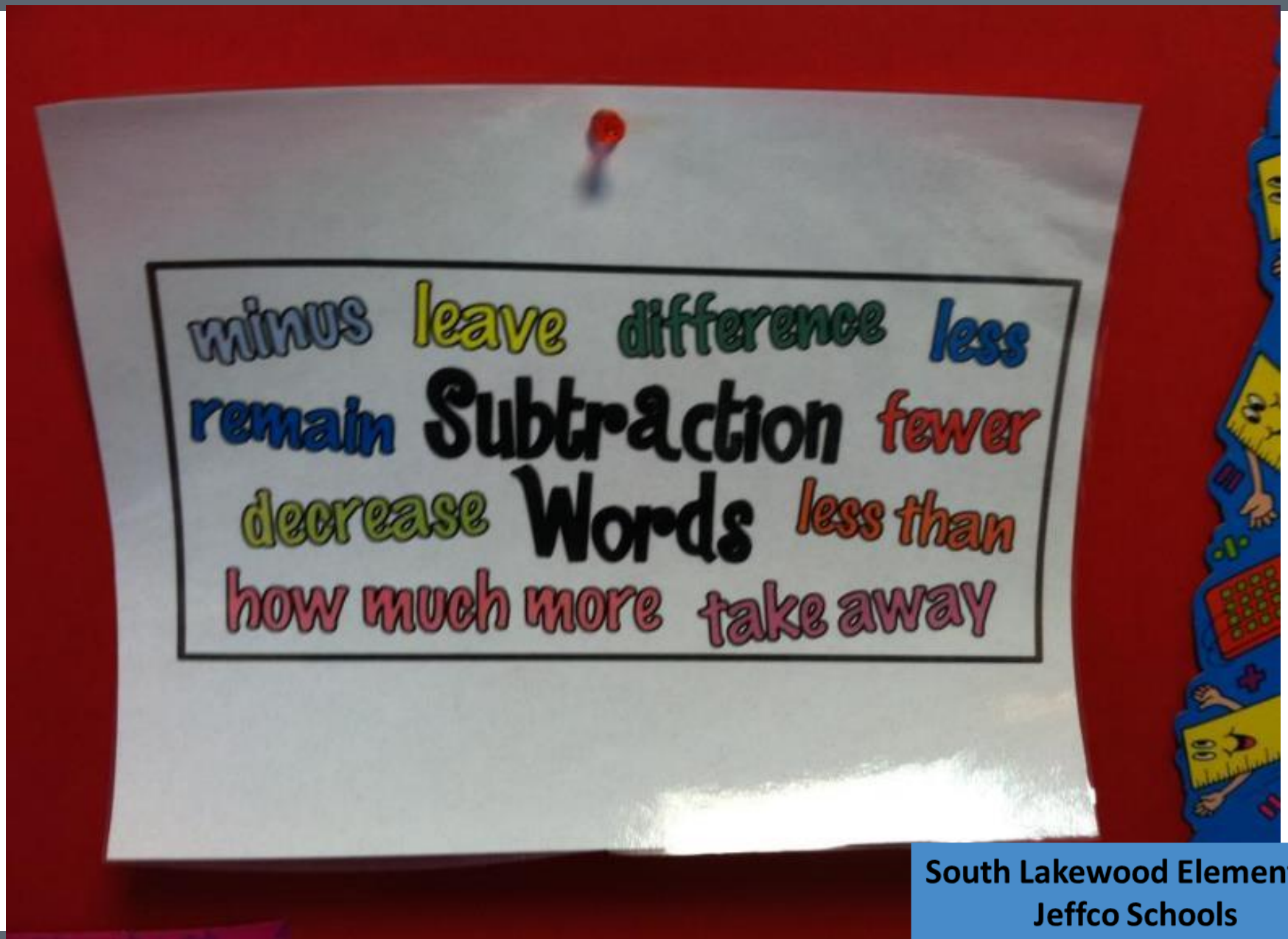
| Word | Everyday Meaning | Math Meaning | Other Content Area Meanings |
|---|---|---|---|
| angle | motive | two rays with a common end point | Journalism—point of view, standpoint, slant |
| mean | not nice, purpose or intention | the average of a set of numbers | ELA—destiny; social studies or economics—produce as a result |
| volume | how loud or soft something is | the amount of space inside a solid | |
| gross | disgusting | twelve dozen | |
| times | how many times | multiplication | |
| carry | to pick something up and take it somewhere | | |
| borrow | when someone lends you something | | |
| tree | a plant | | |
| negative | something bad | | |
| factor | | | |
| domain | | | |

# Synonyms




https://www.ellteaching20.blogspot.com/2012/12/the-language-of-math-ipads-and-ells.html

# Word Walls

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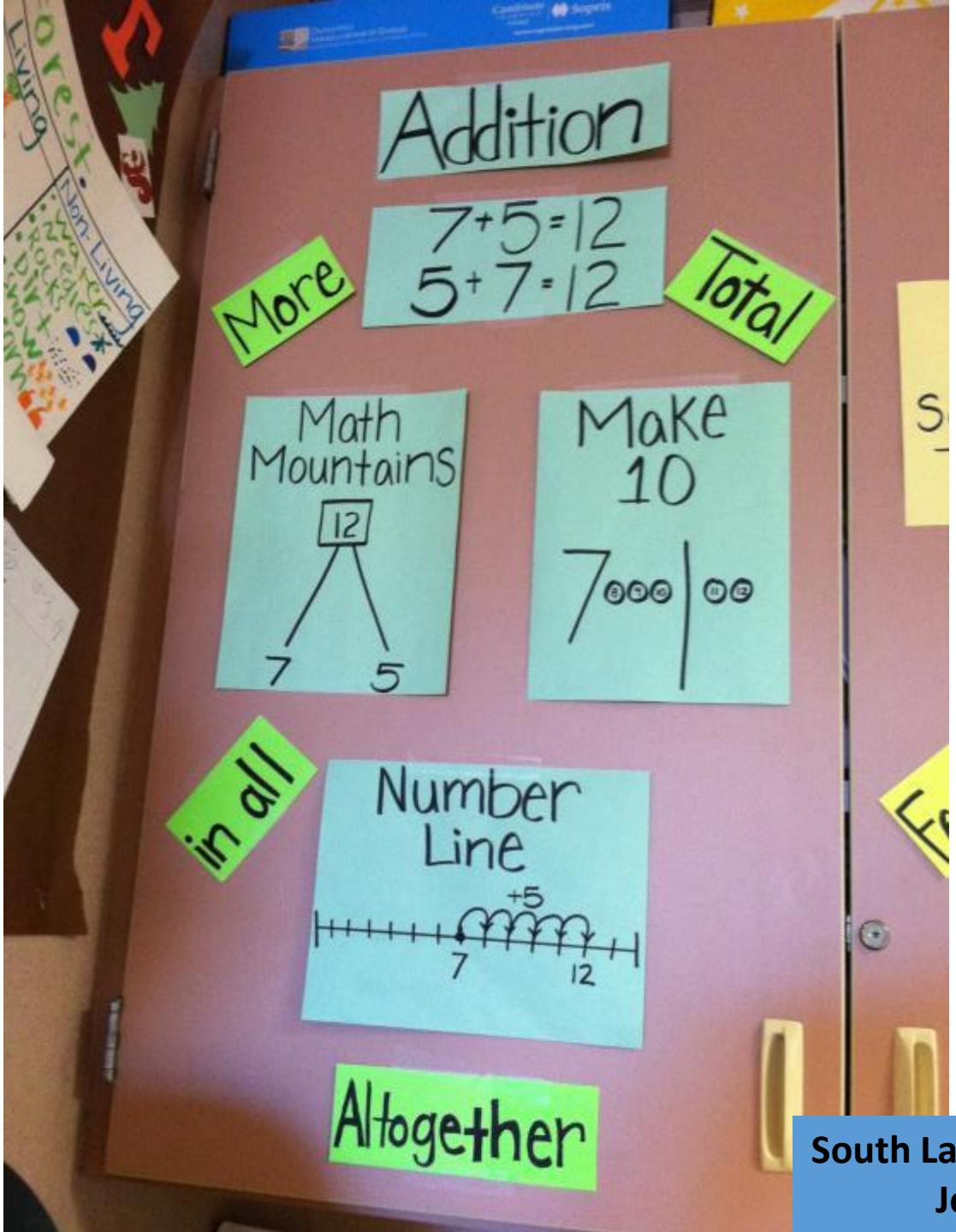


