# Overview of Alaska's English Language Arts & Mathematics Standards

# Preparing College, Career, & Culturally Ready Graduates

# Objectives

- Understand the history of standards in Alaska
- Explore the structural and instructional shifts of Alaska's ELA and Math standards


Setting high academic standards is a key component in the quality of education and breadth of opportunity for students in Alaska.

# Education Historically

- Elementary and Secondary Education Act 1965
- Improving America's Schools Act 1994
- No Child Left Behind 2001

# A **Nation-Wide** Look at Content Standards

- Spearheaded by Council of Chief State School Officers and National Governors Association
- July 2009 work groups from higher education, K – 12 education, and the research community
- March 2010 first public draft
- June 2010 final version – Common Core

# History of Standards in Alaska

- **1990's:** Alaska standards in reading, writing, and mathematics were developed by age spans

- **2004:** Grade Level Expectations (GLEs) in reading, writing, and mathematics were developed to further define standards at each grade level (grades 3 – 10)

- **2006**: Grade Level Expectations were expanded to include kindergarten through second grade

# A Look at Previous Standards

- Long lists of broad, vague statements
- Assessments that "sampled" the standards
- Coverage mentality

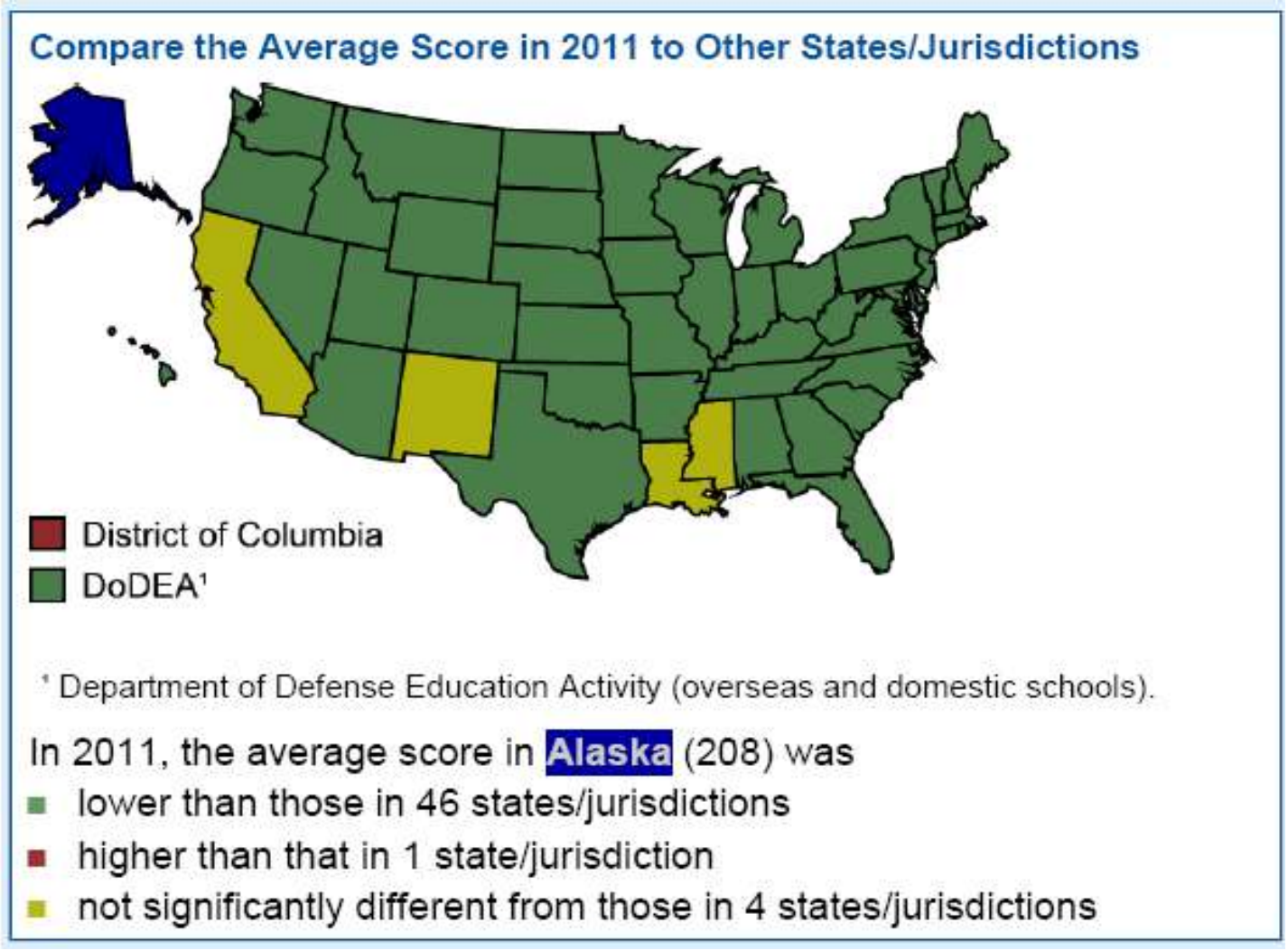
- Focused on teacher behaviors – "the inputs"rather than on student learning


The evidence suggesting Alaska's students need a higher learning standard

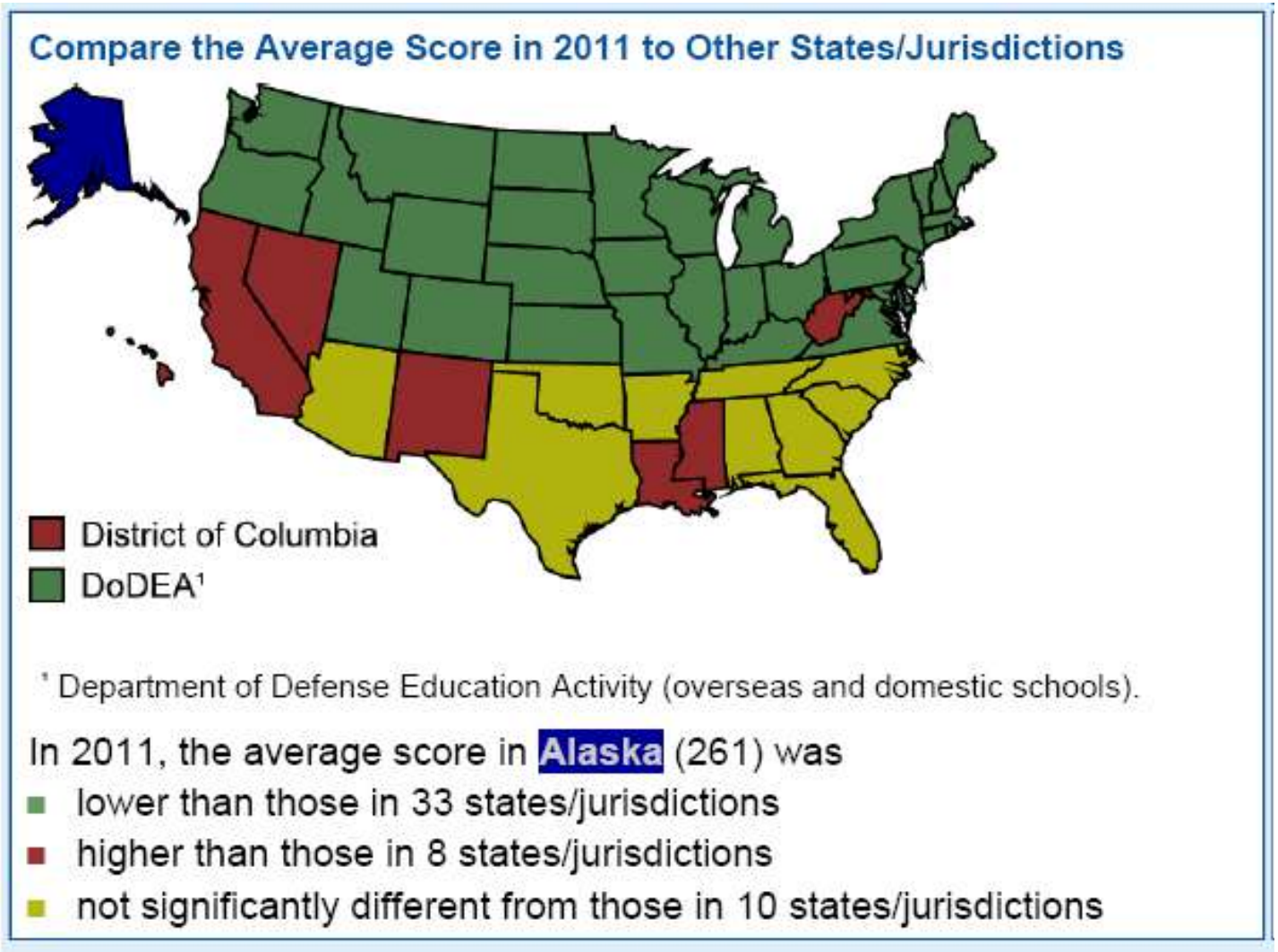
# National Competitiveness

- The National Assessment of Educational Progress (NAEP) is the common measurement of student achievement
  - NAEP was created in 1969; the No Child Left Behind Act (NCLB) mandated state participation in NAEP reading and math every other year
  - Alaska's has NAEP data for 2003, 2005, 2007, 2009, and 2011 for grades 4 and 8 in reading and math
  - Look at Alaska's data for 2011

