Parent Workshop: Common Core State Standards for Mathematics
Taller para Padres: Estándares Académicos Estáteles

March 31, 2012

31 de marzo de 2012

Presented by Region V Algebra Forum Team, the Silicon Valley Leadership Group, San Jose State University, and the Santa Clara County Office of Education

Presentado por el equipo de Algebra de la Región V, El Grupo de Liderazgo del Valle del Silicón, la Universidad de San José y la Oficina Educacional del Condado de Santa Clara

Santa Clara County Office of Education

Outcomes

- Understand how the Common Core State Standards for Mathematics will impact your child's learning.
- Learn how various instructional strategies can impact your child's mathematical development.
- Understand how the new mathematics assessment system will measure your child's mathematics understanding.

Resultados

- Obtendrá entendimiento sobre como los Estándares Académicos Estatales impactaran el aprendizaje de su hijo/a
- Aprenderá varias estrategias instruccionales que impactaran el desarrollo matemático de su hijo/a
- Obtendrá entendimiento sobre como el nuevo sistema de evaluación matemático medirá el entendimiento matemático de su hijo/a

Agenda

- Welcome
- CCSS Overview
- Instruction
- Assessment
- Next Steps

Agenda

- Bienvenida
- Repaso de los Estándares Académicos Estatales
- Instrucción
- Evaluación
- Próximos Pasos

The Common Core State Standards Initiative

- Initiated and coordinated by the National Governors Association and the Council of Chief State School Officers (CCSSO).
- Adopted by California on August 2, 2010 by the State Board of Education.

La Iniciativa de los Estándares Académicos Estatales

- Iniciados y coordinados por la Asociación Nacional de Gobernadores y el Cónsul de Gerentes de los Servicios Escolares del Estado
- Adoptado por California el 2 de agosto de 2010 por el Consejo Estatal de Educación

States that have Adopted the Common Core State Standards

Estados que han adoptado los Estándares Académicos Estatales

- http://www.corestandards.org/in-the-states

Standards are the Centerpiece of a Strong Academic Program
Los estándares son la pieza central en un Programa Académicamente Fuerte

Why Standards

- Standards make educators, students and parents partners in education.
- Standards ensure ALL students have access to quality.

Porque Estándares

- Los estándares permiten que los educadores, estudiantes y padres sean aliados en la educación
- Los estándares aseguran que TODOS los estudiantes tengan acceso a la calidad.

The Power of the Common Core State Standards: College and Career Readiness

- Internationally benchmarked
- Evidence and research-based

El Poder de Los Estándares Académicos Estatales: Preparación para el Colegio y la Profesión

- Punto de referencia Internacionalmente
- Basados en Investigaciones y evidencia

The Power of the Common Core State Standards: College and Career Readiness

- Costs to the state reduced
- Consistent expectations for all—***not*** dependent on individual state expectations
- Expectations clear to students, parents, teachers, and the general public.

El Poder de Los Estándares Académicos Estatales: Preparación para el Colegio y la Profesión

- El costo al estado es reducido
- Expectativas consistentes para todos – **no** es dependiente en las expectativas individuales estatales.
- Expectativas son claras para los estudiantes, padres, maestros y el publico en general

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Criteria for the Standards

- Fewer, clearer, and higher
- Aligned with college and career expectations
- Include rigorous content and application of knowledge through high-order skills

Criterio de los Estándares

- Menos, mas claros, mas altos
- Aliñado con las expectativas del colegio y la profesión
- Contendió riguroso y aplicacion de conocimiento atravez de habilidades de orden superior

Instruction
Instrucción

Barbara Schallau & Sue Vieira
East Side Union High School District

Dorothy Defosses
Santa Clara County Office of Education

Teaching for Understanding—
What does that look
like in the math classroom?

Enseñanza para lograr el entendimiento –
¿Como se mira eso en el salón de matemáticas?

What are the Standards for Mathematics Practice?