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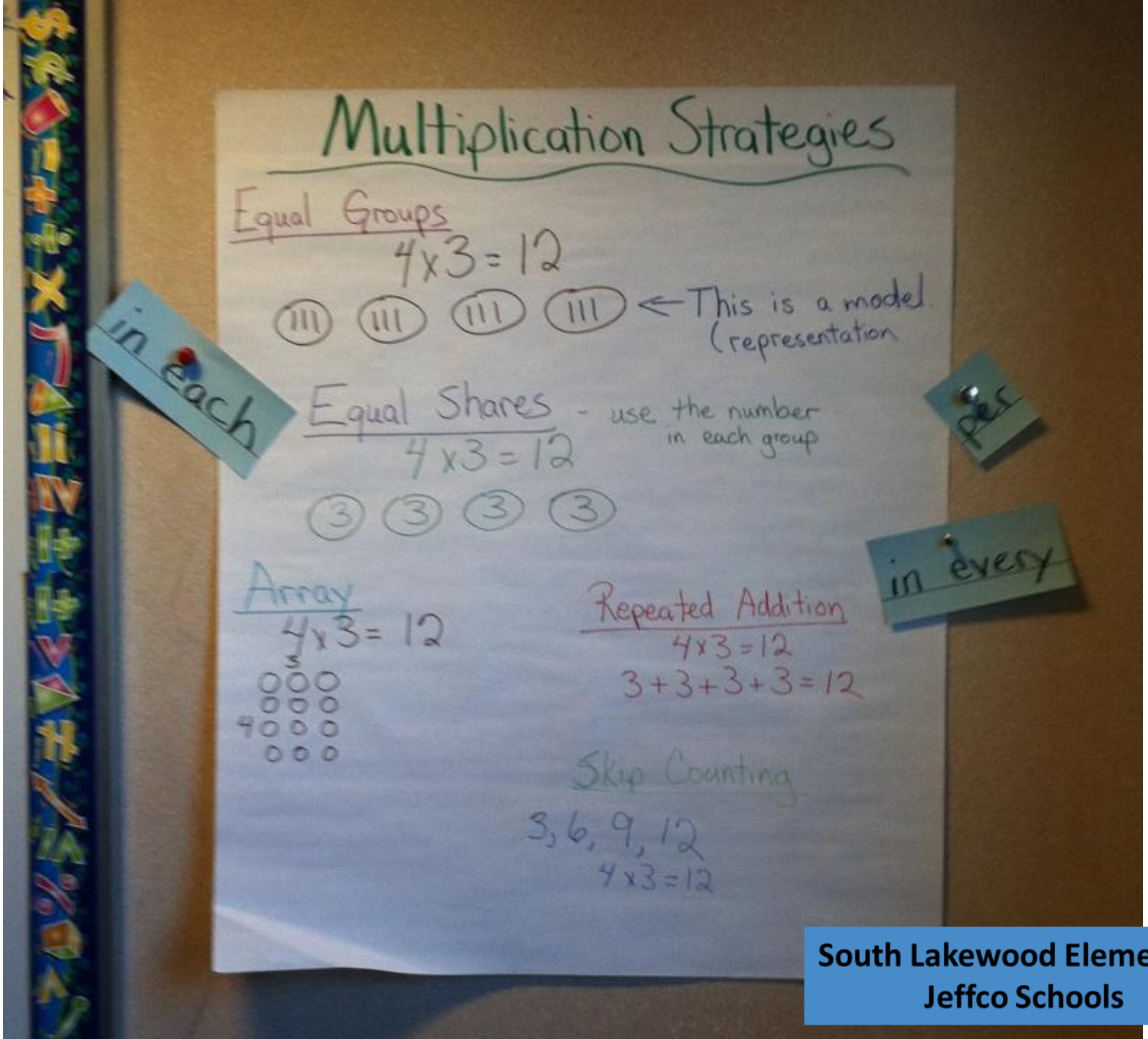


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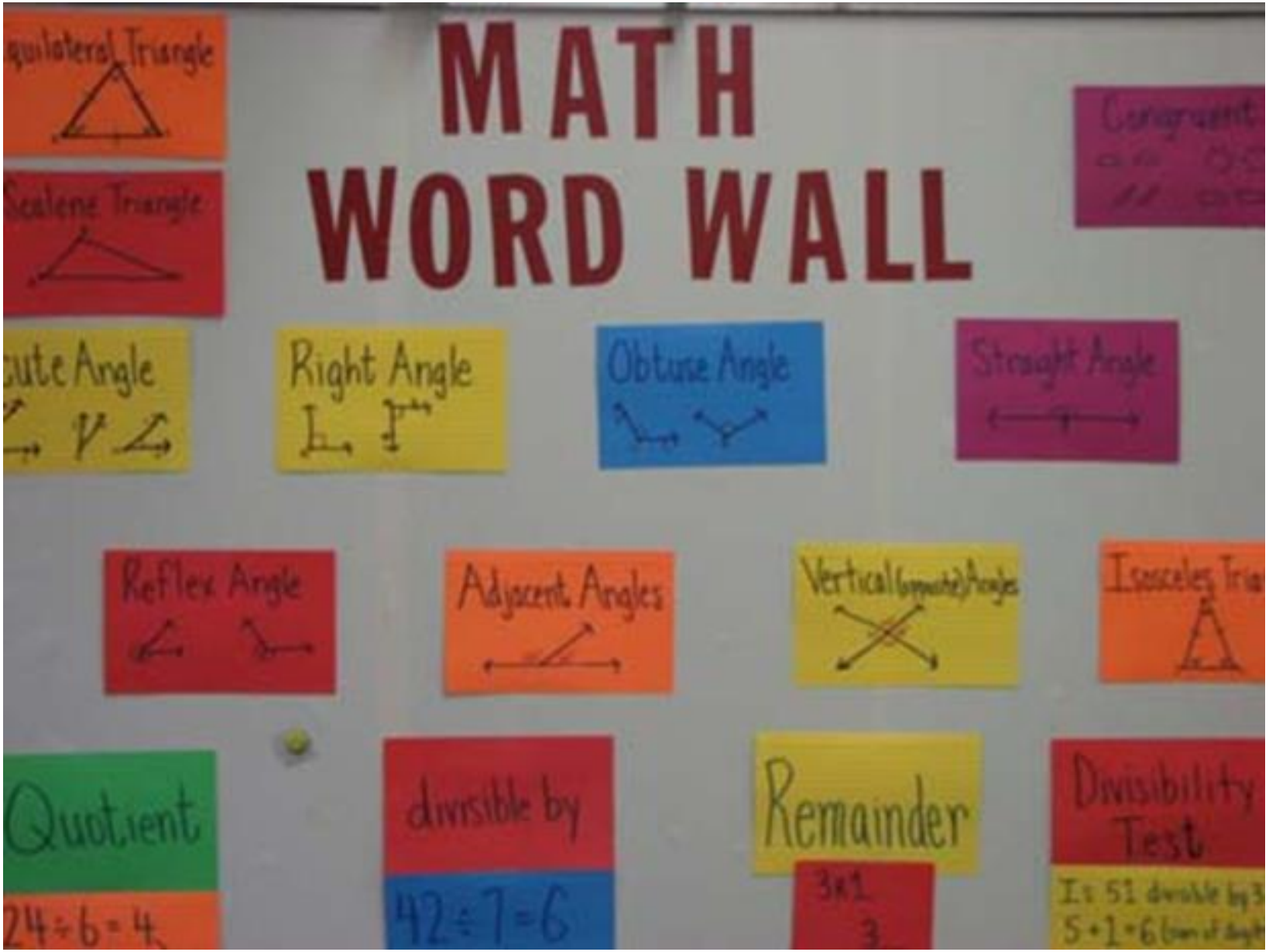
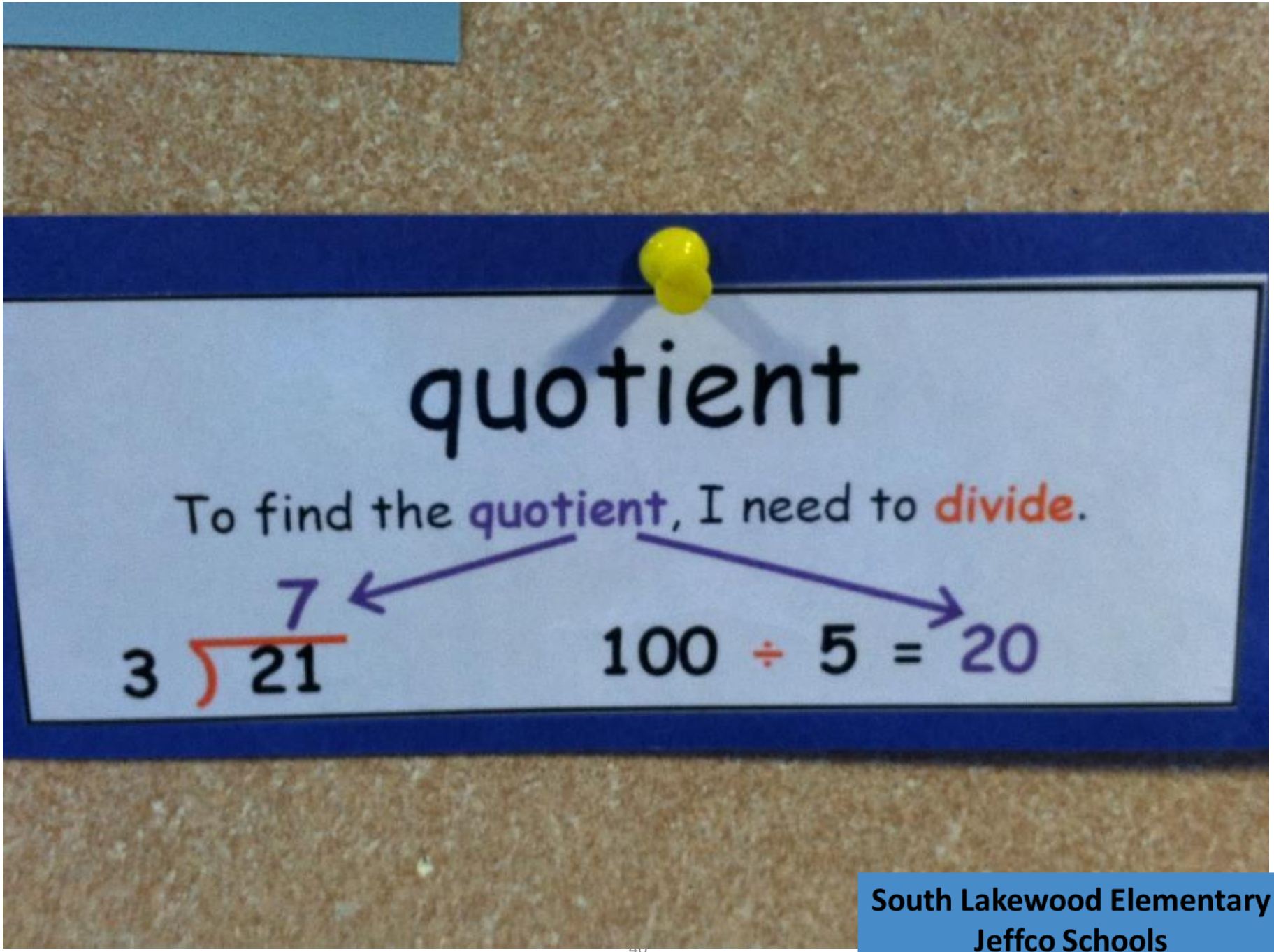



http://schools.nyc.gov/documents/elementarymath/Differentiation/images/vocabulary/5thIllustratedWall.jpg