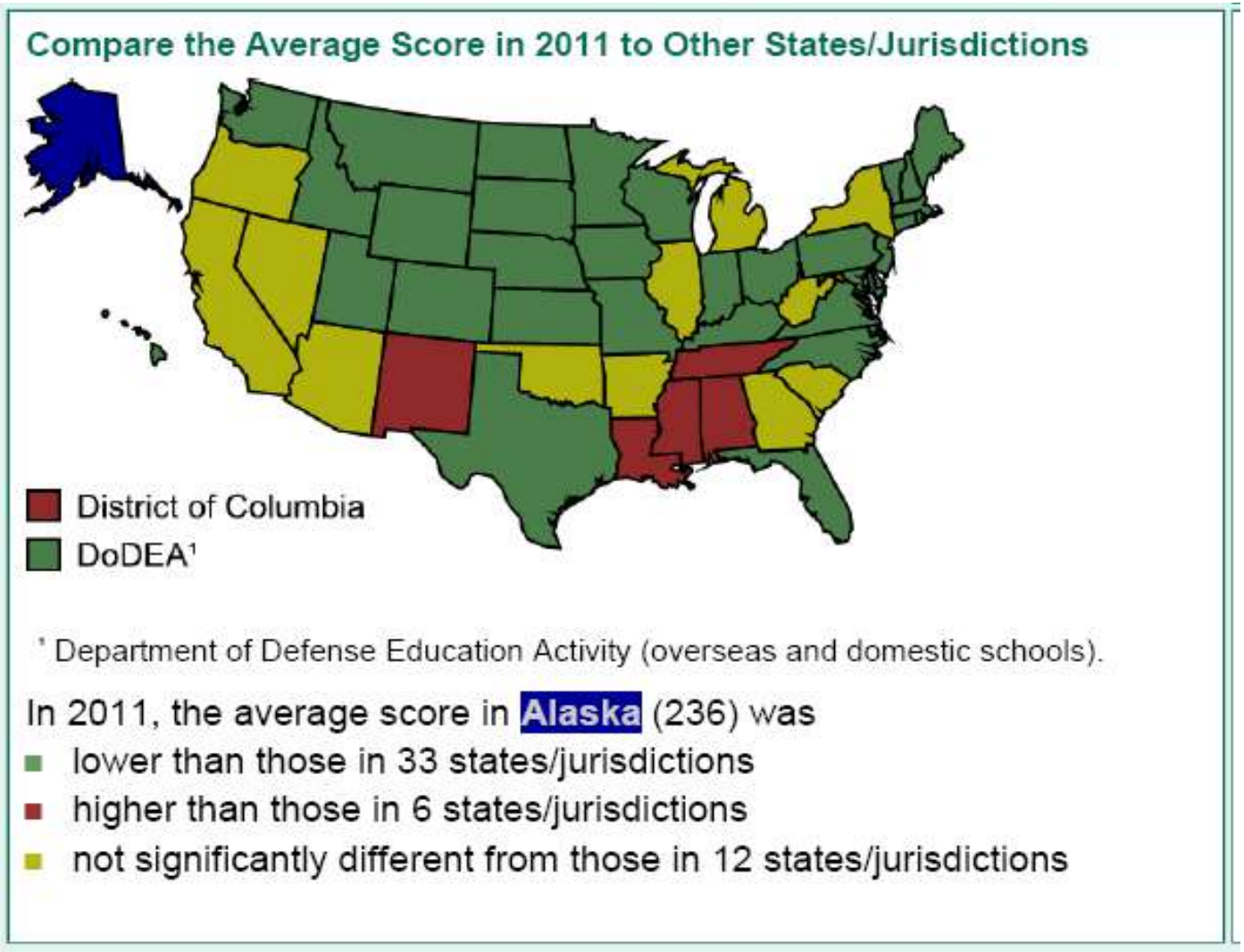
# NAEP – Reading Grade 4



# NAEP – Reading Grade 8



# NAEP – Mathematics Grade 4



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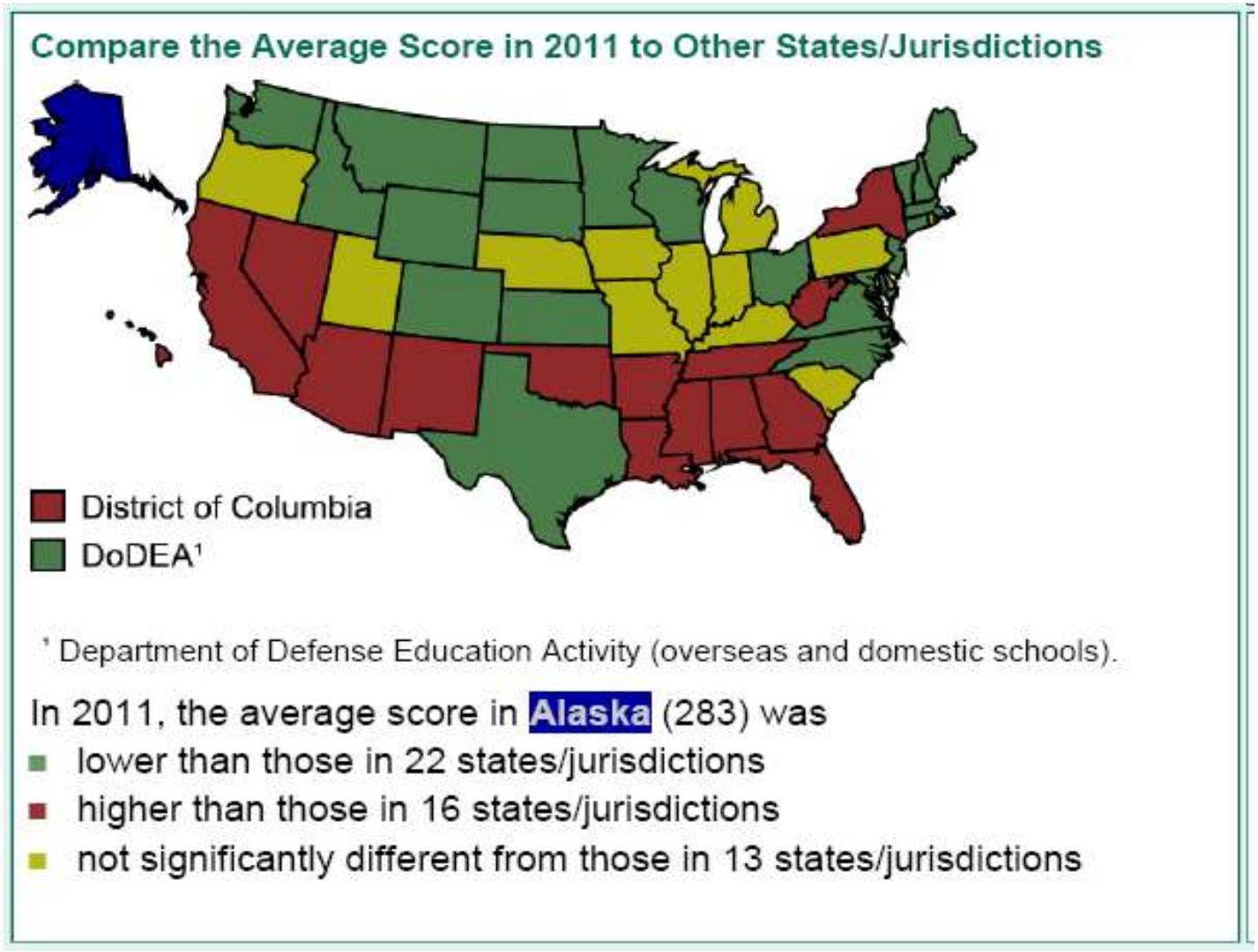
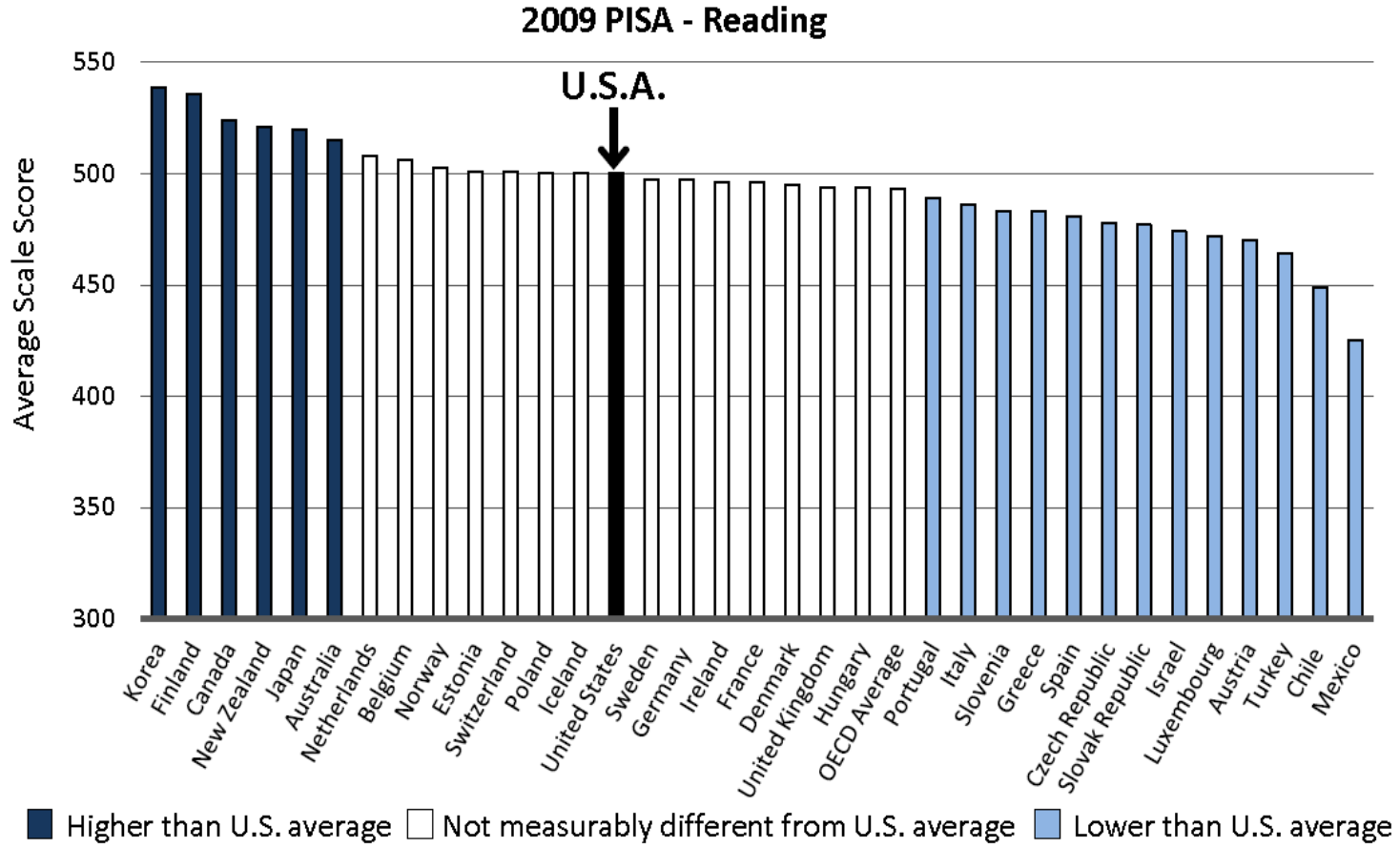


# International Competitiveness

The Program for International Student Assessment (PISA) is an international study which began in the year 2000.