¿Cuáles son los Estándares para la práctica de Matemáticas

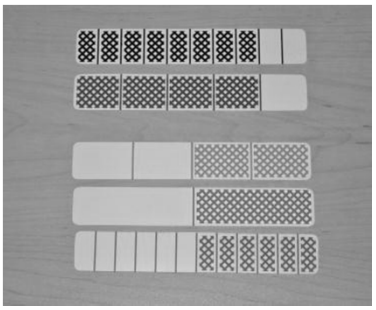
They are **the verbs**, **the actions**,
that students should be **doing**
when learning math.
Son los verbos, las acciones, que lo estudiantes deben
de estar haciendo mientras aprenden matemáticas.

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice
Práctica Matemática

1 Make sense of problems and persevere in solving them.

1. Comprenda el sentido de los problemas y persevere en la resolver los.



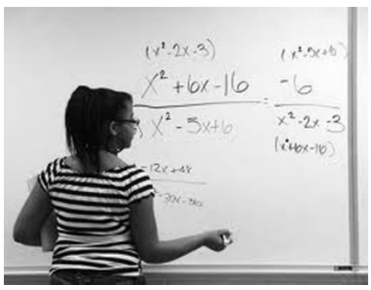
COMMON CORE STATE STANDARDS for MATHEMATICS

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice
Práctica matemática

2 Reason abstractly and quantitatively.

2. Razone de manera abstracta y cuantitativa.



COMMON CORE STATE STANDARDS for MATHEMATICS

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice
Práctica matemática

3 Construct viable arguments and critique the reasoning of others.

3. Construya argumentos viables y critique el razonamiento de los demás.

COMMON CORE STATE STANDARDS for MATHEMATICS

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice
Práctica matemática

4 Model with mathematics.

4 Modele con matemáticas.

COMMON CORE STATE STANDARDS for MATHEMATICS

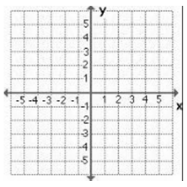
COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

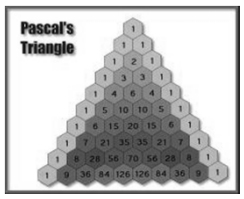
Mathematical Practice
Práctica matemática

5 Use appropriate tools strategically.

5. Utilice herramientas y estrategias apropiadas.

×	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81





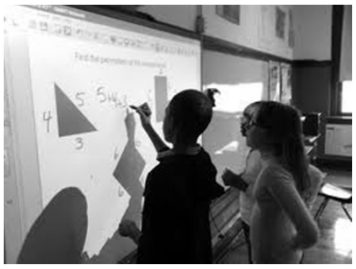
COMMON CORE STATE STANDARDS for MATHEMATICS

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice
Práctica matemática

6 Attend to precision.

6 Asista a la precisión.



COMMON CORE STATE STANDARDS for MATHEMATICS

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice

7 Look for and make use of structure.

7. Busque y haga uso de la estructura.

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Mathematical Practice

8 Look for and express regularity in repeated reasoning.

8. Busque y exprese razonamiento con regularidad y repetición.

COMMON CORE STATE STANDARDS for MATHEMATICS

Some Important Changes in Instruction

- Teachers will design new lesson strategies to develop content learning.
- We call these “Number Talks”

Algunos Cambio Importantes en la Instrucción

- Los maestros diseñaran nuevas estrategias para desarrollar el aprendizaje de lecciones de contenido.
- A esto les llamamos “Platicas de Números”

What are Number Talks?

¿Que son Platicas de Números?

Number Talks

- 10 minutes of Daily Mental Mathematics
- Number Sense Development—working towards efficiency, accuracy, flexibility
- This is a change from learning facts "memorize to automaticity"

Platicas de Números

- 10 minutos diarios de matemáticas mentales
- Desarrollo del sentido numérico – trabajando hacia eficiencia, precisión y flexibilidad
- Esto es un cambio de aprendizaje de cuentas "memorizar para automatizar"

Number Talks, continued

- Generalized Arithmetic—Looking for structure
- Reasoning—Using viable arguments to support thinking

Platicas de Números, continuado

- Aritmética Generalizada – buscando estructura
- Razonamiento – el uso de argumentos viables que apoyan el pensamiento

Number Talks, continued

- Communication—Speaking your thought process and understanding what others are explaining
- Problem Solving—Looking for multiple strategies

Platicas de Números, continuado

- Comunicación – verbalizando el proceso de su pensamiento y el entendimiento de lo que otros están explicando
- Resolución de Problemas – buscando una multitud de estrategias

Today's Number Talk

Without using paper and pencil, find the answer to 8 plus 6.