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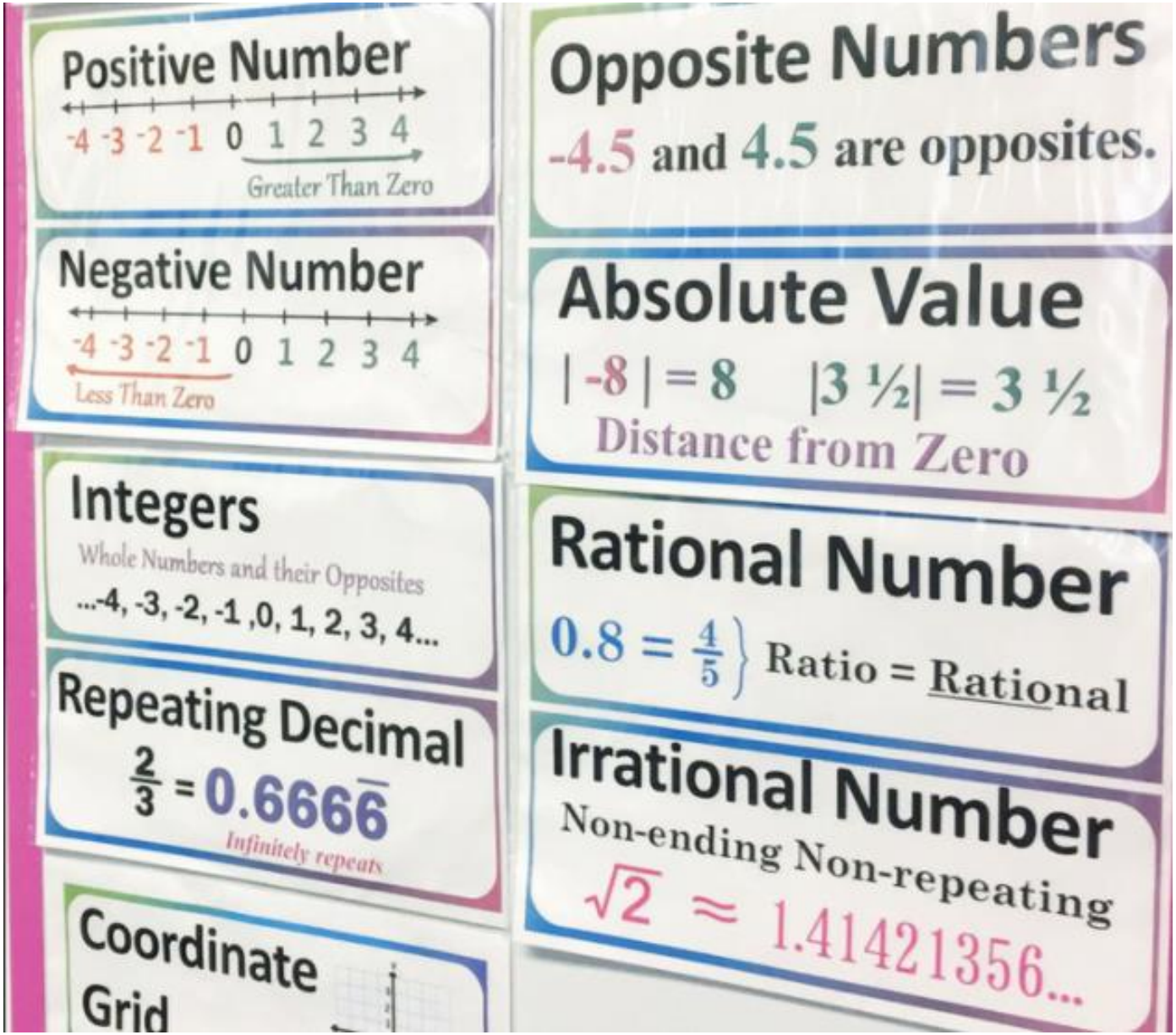
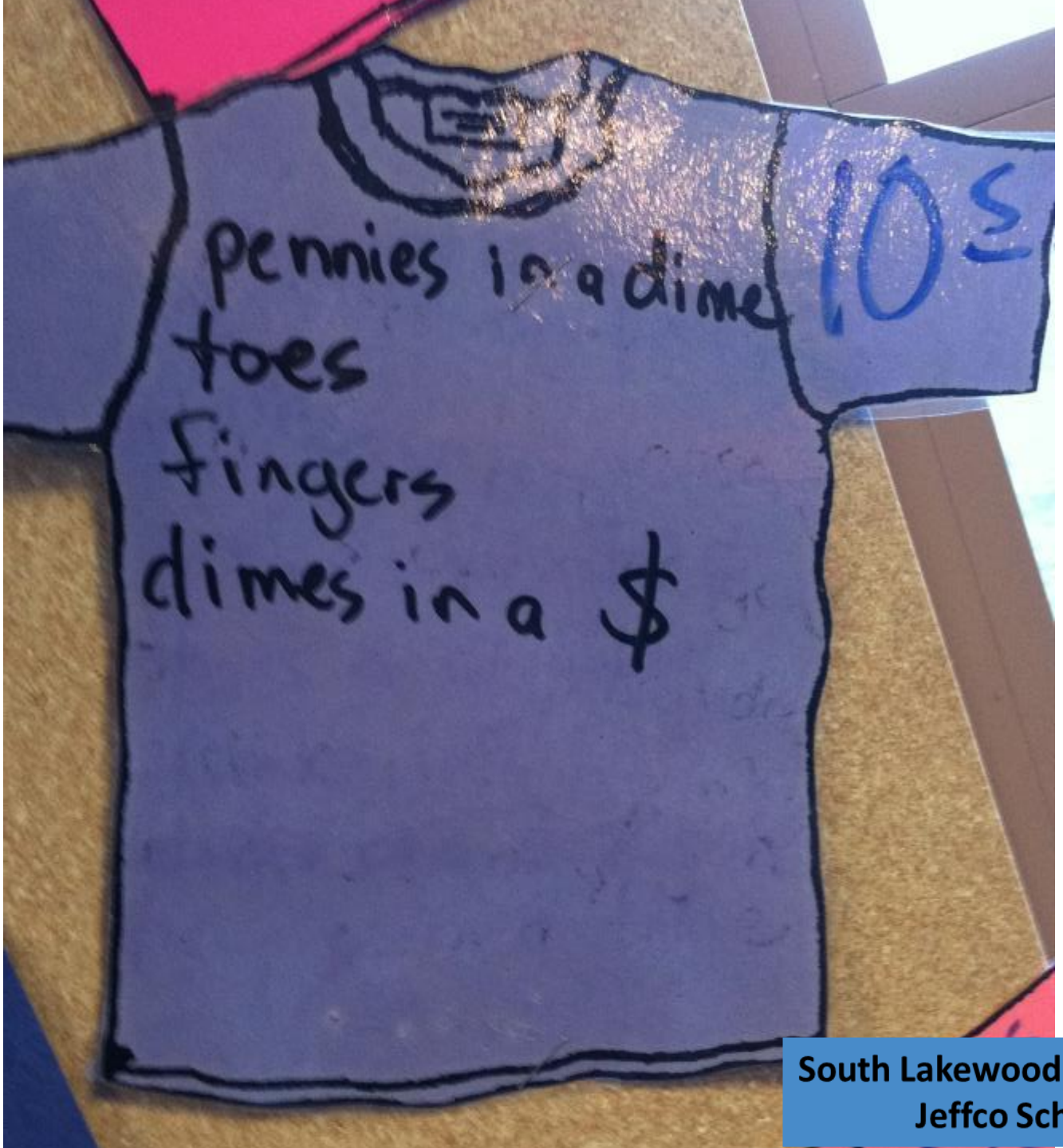



https://www.maneuveringthemiddle.com/using-word-wall-middle-school/

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# Word Walls in the Secondary Classroom

- Word Walls:  A Support for Literacy in Secondary School Classrooms

http://www.readingrockets.org/content/pdfs/World_Walls_-_A_Support_for_Literacy_in_Secondary_School_Classrooms.pdf