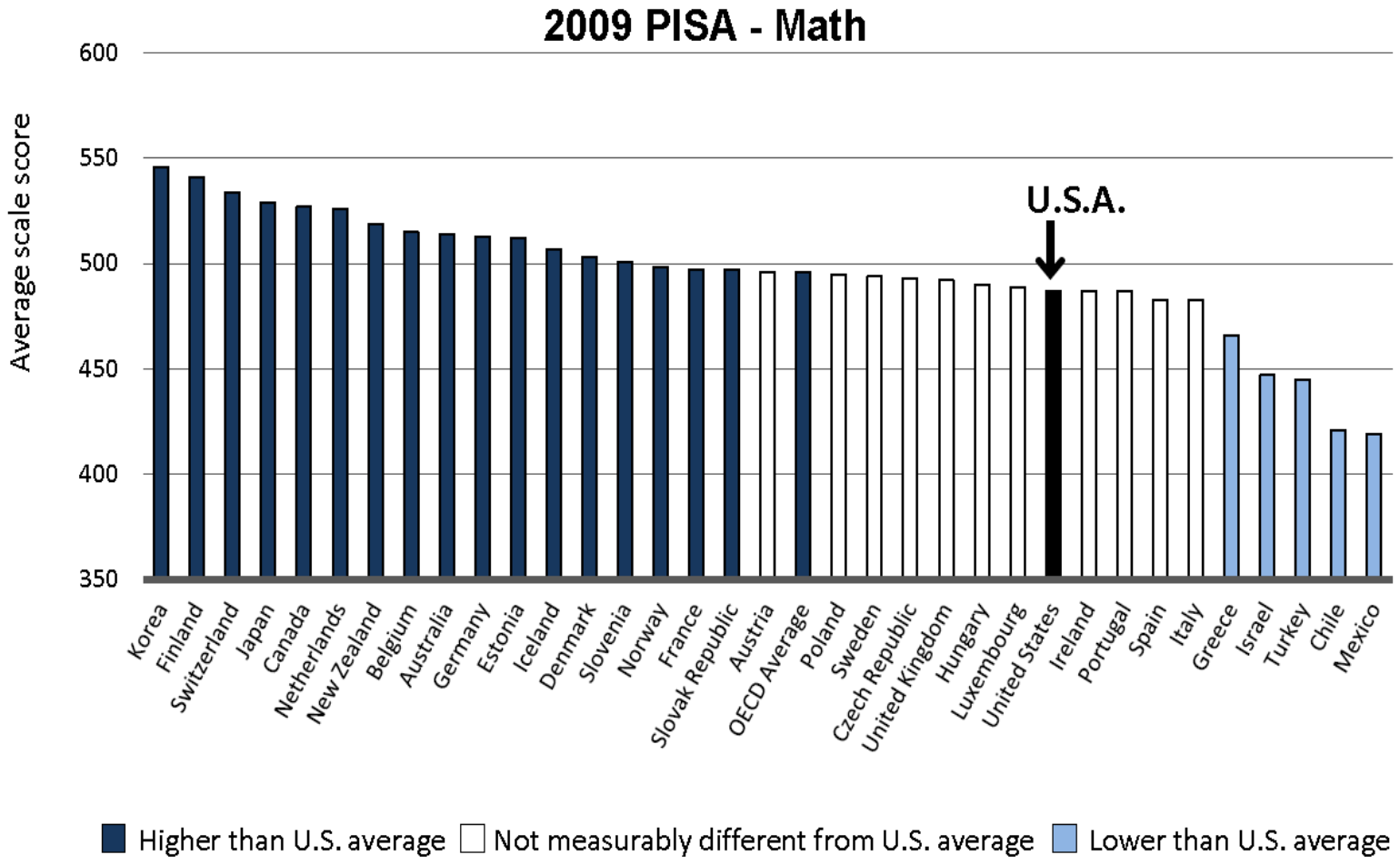
- PISA aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students in participating countries/economies.
- Since the year 2000 over 70 countries and economies have participated in PISA.

# Of 34 OECD Countries, U.S.A. Ranks 12th in Reading Literacy



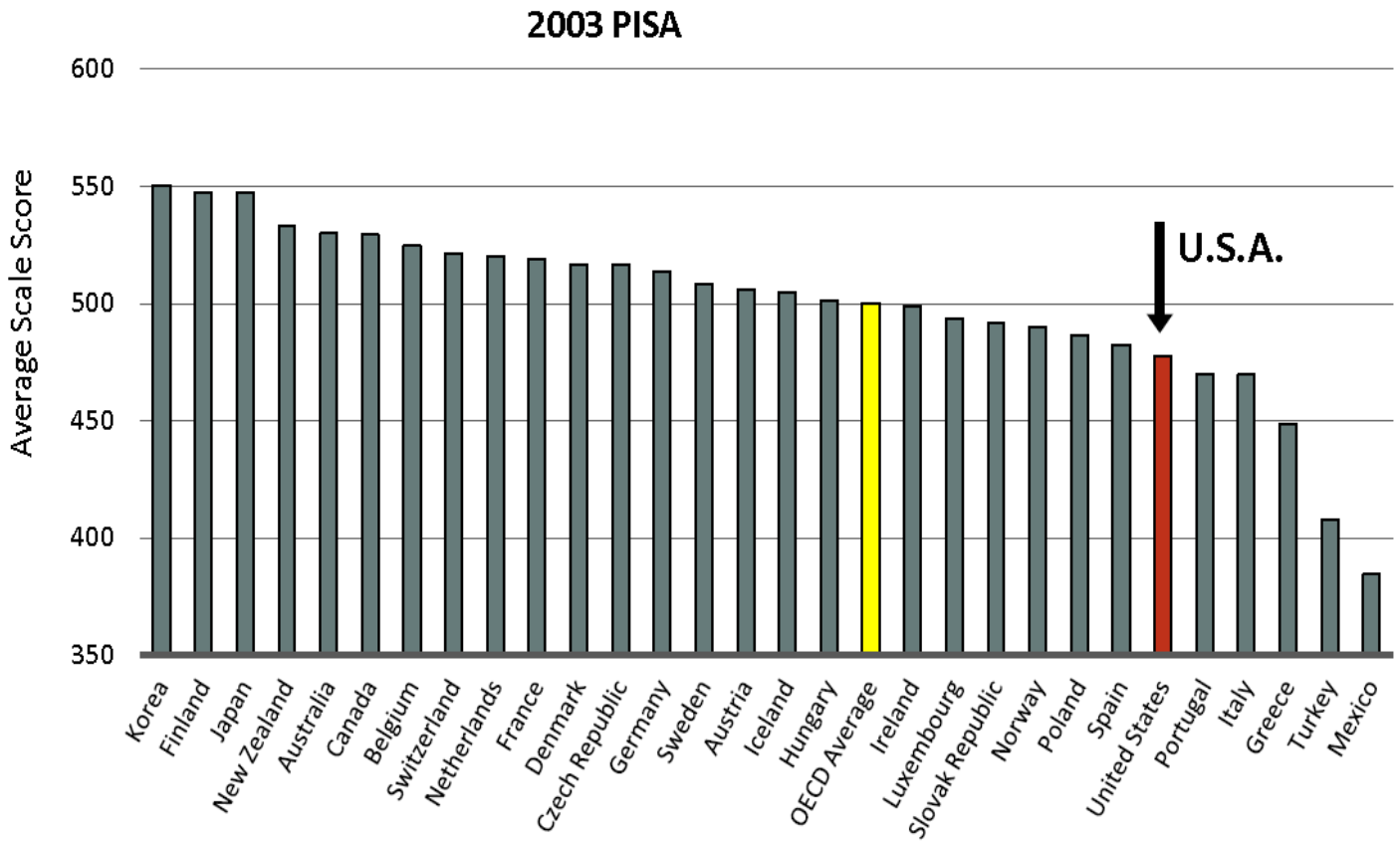

Source: "Highlights from PISA 2009," NCES, 2010

# Of 34 OECD Countries, U.S.A. Ranks 25th in Math




Source: "Highlights from PISA 2009," NCES, 2010

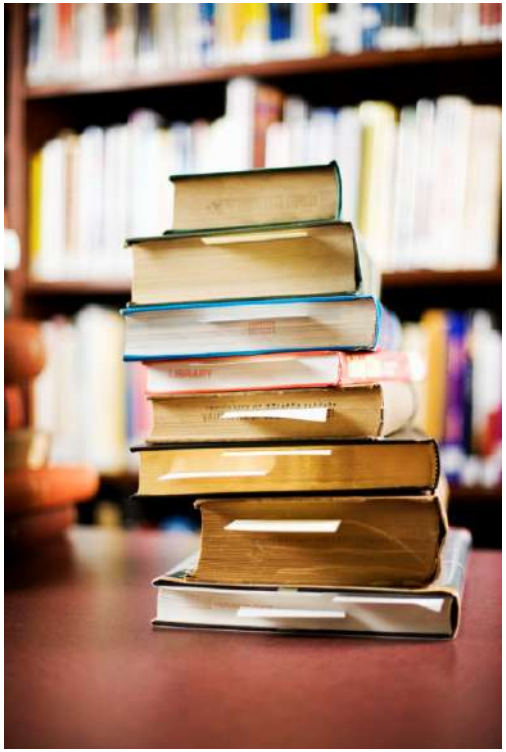
# U.S.A. Ranks 24th Out of 29 OECD Countries in Problem-Solving




Source: PISA 2003 Results, OECD

# Alaskans begin the process

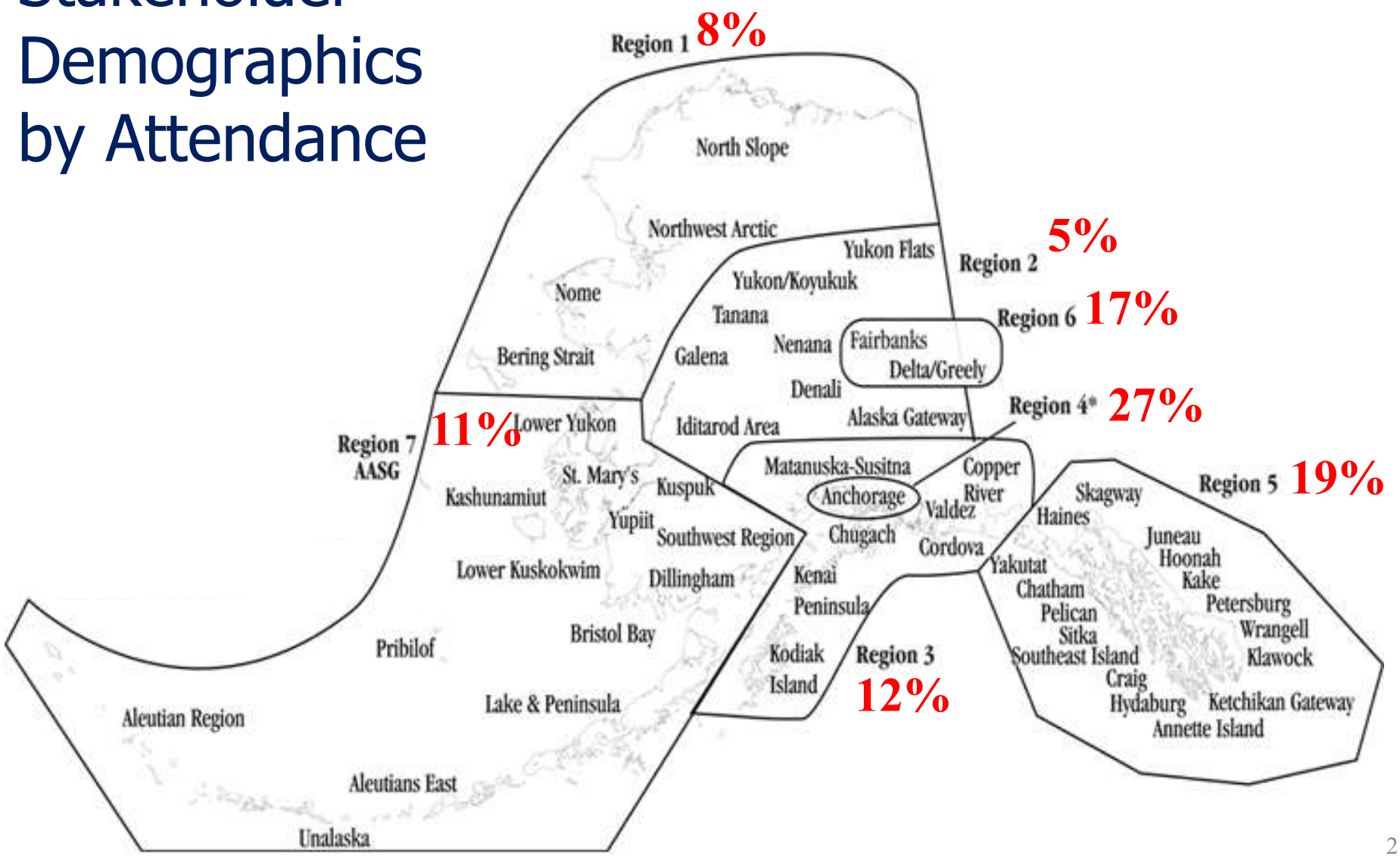
June – November 2011, Alaska educators along with national experts shared their knowledge and assisted in the work to create the proposed standards.



# Stakeholder representation

- Alaska classroom teachers in reading, writing, and mathematics –kindergarten through high school
- University instructors representing multiple content areas
- Career and technical education instructors
- Alaska industry and business representatives
- District administrators
- Educators representing students with disabilities, English language learners, economically disadvantaged, and ethnic groups

# Stakeholder Demographics by Attendance

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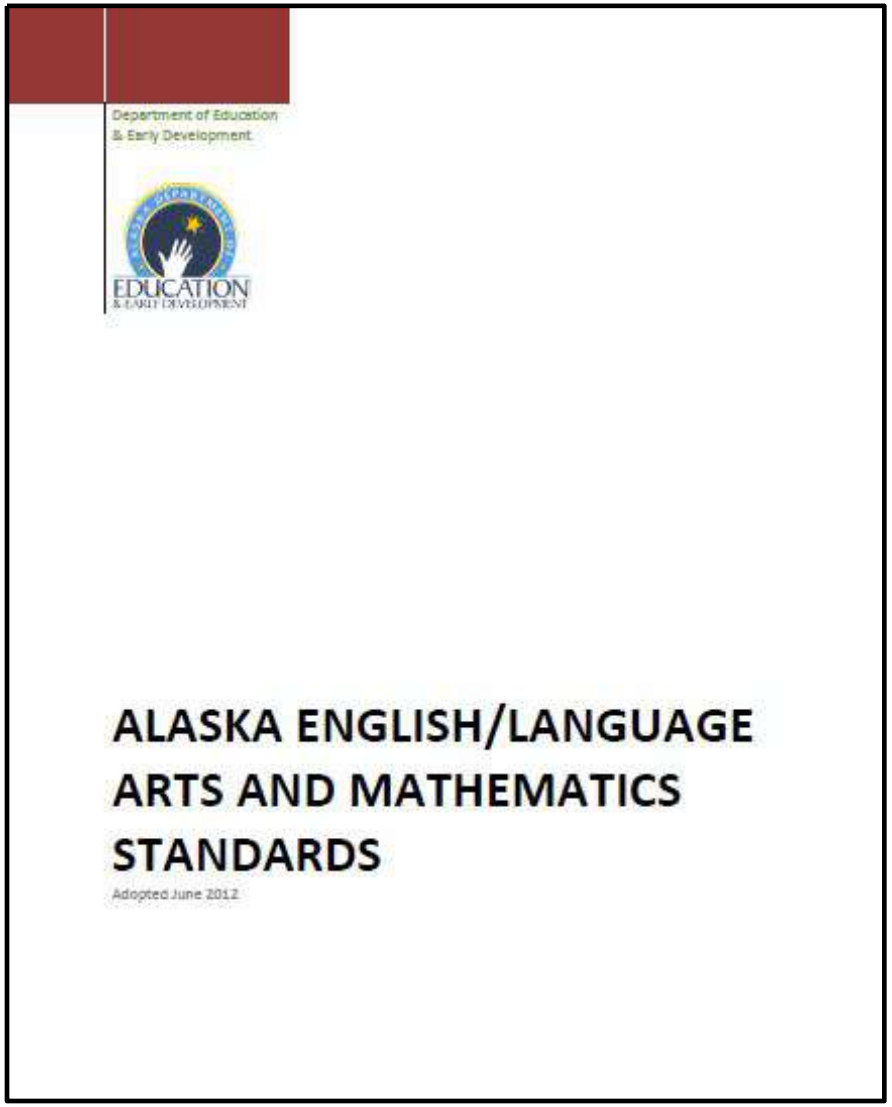

Department of Education
& Early Development
EDUCATION
& EARLY DEVELOPMENT
ALASKA ENGLISH/LANGUAGE ARTS AND MATHEMATICS STANDARDS
Adopted June 2012