- A Research-Based Guide to Word Walls in the Secondary Classroom

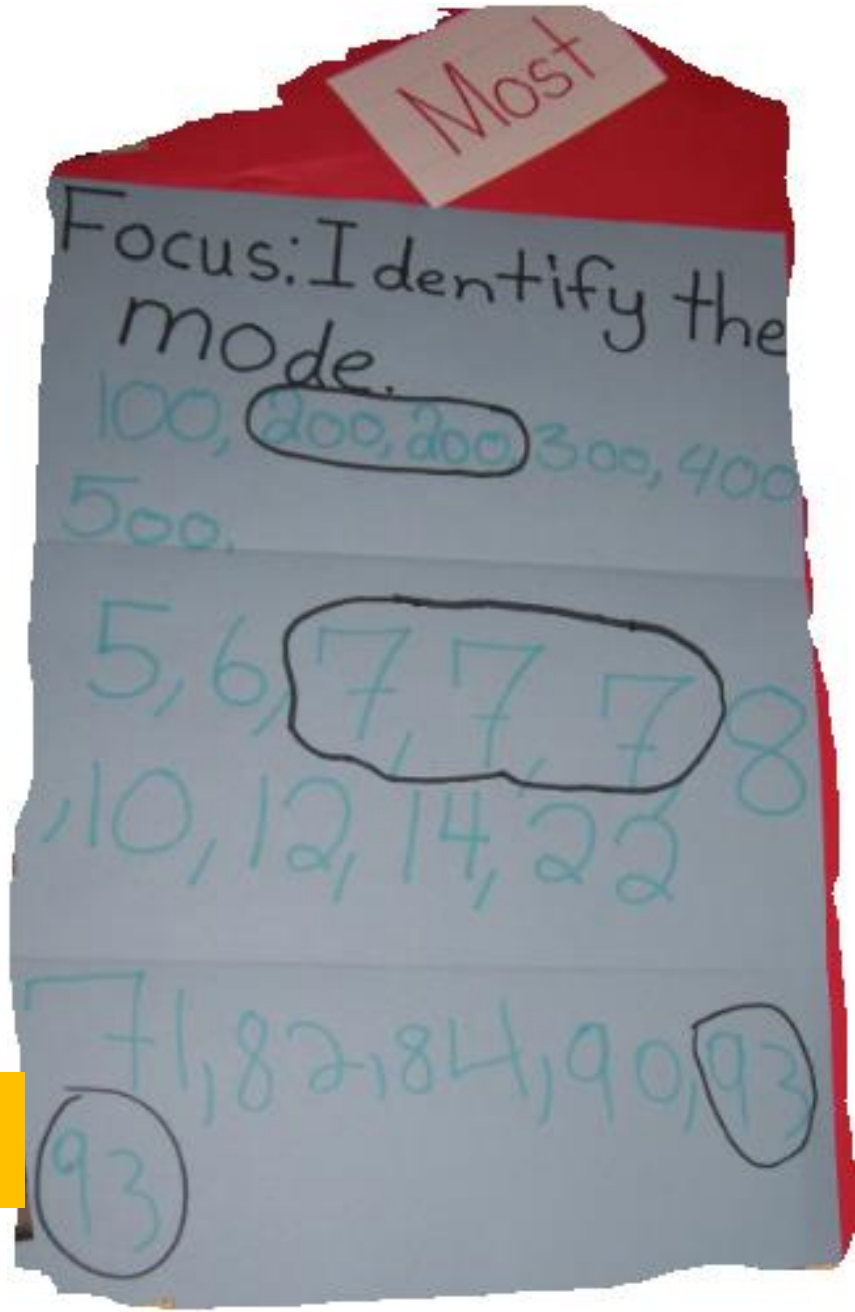
http://www.fulton-ind.k12.ky.us/userfiles/56/Classes/4649/Secondary%20Word%20Walls.pdf

- Vocabulary Strategies for Secondary Students

https://alex.state.al.us/ccrs/sites/alex.state.al.us.ccrs/files/9-Vocabulary%20Strategies%20%20For%20Secondary_0.docx

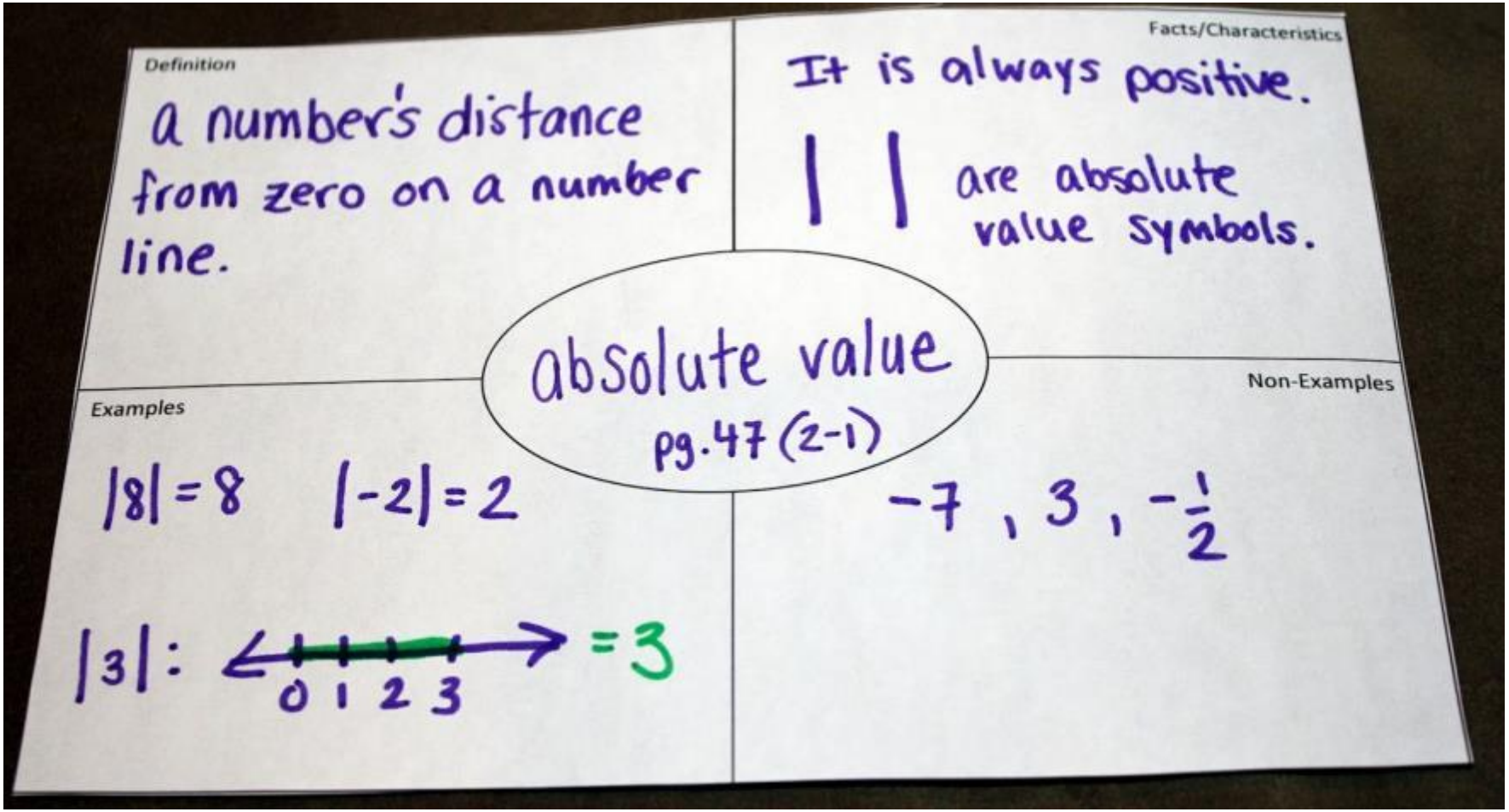
# Cognates

- **Three types**
  - True—looks and sounds alike, similar meaning
    - diverse and diverso
  - Partial—may have similar meaning but different contexts
    - history and la historia
  - False—look and sound alike, different meaning
    - embarrassed vs embarazada

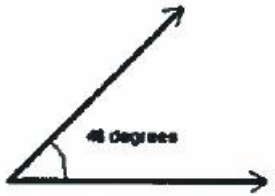
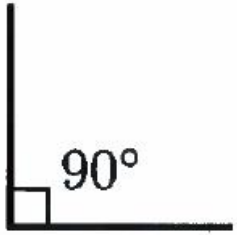
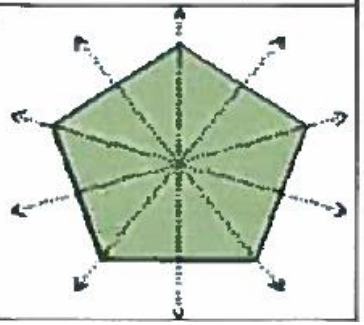




**Rebekah Ottenbreit and Megan Emily Fitzpatrick**
**Jeffco Schools**

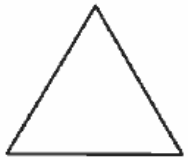
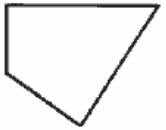
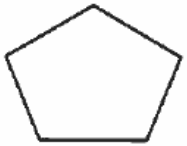
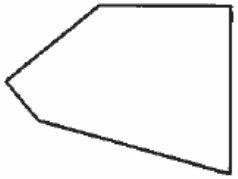
# Personal Dictionaries




http://3.bp.blogspot.com/-VbZV_5I0J2A/UAMIA26DCdI/AAAAAAAAPKw/ADNDLNyIeHU/s1543/IMG_3120.JPG

| Word | Definition | Real Life Example | Native language support | Picture |
|---|---|---|---|---|
| Acute angle | An acute angle is an angle that is less than 90 degrees but more than 0 degrees |  | ángulo agudo |   |
| Obtuse angle | An angle that is greater than 90 degrees but less than 180 degrees |  | ángulo obtuso |   |
| Right angle | A right angle is an angle of 90 degrees, corresponding to a quarter of a full circle. |  | ángulo recto |   |
| Lines of symmetry | Line of symmetry is a line that divides a figure into two congruent parts, each of which is the mirror image of the other. |  | líneas simétricas |  |

http://www.houstonisd.org/cms/lib2/TX01001591/Centricity/Domain/26922/VocabularyStrategiesDocument.pdf

| Figure | Description | Congruent sides | Non-congruent sides |
|---|---|---|---|
| Triangle | • 3 sides<br>• 3 vertices<br>• 3 angles | All sides are equal in length  | Sides are not equal  |
| Quadrilateral | • 4 sides<br>• 4 vertices<br>• 4 angles | All sides are equal in length  | Sides are not equal  |
| Pentagon | • 5 sides<br>• 5 vertices<br>• 5 angles | All sides are equal in length  | Sides are not equal  |
| Hexagon | • 6 sides<br>• 6 vertices<br>• 6 angles | All sides are equal in length  | Sides are not equal  |

http://www.houstonisd.org/cms/lib2/TX01001591/Centricity/Domain/26922/VocabularyStrategiesDocument.pdf

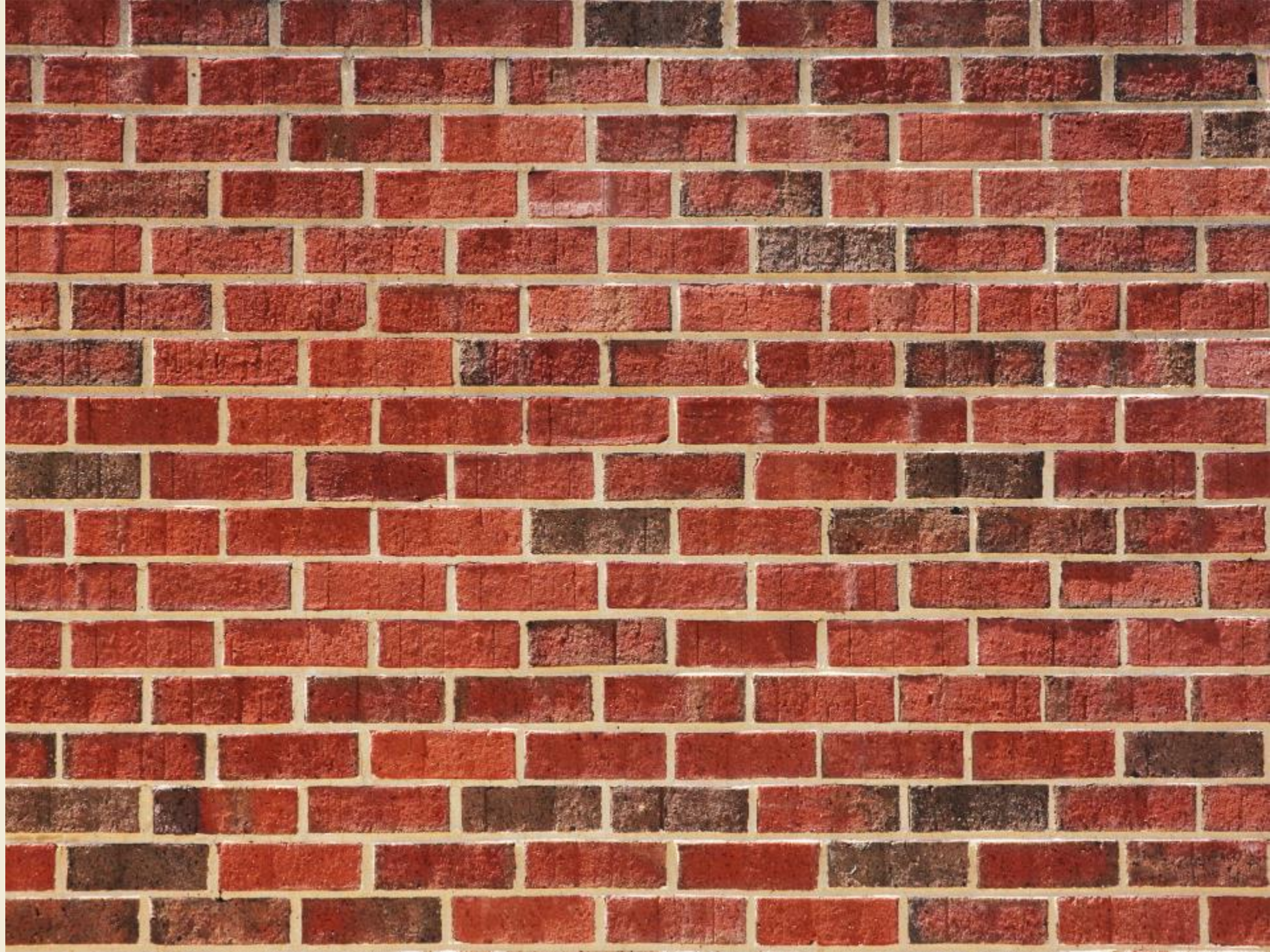
# Teach Vocabulary

## Benefits

- Learn **content specific vocab**
- Learn **cross-content, academic vocab**
- **Make connections** (across content, in context)
- **Visual learners**
- **Learn to use reference tools**
- **Brain research**>color coding
- Use **higher level vocab** orally and in writing
- **Vocab>literacy**

## How to

- Teach **in context**
- **Limit number** of new words introduced at one time
- **Review, recycle** words
- Teach meaning of words **across the content areas**
- **Picture, definition, synonym and/or the word used in a sentence**
- Word walls as **part of the lesson**
- **Add to** word wall
- **Refer to** word wall
- Students add words to **personal reference tool**



# The Features of Academic Language in WIDA's Standards

The Features of Academic Language operate within sociocultural contexts for language use.

| | Performance Criteria | Features |
|---|---|---|
| **Discourse Level** | **Linguistic Complexity** *(Quantity and variety of oral and written text)* | Amount of speech/written text<br>Structure of speech/written text<br>Density of speech/written text<br>Organization and cohesion of ideas<br>Variety of sentence types |
| **Sentence Level** | **Language Forms and Conventions** *(Types, array, and use of language structures)* | Types and variety of grammatical structures<br>Conventions, mechanics, and fluency<br>Match of language forms to purpose/perspective |
| **Word/Phrase Level** | **Vocabulary Usage** *(Specificity of word or phrase choice)* | General, specific, and technical language<br>Multiple meanings of words and phrases<br>Formulaic and idiomatic expressions<br>Nuances and shades of meaning<br>Collocations |

The sociocultural contexts for language use involve the interaction between the student and the language environment, encompassing the…

- Register
- Genre/Text type
- Topic
- Task/Situation
- Participants' identities and social roles

WIDA CONSORTIUM

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WIDA CONSORTIUM

# The Discourse Level

- Language functions and tasks
- Quality and quantity of language
- Organization and structure of ideas (written or spoken)
- Cohesion and connecting of ideas
- Explaining ideas with details and support
- Expression of ideas (style, voice)

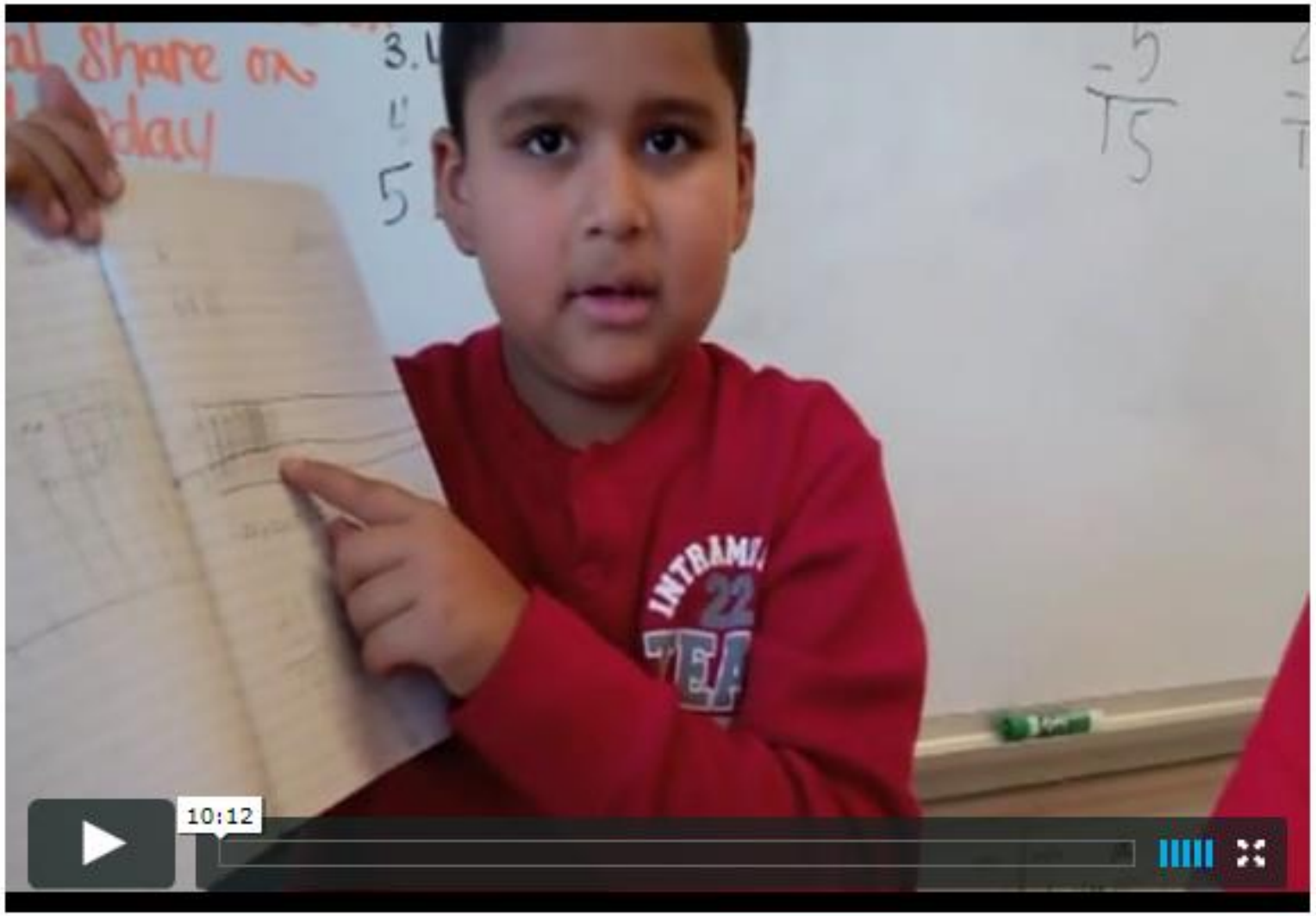
# Mathematics at the Discourse Level

- Word problems
- Explanations
- Tables
- Graphs
- Proofs

# The Language of Math

| Content | Language Use/Function |
| --- | --- |
| **What?** | **How?** |
| Measure objects with a ruler | Compare sizes of objects measured in a class |
| Is it better to purchase these items in bulk or by unit. Why? | **Language function?** |