# How are the new standards different from the old?

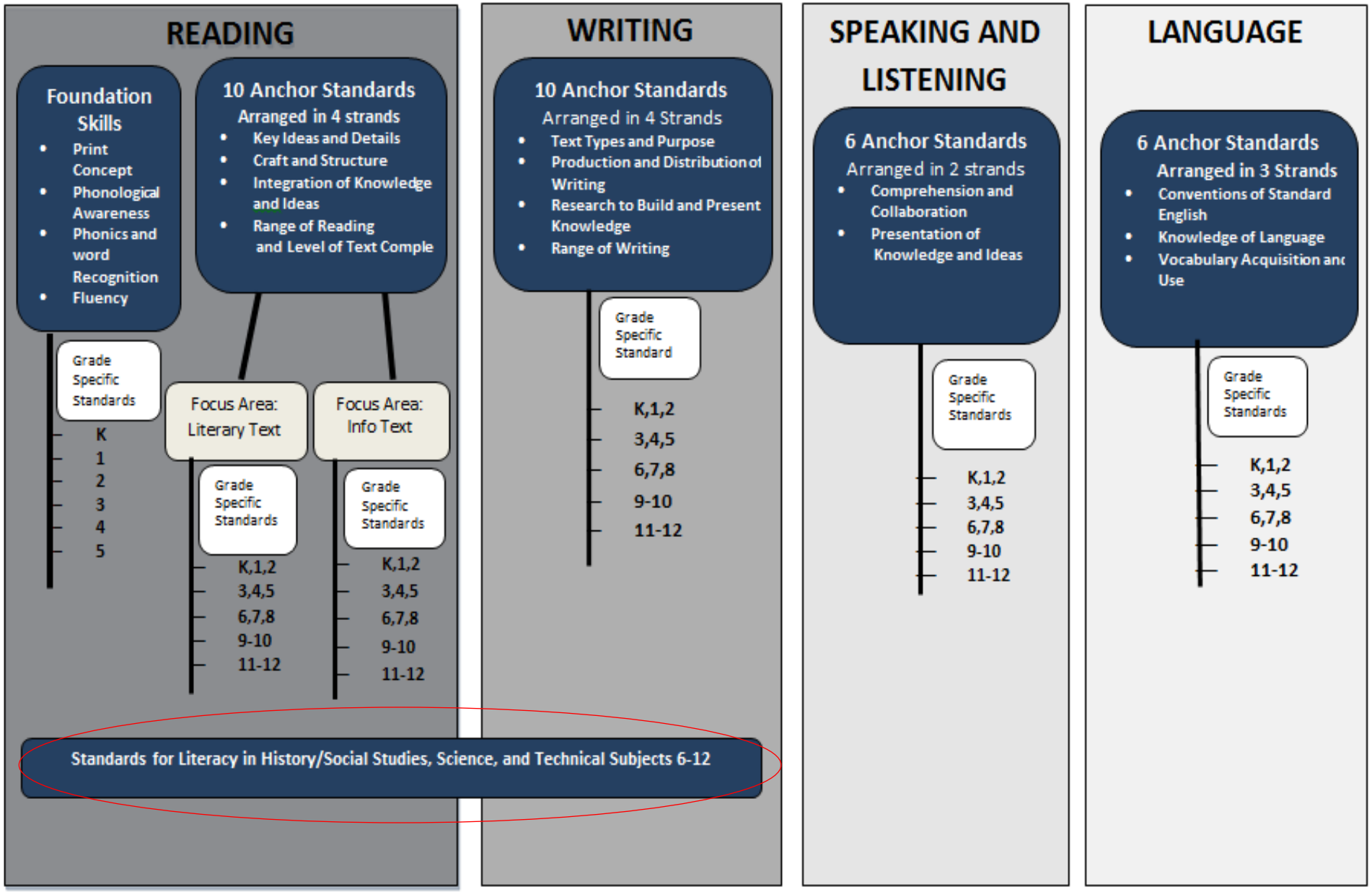
- Structural – Different in structure. ELA and Math different

- Instructional – 3 general shifts in English Language Arts and 3 general shifts in Mathematics

# Understanding Alaska English/Language Arts Standards Shifts

# Structure of English Language Arts Standards

# Alaska English Language Arts Standards Organization



# What has NOT changed

## Foundational Skills

- Print Concepts (K – 1)
- Phonological Awareness (K – 1)
- Phonics and Word Recognition (K – 5)
- Fluency (K – 5)

# General Shifts in Instruction

**1.Building knowledge** through **content-rich nonfiction** and **information texts** in addition to literature

2. Reading and writing grounded in **evidence from the text**

3. Regular practice with **complex text** and its **academic vocabulary**

# Shift #1: Building Knowledge Through A Balance of Content-Rich Nonfiction and Literature

# Reading Anchor Standards

*Alaska Anchor Standards Reading Grades K-12*

The K-12 grade-specific standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the anchor standards below by number. The grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

**Key Ideas and Details**

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

**5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.**

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6. Assess how point of view or purpose shapes the content and style of a text.

**Integration of Knowledge and Ideas**

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

**Range of Reading and Level of Text Complexity**

10. Read and comprehend a range of complex literary and informational texts independently and proficiently.

Reading Standards for Informational Text K-5

| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Key Ideas and Details** | | |
| **1.** Ask and answer questions to demonstrate understanding of a text, (e.g., explaining what the texts says explicitly, making basic inferences and predictions), referring explicitly to the text as the basis for the answers. | **1.** Locate explicit information in the text to explain what the text says explicitly and to support inferences drawn from the text. | **1.** Locate explicit information in the text to explain what the text says explicitly and to support inferences drawn from the text. |
| **5. Use text features and search tools (e.g., table of contents, index, key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.** | **5. Describe the overall structure (e.g., sequence, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.** | **5. Compare and contrast the overall structure (e.g., sequence, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.** |
| relevant to a grade 3 topic or subject area.<br>**5.** Use text features and search tools (e.g., table of contents, index, key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.<br>**6.** Determine author's purpose; distinguish own point of view from that of the author of a text. | relevant to a grade 4 topic or subject area.<br>**5.** Describe the overall structure (e.g., sequence, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.<br>**6.** Determine author's purpose; compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided. | relevant to a grade 5 topic or subject area.<br>**5.** Compare and contrast the overall structure (e.g., sequence, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.<br>**6.** Determine author's purpose; analyze multiple accounts of the same event or topic, noting important similarities and differences in the points of view they represent. (e.g., social studies topics, media messages about current events). |

# *The Why*: Shift One

- Much of our knowledge base comes from informational text
- Informational text makes up the vast majority (80 percent) of the required reading in college and the workplace
- Informational text is harder for students to comprehend than narrative text

# *The What:* Shift One

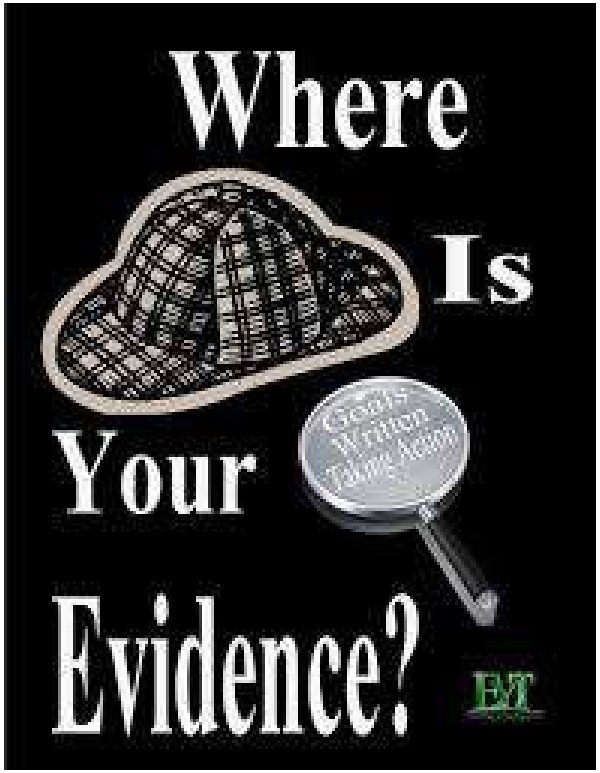
- Reading Standards for Literary Text and for Informational Text
- Increase in reading of non-fiction, informational text
  - 50/50 balance K-5 of informational and literary text
  - 55/45 balance in middle school of informational and literary text
  - 70/30 balance in 9-12 of informational and literary text
- Coherent set of non-fiction texts that support building knowledge
- For grades 6-12:  Standards for Literacy in Social Studies, Science, and Technical Subjects

# What is Informational /Content-Rich Nonfiction Text in ELA ?

- Literary nonfiction. For purposes of Alaska ELA Standards
  - Biographies, memoirs, speeches, opinion pieces
  - Essays about art, literature, journalism, etc.
  - Historical , scientific, technical, or economic accounts written for a broad audience

- Historical text (Gettysburg Address, Letters from the Birmingham Jail, or The Preamble and First Amendment of the United States Constitution)

# Shift #2: Reading and Writing Grounded in Evidence From Text



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3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

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**Range of Reading and Level of Text Complexity**

10. Read and comprehend a range of complex literary and informational texts independently and proficiently.

# *The Why*: Shift Two

- Most college and workplace writing requires evidence
- The ability to cite evidence differentiates strong from weak student performance on NAEP
- Being able to locate and deploy evidence are hallmarks of  strong readers and writers