Adapted from Aiming High-Sonoma County Office of Education 2010




https://www.wida.us/professionaldev/educatorresources/videos.aspx#VideoContest

# Opportunities for Discourse

**Mix N Match activity**

**By Nancy Commins**

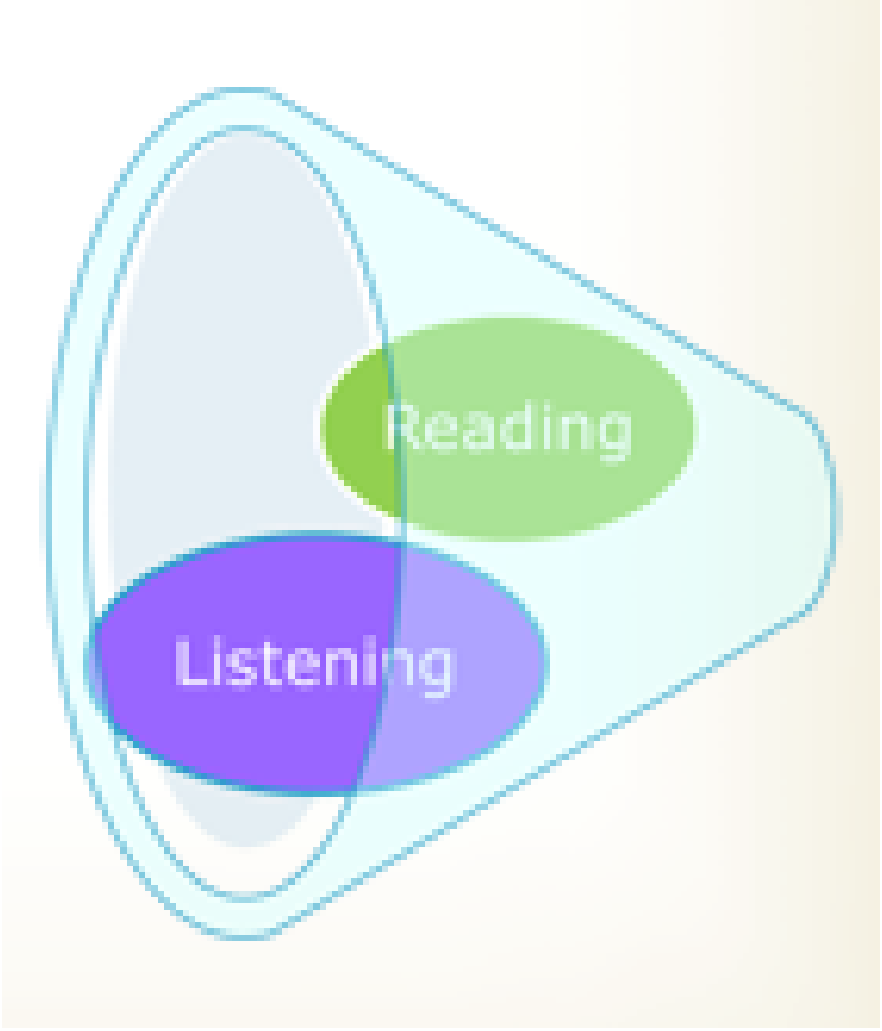
**UC Denver**

http://www.ucdenver.edu/academics/colleges/SchoolOfEducation/FacultyandResearch/Pages/NancyCommins.aspx

- **Multiple representations of a quantity (e.g. fractional, decimal, percentage)**
- **Math problems with steps to solve the equation**
- **Factors and multiples (ordering decimals and fractions to form a number line)**

# Oral Rehearsal

# Receptive Language



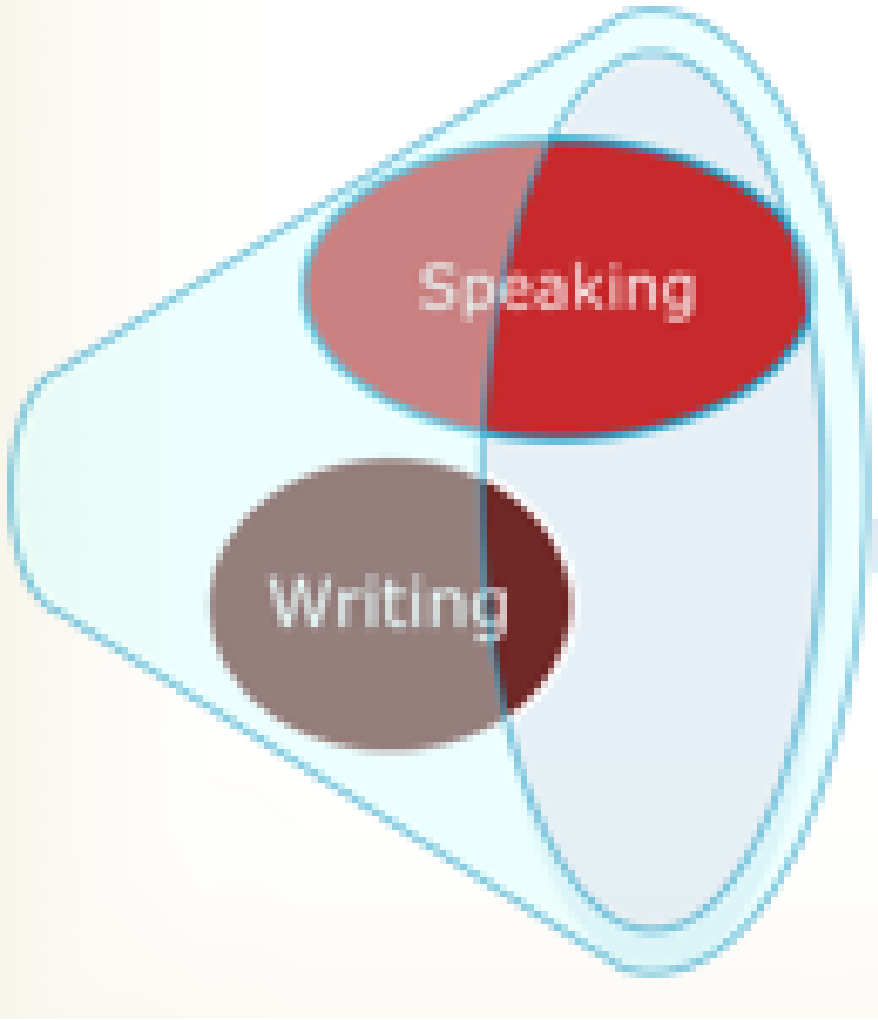
# The problem with word problems

**A rectangular garden has a length that is 3 feet longer than its width. Let *w* represent the width of the garden, in feet. The entire garden is surrounded by a 2 foot wide sidewalk. Explain what the algebraic expression (w+4)(w+7) represents in this context.**

*Adapted from sample High School Algebra 1 PARCC released item*

https://prc.parcconline.org/system/files/Algebra%201%20-%20EOY%20-%20Item%20Set_0.pdf

# Productive Language



**Graphic Organizer for Solving Word Problems**

The problem says:

| |
|---|
| |

| The problem is asking me to: | Some words I need to use to solve this problem are: |
|---|---|
| | |

In order to solve this problem, first I...

| |
|---|
| |

# Language Functions

- Explain
- Argue
- Retell
- Describe
- Compare
- Contrast
- Justify

# Math Examples

- Explain how you solved the equation.
- Argue why you need to know how to count out money.
- Retell the steps for finding the growth factor.
- Describe the properties of your shape.
- Compare rectangles to squares.
- Contrast the differences between 2D shapes and 3D shapes.
- Justify your answer.

# Write Your Own--Activity part 1

- You will need at least 3 post it notes
  - 1 post it—explain
  - 1 post it—argue
  - 1 post it—retell
- Who does a 4th post it?
  - Those experienced writing sentence frames
  - ELD specialists
- Ok, I have a 4th post it, what do I do with it?
  - Choose your own—describe, compare, contrast, justify, predict, inform, etc

Then, put your post its on their respective charts

# Teach at the Discourse Level

## How to

- **Think about:**
  - the language functions in the math CAS
  - the type of math discourse students are expected to understand and produce
- **Analyze and talk about what is being asked in word problems**
  - Warm up with one problem a day
  - Don't solve, just talk about what the problem is asking
- **Provide opportunities for students to talk about math**
  - Mix and match

## Benefits

- **Understand**
  - teacher
  - text book
  - assessments
- **Explain**
  - thinking
- **Answer**
  - questions
  - word problems
- **Speak like a mathematician**
- **Write like a mathematician**
- **Transfer to other content areas**
  - Understanding
  - Oral skills
  - Written skills

# The Features of Academic Language in WIDA's Standards

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The sociocultural contexts for language use involve the interaction between the student and the language environment, encompassing the…

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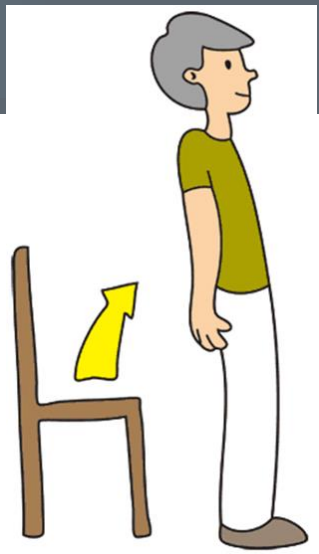
- Participants' identities and social roles

WIDA CONSORTIUM

# The Sentence Level

- **Grammatical structures**
  - Match of correct language form to purpose/language function
- **Conventions**
  - Subject verb agreement
  - Correct verb tense
- **Sentence variety**
  - Compound sentences
  - Complex sentences
- **Variety of grammatical structures**
  - Not starting each sentence the same way
  - Using different transitions
  - Changing word order

# The Sentence Level—Activity part 2



- **Gallery walk**
  - pick a post it that is not yours….unless….
- **Think** about the language you want to hear your students using
- **Script** the ideal conversation
- **Keep** your post its

**Example**

**Explain why it is better for Jose to buy his notebooks in bulk.**

It is better to buy the notebooks in bulk because in bulk, the notebooks cost 10 cents a piece. Whereas when buying them individually, each notebook costs 35 cents a piece.

# Common Transition and Signal Words

| Language Function(s) | Transition and Signal Words |
|---|---|
| • Sequence<br>• Arrange<br>• Order (into steps)<br>• Describe the process | after, afterward, after that, anticipation, at first, at this time, before, beginning with, beyond, during, earlier, ending with, eventually, initially, finally, following, from then on, last, later, meanwhile, in the meantime, next, now, at that point, preceding, previously, prior, reflecting, simultaneously, since, soon, subsequently, then, ultimately, until, when, while, at which point |
| • Compare & Contrast<br>• Distinguish between<br>• Associate | Contrast: alternatively, although, but, contradictory, conversely, despite, even though, however, in contrast, nevertheless, on the contrary, on the other hand, opposed/opposition, rather, unlike, whereas<br>Compare: both, in common, by comparison, compared to, correlate to, equal(ly) likewise, same, share, similarly |
| • Identify Cause & Effect | affect, as a result, because, because of, caused by, change, consequently, contributed, factors, for that reason, if...then, impact, in the aftermath of, leads to, in order to, in reaction/response to, since, that is why, shift, since, therefore |
| • Classify<br>• Sort<br>• Categorize | according to, attributes, behaviors, belongs, characteristics, dimensions, fits, features, group, organized by, qualities, traits, value |
| • Infer/ Draw Conclusions<br>• Predict | Conclude, draw a conclusion, estimate, implies, inference, guess, speculate, suspect, suspicion |

| | |
|---|---|
| • Elaborate (add detail)<br>• Give examples | also, another, besides, for example, further, for instance, furthermore, in addition, likewise, moreover, similarly, such as, to illustrate, that is |
| • Justify<br>• Persuade | after analysis, appeal to, argue, based on, belief, certainly, claim, convince, consider, criteria, defend, evidence, in fact, in light of, point of view, propose, prove/proof, sway, urge |
| • Critique/Evaluate<br>• Assess | advantage/advantageous, benefit, bias, certainly, judge, misleading, objective/subjective, obviously, of course, outweigh, positive/support, scrutiny, undoubtedly, without a doubt, worth, value |
| • Summarize<br>• Conclude | Summarize: above all, all in all in fact, in other words, most important, in summary<br>Conclude: accordingly, all in all, finally, in conclusion, in other words, in short, to conclude, to sum up, to summarize |

Modified from (1) Sweetwater District Academic Support Teams, October 2010 (from K. Kinsella). Available online: http://www.tntech.edu/files/teachered/edTPA_Academic-Language-Functions-toolkit.pdf and (2) *J.Sedita, www.keystoliteracy.com* and Academic Language Toolkit by Sweetwater District Academic Support Teams, 2010

# Sentence Frames

- Who has experience with sentence frames?
- How do you write them?
- Who has experience with differentiated sentence frames?
- How do you write them?

*Though I concede that_____,*
*I still insist that_____.*

# Example Sentence Frames—Activity part 3

**Explain why it is better for Jose to buy his notebooks in bulk.**

***Ideal Conversation***

It is better to buy the notebooks in bulk because in bulk, the notebooks cost 10 cents a piece. Whereas when buying them individually, each notebook costs 35 cents a piece.

***Sentence Frames***

**Beginning**

It is better to buy the notebooks in bulk because in bulk, each notebook costs _____, but individually, each notebook costs _____.

**Middle**

It is better to buy the notebooks in bulk because in bulk, _____cost _____.
Whereas_____.

**High**

Buying the notebooks in bulk would be preferable because in bulk, _____. Whereas individually, _____.

# Example Sentence Frames—Activity Part 3

**Compare** rectangles to squares.

***Ideal Conversation***

Both rectangles and squares have 4 parallel lines and 4 right angles. Therefore, they are similar.

***Sentence Frames***

**Beginning**

Rectangles and squares are similar because they both have _____ and _____.

**Middle**

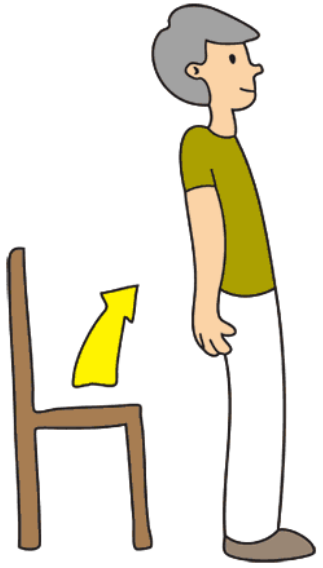
Both rectangles and squares have _____ and _____. Therefore, they are similar.

**High**

Rectangles and squares have a number of similarities. For example, both rectangles and squares have _____ and _____.

# Writing Your Own Sentence Frames—Activity part 3

1. Think about the ideal language for each level of student
2. Pick where you want to start and write your first frame
3. Scaffold up or down, as needed, to write your other frames
   - Lower level frames may have more language provided
   - Higher level frames may expect students to generate more language on their own
   - Lower level frames may have more hints
   - Higher level frames may use more sophisticated transition words
   - Higher level frames may elicit more complex grammatical structures
4. Use your resources
   - List of common transition words
   - Experienced colleagues
   - Ask me
5. As you finish,
   - Put your post its on their respective charts



# Gallery Walk

# Take Speaking to Writing

# Sentence Frames

- Purpose
- Differentiated frames
- Scaffolding away
- Reference Tool
- Writing your own

# Teach at the Sentence Level

## Benefits

- **Understand grammatical patterns**
- **Explain**
  - Thinking at their level
- **Have structures to better**
  - Answer questions
  - Answer word problems
  - Explain their thinking
- Have structures to **write like a mathematician** at any language proficiency level
- **Transfer to other content areas**
  - Understanding
  - Oral skills
  - Written skills

## How to

- **Think about:**
  - the sentence patterns you use
  - the sentence patterns used in math assessments
  - the sentences you want your students to produce
- **Use example signal words, grammatical structures and sentence frames**
- **Color code** by language proficiency level
- Students can use **their level frame or** challenge themselves with a **higher** level frame
- **Students add frames to personal reference tool**

# WIDA Performance Definitions - Speaking and Writing Grades K–12

**Within sociocultural contexts for language use…**

| | Discourse Dimension | Sentence Dimension | Word/Phrase Dimension |
|---|---|---|---|
| | **Linguistic Complexity** | **Language Forms and Conventions** | **Vocabulary Usage** |
| **Level 6 - Reaching** English language learners will use a range of grade-appropriate language for a variety of academic purposes and audiences. Agility in academic language use is reflected in oral fluency and automaticity in response, flexibility in adjusting to different registers and skillfulness in interpersonal interaction. English language learners' strategic competence in academic language use facilitates their ability to relate information and ideas with precision and sophistication for each content area. | | | |
| At each grade, toward the end of a given level of English language proficiency, and with instructional support, English language learners will produce… | | | |
| **Level 5 Bridging** | • Multiple, complex sentences<br>• Organized, cohesive, and coherent expression of ideas characteristic of particular content areas | • A variety of complex grammatical structures matched to purpose<br>• A broad range of sentence patterns characteristic of particular content areas | • Technical and abstract content-area language, including content-specific collocations<br>• Words and expressions with precise meaning across content areas |
| **Level 4 Expanding** | • Short, expanded, and some complex sentences<br>• Organized expression of ideas with emerging cohesion characteristic of particular content areas | • Compound and complex grammatical structures<br>• Sentence patterns characteristic of particular content areas | • Specific and some technical content-area language<br>• Words and expressions with expressive meaning through use of collocations and idioms across content areas |
| **Level 3 Developing** | • Short and some expanded sentences with emerging complexity<br>• Expanded expression of one idea or emerging expression of multiple related ideas across content areas | • Simple and compound grammatical structures with occasional variation<br>• Sentence patterns across content areas | • Specific content language, including cognates and expressions<br>• Words or expressions with multiple meanings used across content areas |
| **Level 2 Emerging** | • Phrases or short sentences<br>• Emerging expression of ideas | • Formulaic grammatical structures<br>• Repetitive phrasal and sentence patterns across content areas | • General content words and expressions<br>• Social and instructional words and expressions across content areas |
| **Level 1 Entering** | • Words, phrases, or chunks of language<br>• Single words used to represent ideas | • Phrase-level grammatical structures<br>• Phrasal patterns associated with familiar social and instructional situations | • General content-related words<br>• Everyday social and instructional words and expressions |

WIDA™

# WIDA Model (Example) Performance Indicators

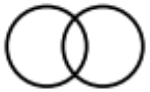
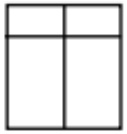
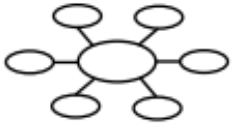
**COGNITIVE FUNCTION:** Students at all levels of English language proficiency UNDERSTAND congruence of figures in different positions on the coordinate plane.

| | Level 1 Entering | Level 2 Emerging | Level 3 Developing | Level 4 Expanding | Level 5 Bridging | |
|---|---|---|---|---|---|---|
| LISTENING | Adjust the position of figures based on simple oral commands (e.g., "rotate," "reflect," etc.) using visual supports with a partner | Adjust the position of figures based on oral descriptions (e.g., "reflect over the y-axis") using visual supports with a partner | Adjust the position of figures based on detailed oral descriptions using visual supports with a partner | Adjust the position of figures based on multi-step oral instructions using visual supports | Adjust the position of figures based on information from complex oral discourse | Level 6 – Reaching |

**TOPIC-RELATED LANGUAGE:** Students at all levels of English language proficiency interact with grade-level words and expressions, such as: geometric transformation, rotation, reflection, translation, dilation, scale factor, vector