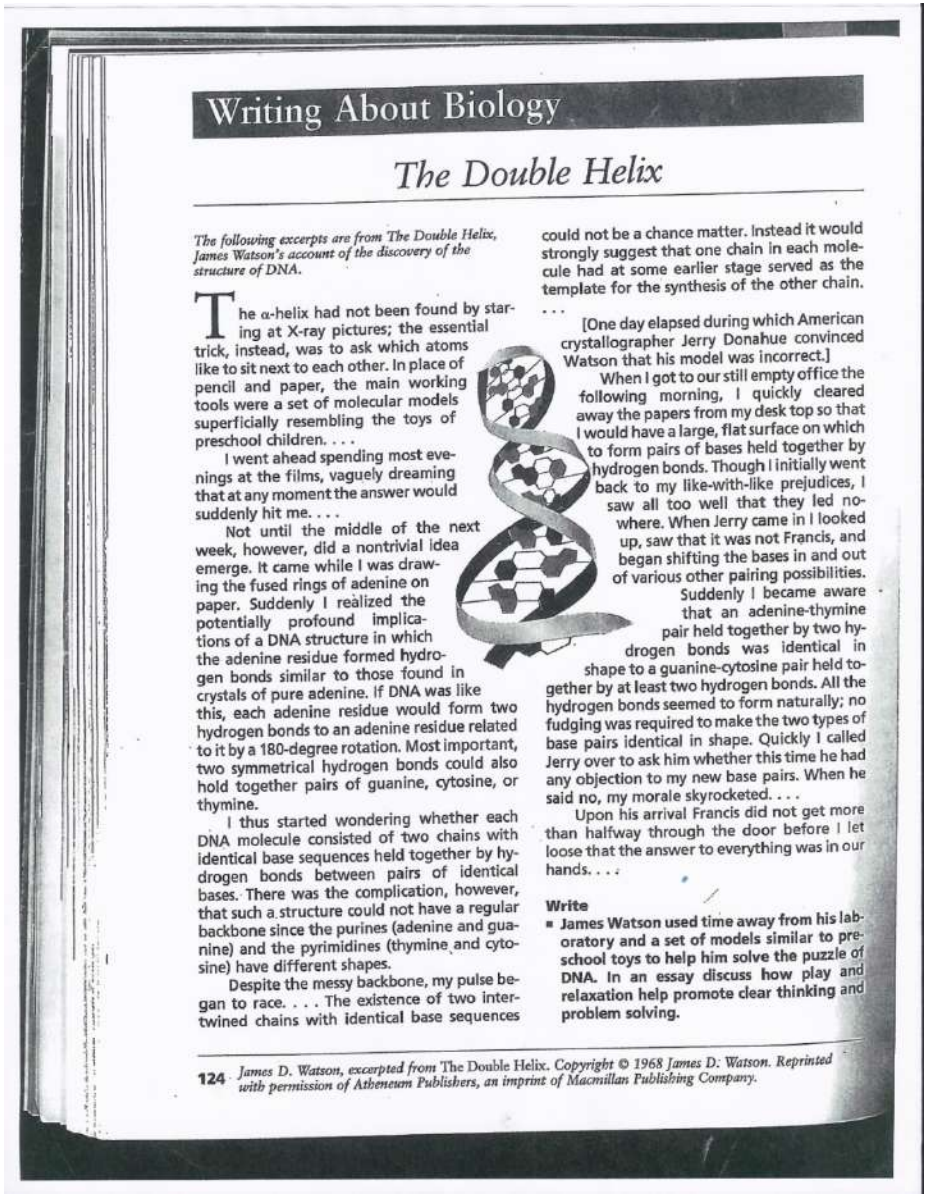
# *The What:* Shift Two

- For **reading**, students must grasp information, arguments, ideas and details based on careful attention to the text
- For **writing**, students must write to present analyses, well-defended claims, and clear information using clear information
- For teachers, crafting good text-dependent questions achieve these objectives.

# Asking the right questions takes as much skill as giving the right answers.

Robert Half

| Not Text Dependent | Text Dependent |
| --- | --- |
| In "Casey at the Bat," Casey strikes out. Describe a time when you failed at something. | What makes Casey's experiences at bat humorous? |
| In "Letter From Birmingham Jail," Dr. King discusses nonviolent protest. Discuss, in writing, a time when you wanted to fight against something that you felt was unfair. | What can you infer from King's letter about the letter that he received? |
| In "The Gettysburg Address" Abraham Lincoln says the nation is dedicated to the proposition that all men are created equal. Why is equality an important value to promote? | "The Gettysburg Address" mentions the year 1776. According to Lincoln's speech, why is this year significant to the events described in the speech? |



Writing About Biology

## The Double Helix

*The following excerpts are from The Double Helix, James Watson's account of the discovery of the structure of DNA.*

The α-helix had not been found by staring at X-ray pictures; the essential trick, instead, was to ask which atoms like to sit next to each other. In place of pencil and paper, the main working tools were a set of molecular models superficially resembling the toys of preschool children. . . .

I went ahead spending most evenings at the films, vaguely dreaming that at any moment the answer would suddenly hit me. . . .

Not until the middle of the next week, however, did a nontrivial idea emerge. It came while I was drawing the fused rings of adenine on paper. Suddenly I realized the potentially profound implications of a DNA structure in which the adenine residue formed hydrogen bonds similar to those found in crystals of pure adenine. If DNA was like this, each adenine residue would form two hydrogen bonds to an adenine residue related to it by a 180-degree rotation. Most important, two symmetrical hydrogen bonds could also hold together pairs of guanine, cytosine, or thymine.

I thus started wondering whether each DNA molecule consisted of two chains with identical base sequences held together by hydrogen bonds between pairs of identical bases. There was the complication, however, that such a structure could not have a regular backbone since the purines (adenine and guanine) and the pyrimidines (thymine and cytosine) have different shapes.

Despite the messy backbone, my pulse began to race. . . . The existence of two intertwined chains with identical base sequences could not be a chance matter. Instead it would strongly suggest that one chain in each molecule had at some earlier stage served as the template for the synthesis of the other chain. . . .

[One day elapsed during which American crystallographer Jerry Donahue convinced Watson that his model was incorrect.]

When I got to our still empty office the following morning, I quickly cleared away the papers from my desk top so that I would have a large, flat surface on which to form pairs of bases held together by hydrogen bonds. Though I initially went back to my like-with-like prejudices, I saw all too well that they led nowhere. When Jerry came in I looked up, saw that it was not Francis, and began shifting the bases in and out of various other pairing possibilities. Suddenly I became aware that an adenine-thymine pair held together by two hydrogen bonds was identical in shape to a guanine-cytosine pair held together by at least two hydrogen bonds. All the hydrogen bonds seemed to form naturally; no fudging was required to make the two types of base pairs identical in shape. Quickly I called Jerry over to ask him whether this time he had any objection to my new base pairs. When he said no, my morale skyrocketed. . . .

Upon his arrival Francis did not get more than halfway through the door before I let loose that the answer to everything was in our hands. . . .

**Write**

- **James Watson used time away from his laboratory and a set of models similar to preschool toys to help him solve the puzzle of DNA. In an essay discuss how play and relaxation help promote clear thinking and problem solving.**



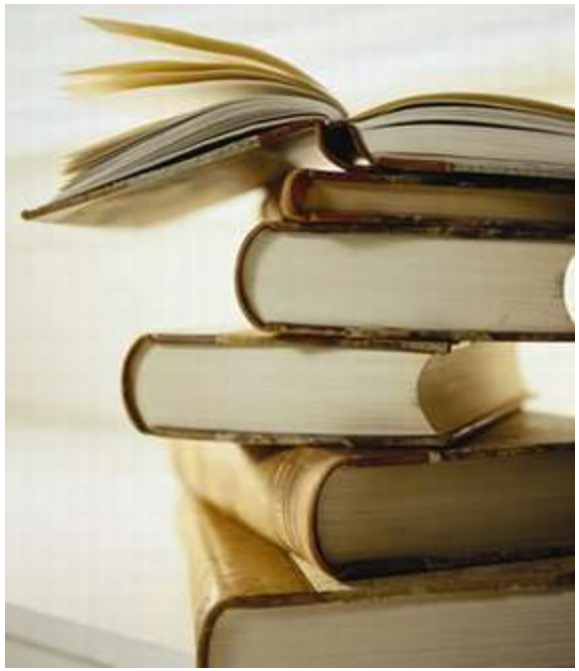
# Example?

*James Watson used time away from his laboratory and a set of models similar to preschool toys to help him solve the puzzle of DNA. In an essay discuss how play and relaxation help promote clear thinking and problem solving.*

# Progression of Text Dependent Questions


- Opinions, Arguments, Intertextual Connections
- Inferences
- Author's Purpose
- Vocab & Text Structure
- Key Details
- General Understanding

# Shift #3: Regular Practice With Complex Text and Its Academic Vocabulary



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|---|---|---|
| **Integration of Knowledge and Ideas** | | |
| **7.** Use information gained from illustrations (e.g., maps, photographs), and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). | **7.** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. | **7.** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. |
| **10. By the end of the year, read and comprehend a range of literature from a variety of cultures, within a complexity band appropriate to grade 3 (from upper grade 2 to grade 4), with scaffolding as needed at the high end of the range.** | **10. By the end of the year, read and comprehend a range of literature from a variety of cultures, within a complexity band appropriate to grade 4 (from upper grade 3 to grade 5), with scaffolding as needed at the high end of the range.** | **10. By the end of the year, read and comprehend a range of literature from a variety of cultures, within a complexity band appropriate to grade 5 (from upper grade 4 to grade 6), with scaffolding as needed at the high end of the range.** |

# *The Why*: Shift Three

- The gap between the complexity of college and high school text is huge.
- What students can read, in terms of complexity, is the greatest predictor of success in college (ACT study).
- Too many students are reading at a low level. (Less than 50 percent of graduates can read sufficiently complex text to succeed at the college level.)

# *The What:* Shift Three

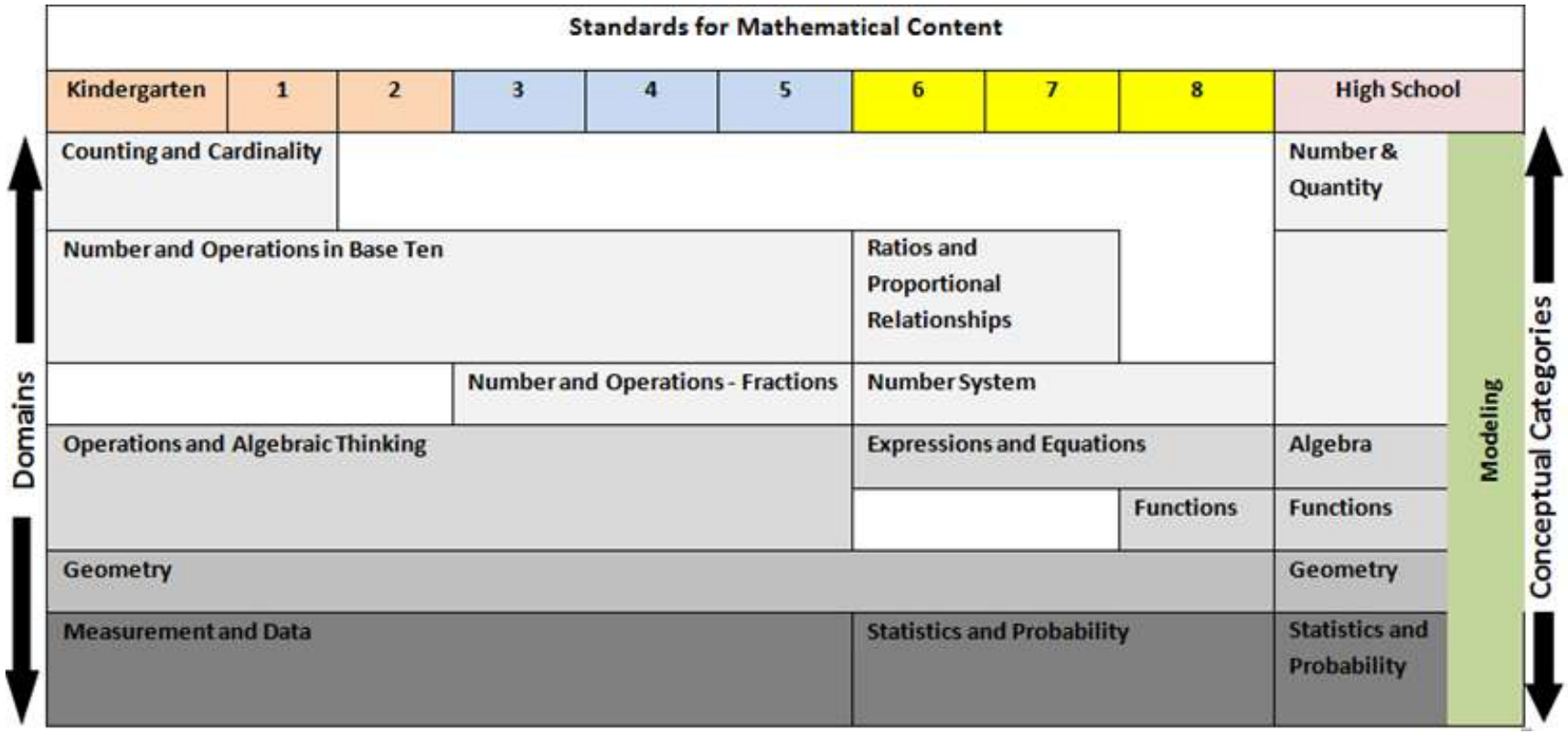
- Subtle and/or frequent **transitions**
- Multiple and/or subtle themes and purposes
- Density of information
- Complex sentences
- Uncommon vocabulary
- Lack of words, sentences or paragraphs that review or pull things together for the student
- Longer paragraphs
- Any text structure which is less narrative and/or mixes structures