**Taken from WIDA**
**2012 Amplification of**
**The English Language Development Standards**
**Page 96**

# WIDA Examples of Use of Graphic Organizers to Teach the Language of Math

| ELP standard | 3- The language of Mathematics |
|---|---|
|  **Venn Diagrams** - Comparing and Contrasting Two Entities | • Two operations<br>• Two geometric figures<br>• Two forms of proportion |
|  **T-Charts** - Sorting or Categorizing Objects or Concepts | • Area/Perimeter<br>• Fractions/ Decimals<br>• Addition/ Subtraction |
|  **Cycles** - Producing a Series of Connected Events or a Process | • Steps in problem-solving |
|  **Cause and Effect** - Illustrating a Relationship | • Variables in algebraic equations<br>• Geometric theorems |
|  **Semantic Webs** - Connecting Categories to Themes or Topics | • Types and features of polygons<br>• Types and characteristics of angles |

**Taken from WIDA English Language Proficiency Standards and Resource Guide 2007 Edition Page RG-23**

# WIDA Tools

- **WIDA English language Development Standards (CELP Standards)**

https://www.wida.us/standards/eld.aspx

- **WIDA Download Library**

http://www.wida.us/downloadlibrary.aspx

- **WIDA Educator Resources**

https://www.wida.us/professionaldev/educatorresources/

# Professional Learning Opportunities

COLORADO
Department of Education

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SchoolView | Data & Accountability | Programs & Supports | Teaching & Learning | Policy & Funding

* * CDE will be closed on Monday, May 29 for the Memorial Day holiday. * *

- Culturally and Linguistically Diverse Education Home
- Statewide Support
  - CLDE Meetings
  - Events
  - **Professional Learning Opportunities**
  - Targeted Support
  - Webinars
- ELD Program Requirements
- English Language Proficiency Act (ELPA)
- Title III (ESEA)
- Title VI
- Title IX (Education Amendments of 1972)
- Resources
- Contact Us

Home / Statewide Support

## Professional Learning Opportunities

Attendees must register for Professional Learning Opportunities through the link provided. Please note times and locations in the registration link. Space is limited to 35 people. In the event that there are fewer than ten people registered, the professional learning opportunity will be rescheduled and those registered will be notified.

### 2017 Professional Learning Opportunities for Administrators

#### Cultural Responsiveness

**Intended Audience - District Directors, Coordinators, and Administrators**

In this session, we will explore culture and diversity as it applies to educators and education. Participants will explore the influence of culture in the education system and on individual identity development as it relates to students, schools and districts.

- May 8, 2017 - Garfield School District – 839 Whiteriver Ave, Rifle, 81650 - *Registration Closed*

### 2017 Professional Learning Opportunities for Content and Classroom Teachers

#### Teaching Science to English Learners

**Intended Audience - Science teachers, classroom teachers, co-teachers, co-teaching teams, grade level teams, and school teams**

This session provides science and classroom teachers, as well as ESL/bilingual educators, a foundational knowledge of English language development and explores tools and strategies for making science more accessible to English learners through teaching the Colorado English Language Proficiency (CELP) standards.

- June 8, 2017 - Montrose County - 930 Colorado Avenue, Montrose, 81401 - Register Here for June 8th Science Training in Montrose

#### Teaching Math to English Learners

**Intended Audience - Math teachers, classroom teachers, co-teachers, co-teaching teams, grade level teams, and school teams**

This session provides math and classroom teachers, as well as ESL/bilingual educators, a foundational knowledge of English language

**http://www.cde.state.co.us/cde_english/professionaldevelopment**

# Standards Office: Mathematics

COLORADO
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- Standards and Instructional Support
  - 2009/2010 Standards
  - 2020 Standards Implementation
  - 2020 Standards Downloads
  - Communication Resources
  - Extended Evidence Outcomes
- Arts
- Comprehensive Health
- Computer Science
- Financial Literacy
- Mathematics
  - Academic Standards
  - Family and Community Communication
  - Curriculum Support
  - Colorado Mathematics
  - Instructional Resources

Home

## Mathematics

The Mathematics standards compel us to make mathematics relevant to students by moving beyond mere answer getting to doing the work of mathematicians. The standards emphasize the development of students' abilities to use mathematics to represent their lived experiences and to simplify and explain complex phenomena.

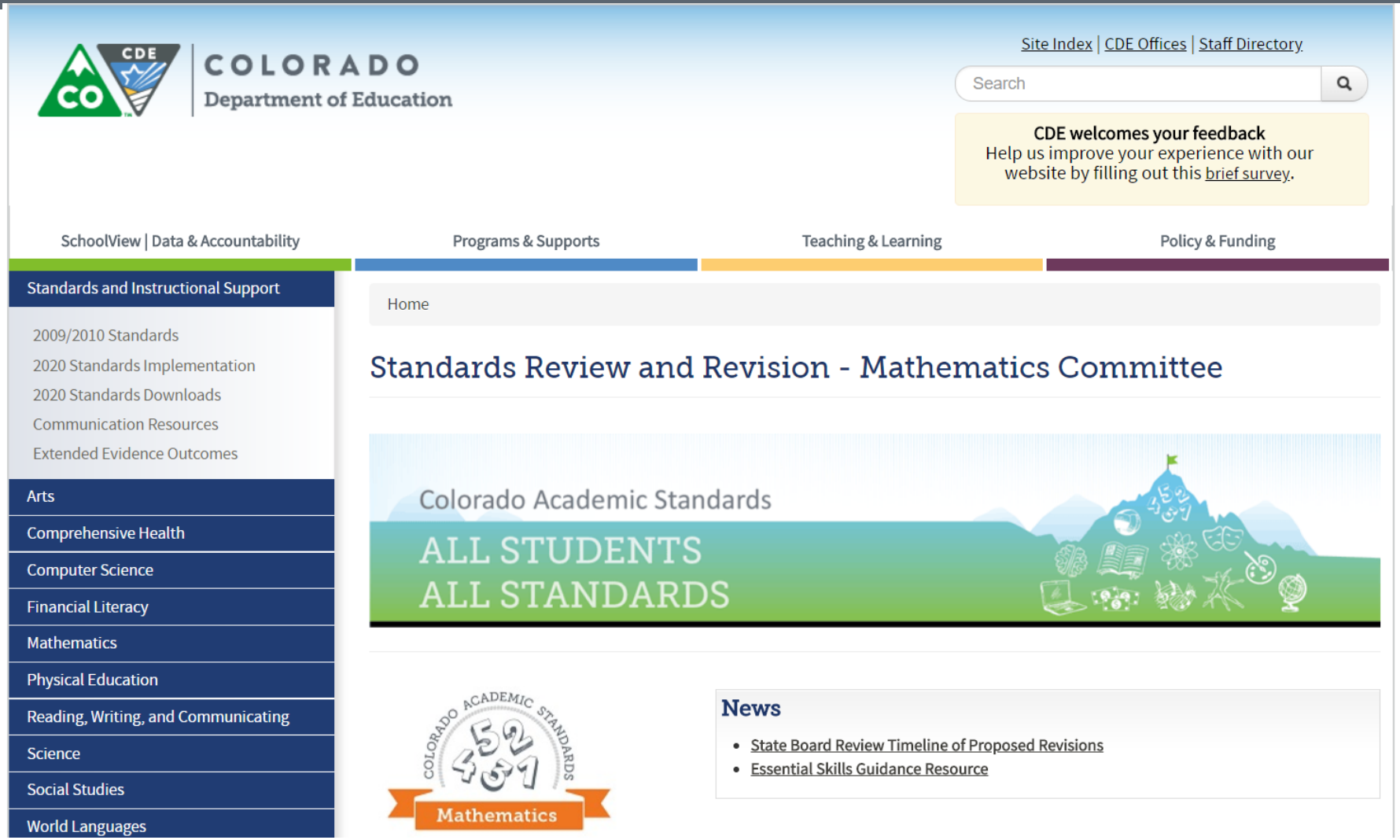
### Important Announcements

*New!* Word Problems - Research and Practice Guide

Word problems have an undeserved reputation within mathematics. With a better understanding of why people struggle with word problems, and ideas for supporting them in instruction, word problems can be a useful tool for learning mathematics.

http://www.cde.state.co.us/comath

# Standards Math Committee




http://www.cde.state.co.us/standardsandinstruction/cas-committees-mathematics

# Other Resources

- **Math Vocabulary Word Wall Cards**

http://www.doe.virginia.gov/instruction/index.shtml

  - Click on mathematics
  - Scroll to click on Mathematics Vocabulary Word Wall Cards
  - Click on your grade

- **Math Vocabulary Cards, Charts, and Notebook**

https://morethanenglish.edublogs.org/resources/#Math

- **Graphic Organizer Maker**

http://graphicorganizer.net/?utm_campaign=p4l_home&utm_source=p4l&utm_medium=web

- **Vocabulary Strategies, Sentence Frames, Cognates**

http://www.houstonisd.org/cms/lib2/TX01001591/Centricity/Domain/26922/VocabularyStrategiesDocument.pdf

- **Doing and Talking Math and Science**

http://stem4els.wceruw.org/index.html

# Please


- How do you teach the language of math?
  - Email photos, videos, lesson plans, handouts, etc. Ottenbreit_r@cde.state.co.us
  - Post a lesson on the WIDA lesson plan share space

https://www.wida.us/professionaldev/educatorresources/lessonPlan-shareSpace.aspx

  - Submit a video to the WIDA video contest

https://www.wida.us/professionaldev/educatorresources/videos.aspx

# Outcomes

- Build awareness of WIDA's Can Do Philosophy and the Guiding Principals of Language Development
- Learn strategies to teach the language of math in order to provide access to math content for English Learners and support academic language learning for all students
- *Pick at least one strategy to start using tomorrow*

# Ticket Out the Door


- **Describe** one strategy that you will start using tomorrow and **explain** why you chose that strategy.
- **Describe** one strategy that you will share with a colleague and **explain** why you chose that strategy.
- What is something that you would like to know more about?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