# Understanding Alaska Mathematics Standards Shifts

# Structure of Alaska Mathematic Standards

# Math Organization

## Math Content Standard



# Math Organization

## Math Practices

This chart shows the organization of mathematics standards and the domain progression from Kindergarten through High School.

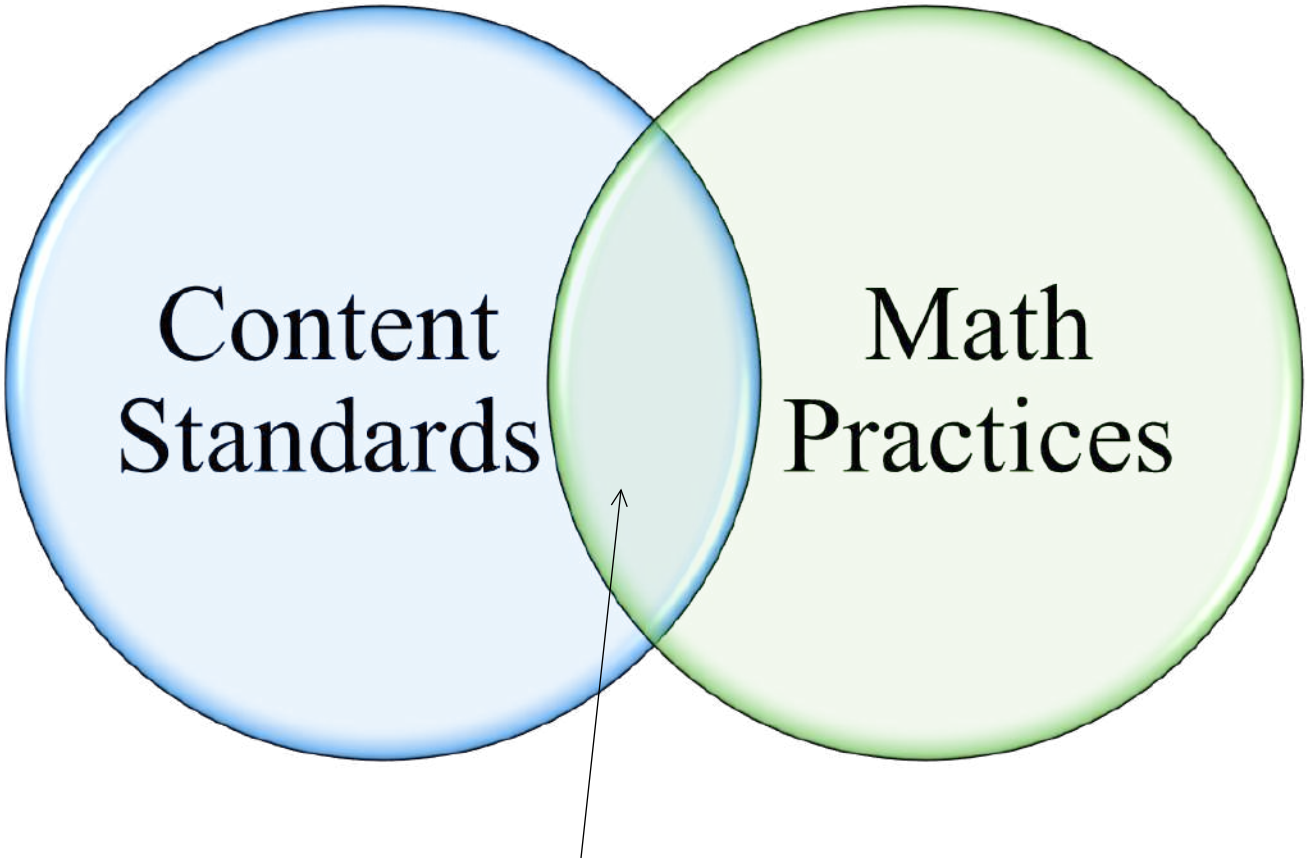
**Standards for Mathematical Practice**

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

**Standards for Mathematical Content**

| Domains | Kindergarten | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | High School | Conceptual Categories |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Counting and Cardinality | | | | | | | | | Number & Quantity | Modeling |
| | Number and Operations in Base Ten | | | | | | Ratios and Proportional Relationships | | | | |
| | | | | Number and Operations - Fractions | | | Number System | | | | |
| | Operations and Algebraic Thinking | | | | | | Expressions and Equations | | | Algebra | |
| | | | | | | | | | Functions | Functions | |
| | Geometry | | | | | | | | | Geometry | |
| | Measurement and Data | | | | | | Statistics and Probability | | | Statistics and Probability | |

# Mathematics Standards



# Shifts in Mathematics

1. **Focus**: 2-3 topics focused on deeply in each grade.

2. **Coherence**: Concepts logically connected from one grade to the next and linked to other major topics within the grade.

3. **Rigor**: In major topics pursue **conceptual understanding**, procedural skill and **fluency**, and **application** with equal intensity.

# *The Why*: Shift #1 Focus

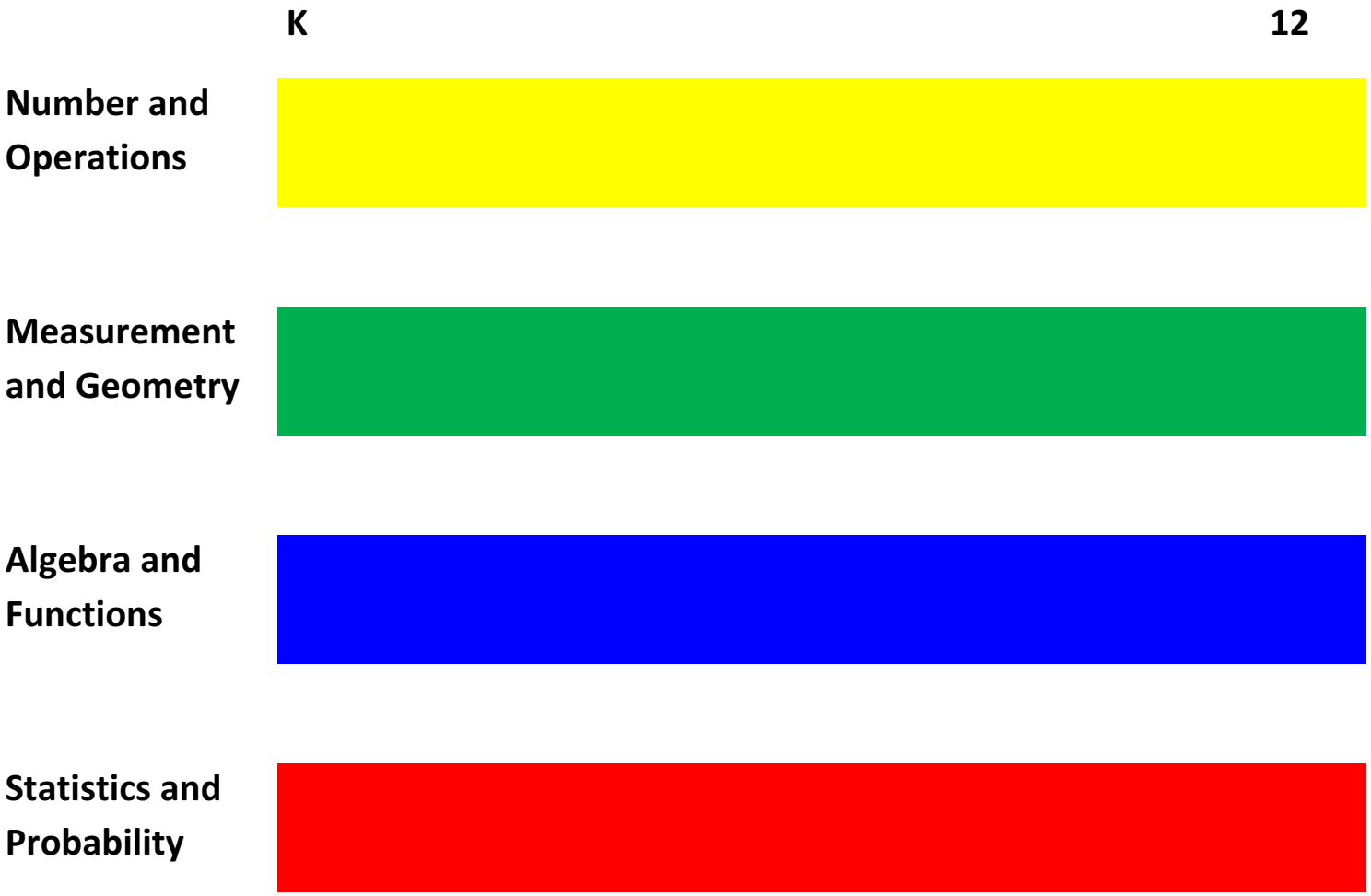
- Learn from international comparisons
  - U.S. known as "mile wide, inch deep"
- We "cover" lots of topics with little time to build command of anything

# *The What*: Shift # 1 Focus

- Significantly narrow the scope of content and deepen how time and energy is spent in the math classroom

- Focus deeply only on what is emphasized in the standards, so that students gain strong foundations

# Traditional U.S. Approach



# Key Areas of Focus in Mathematics

| Grade | Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding |
|---|---|
| K–2 | Addition and subtraction - concepts, skills, and problem solving and place value |
| 3–5 | Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving |
| 6 | Ratios and proportional reasoning; early expressions and equations |
| 7 | Ratios and proportional reasoning; arithmetic of rational numbers |
| 8 | Linear algebra; linear functions |

. . .

| Grade | Materials should not assess any of the following topics before the grade level indicated |
|---|---|
| 4 | Symmetry of shapes, including line/reflection symmetry, rotational symmetry |
| 6 | Statistical distributions (including center, variation, clumping, outliers, mean, median, mode, range, quartiles); and statistical association or trends (including two-way tables, bivariate measurement data, scatter plots, trend line, line of best fit, correlation) |
| 7 | Probability (including chance, likely outcomes, probability models) |
| 8 | Similarity, congruence, or geometric transformations |

# Shift 1: Focus

# Multiplication Grade 3

## New Math Standards

- Represent and solve problems involving multiplication.
  - 3.OA.1, 3.OA.2, 3.OA.3, 3.OA.4
- Understand properties of multiplication and the relationship between multiplication and division.
  - 3.OA.5, 3.OA.6,
- Multiply and divide up to 100.
  - 3.OA.7
- Solve problems involving the four operations and identify and explain patterns in arithmetic.
  - 3.OA.8, 3.OA.9
- Use place value understanding and properties of operations to perform multi-digit arithmetic.
  - 3.NBT.3

## GLE

- M3.1.4 Model multiplication as repeated addition and grouping objects; model division as "sharing equally" and grouping objects
  - [3] E&C-5, [3]E&C-6

Digging Deeper

# Shift #2: Coherence

# Across grades and within a grade

# *The Why:* Shift #2

**Coherence**

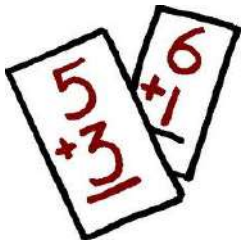
- Carefully connect the learning within and across grades so that students can build new understanding onto foundations built in previous years.

- Begin to count on solid conceptual understanding of core content and build on it. Each standard is not a new event, but an extension of previous learning.

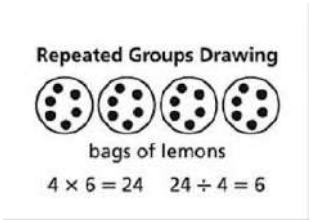
# *The What:* Shift 2

Grade Level

| K | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Represent addition and subtractions with objects. | Solve single step addition and subtraction word problems. | Estimate and solve multistep addition and subtraction word problems. | Multiplication (repeated addition)<br>Division (repeated subtraction) | Recognize multiplication as a comparison (commutative property). | Use parentheses to construct numerical expressions and evaluate expressions with these symbols. |
| ***K.OA.1*** | ***1.OA.1*** | ***2.OA.1*** | ***3.OA.1, 3.OA.2*** | ***4.OA.1*** | ***5.OA.1*** |




Craig has $20. He buys 6 squirt guns for $2 each. How much money does he have left?




$5x7 = 7x5$

$(12+8)\div(3-2+9)x6=$

# Shift #3: Rigor

In major topics, pursue:

- conceptual understanding,
- procedural skills and fluency,
- and application

# *The Why*: Shift #3

- The Alaska Math Standards require a balance of:
  - Solid conceptual understanding
  - Procedural skill and fluency
  - Application of skills in problem solving situations
- This requires equal intensity in time, activities, and resources in pursuit of all three

# *The What*: Shift #3
## Solid Conceptual Understanding

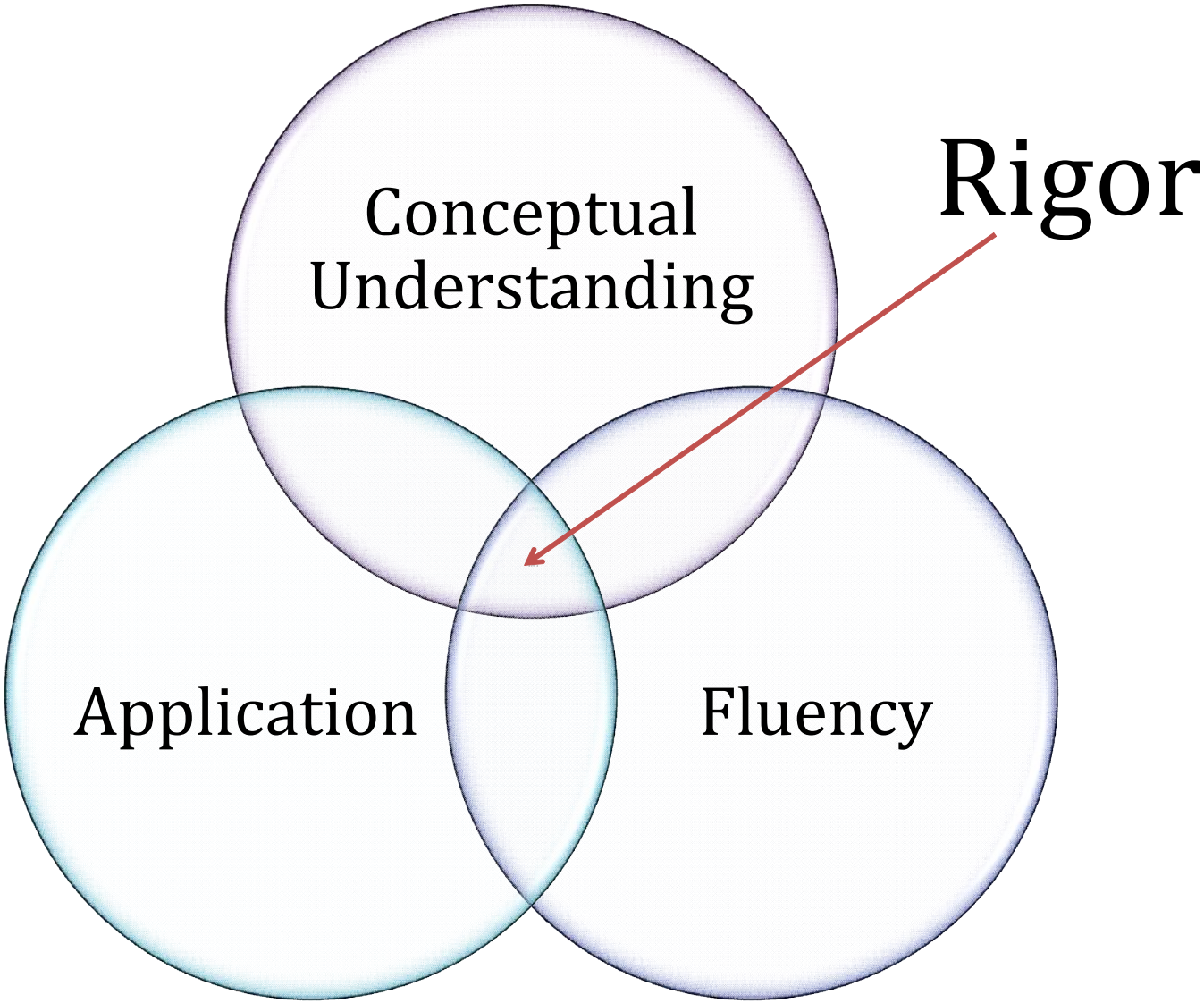
- Teach more than "how to get the answer" and instead support students' ability to access concepts from a number of perspectives
- Students are able to see math as more than a set of mnemonics or discrete procedures
- Conceptual understanding supports the other aspects of rigor (fluency and application)

# Fluency

- The standards require speed and accuracy in calculation.
- Teachers structure class time and/or homework time for students to practice core functions such as single-digit multiplication so that they are more able to understand and manipulate more complex concepts.

# Required Fluencies in K-6

| Grade | Standard | Required Fluency |
|---|---|---|
| K | K.OA.5 | Add/subtract up to 5 |
| 1 | 1.OA.6 | Add/subtract up to 10 |
| 2 | 2.OA.2<br>2.NBT.5 | Add/subtract up to 20 (know single-digit sums from memory)<br>Add/subtract up to 100 |
| 3 | 3.OA.7<br>3.NBT.2 | Multiply/divide up to 100 (know single-digit products from memory)<br>Add/subtract up to 1000 |
| 4 | 4.NBT.4 | Add/subtract up to 1,000,000 |
| 5 | 5.NBT.5 | Multi-digit multiplication |
| 6 | 6.NS.2,3 | Multi-digit division<br>Multi-digit decimal operations |


Rigor
Conceptual Understanding
Application
Fluency

Karen Melin
Administrator of Instructional Support
Karen.melin@alaska.gov
908-465-6536