La Platica de Números de Hoy

Sin usar papel y lápiz, encuentre la respuesta de 8 mas 6.

Questions Teachers (and Parents) Might Ask

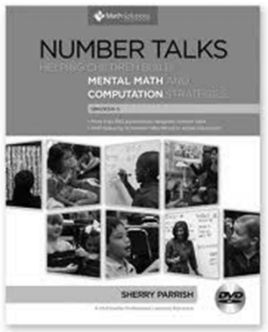
- How did you think about that?
- How did you figure it out?
- What did you do next?
- What did you need to know?

Preguntas que Maestros y Padres Pueden Preguntar

- ¿Como pensaste en eso?
- ¿Cómo llegaste a esta conclusión?
- ¿Que hiciste después?
- ¿Qué era necesario que supieras?

Number Talk Classroom Example

Ejemplo de Platicas de Números en el Salón



Second grade students solving the same problem.

Estudiantes del segundo grado resolviendo el miso problema

Questions Teachers (and Parents) Might Ask

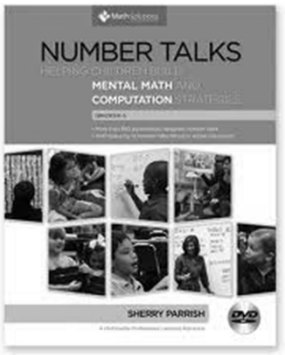
- Why did you do that? Tell me more.
- Who would like to share their thinking?
- Did someone solve it a different way?

Preguntas que Maestros y Padres Pueden Preguntar

- ¿Por qué hiciste eso? Dime más.
- ¿A quien le gustaría compartir su pensamiento?
- ¿Alguien lo resolvió de una manera distinta?

Number Talk Classroom Example

Third grade students solving 4 times 7.
Estudiantes del tercer grado resolviendo el problema 4 por 7.



Questions Teachers (and Parents) Might Ask

- Who else used this strategy to solve the problem?
- Which strategies do you see being used?

Preguntas que Maestros y Padres Pueden Preguntar

- ¿Alguien mas utilizo esta estrategia para resolver este problema?
- ¿Qué estrategias miras que están siendo utilizadas?

Standards for Mathematical Practice Estándares para la Practica de las Matemáticas

- Focus on 1 Standard for Mathematical Practice
  - Standard 1, 3, 4, 6, or 7
- Complete the Frayer Model for your specific standard
- Complete the poster for your specific standard
- Walk around the room and view each poster

- Enfoque en un Estándar para la practica matemática
  -Estándar 1,3,4,6, o 7
- Complete el Modelo Frayer para el Estándar especio.
- Complete el poster para el Estándar especifico.
- Camine alrededor del salón y vea cada poster.

Assessments for the CCSS
Parent Overview
Evaluaciones para el CCSS
Repaso para Padres

March 31, 2012
31 de marzo de 2012

Sally Keyes
Cambrian School District

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Outcome
Resultado

To learn about the different types of assessments that will be administered to students with the adoption of the Common Core State Standards.

Aprender sobre los diferentes tipos de evaluaciones que serán administrados a los estudiantes atraves de la adopción de los Estándares Académicos Estatales.

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Types of Tasks in Mathematics

Variedad de Tareas en Matemáticas

Novice – short items focused on skills and routines
Apprentice – medium performance tasks with scaffolding
Expert – long tasks with high cognitive load and/or complexity.

Principiante – elementos cortos enfocados en habilidades y rutinas
Aprendiz – rendimiento medio con andamiaje
Experto - tareas largas con una alta carga cognitiva y/o complicada.

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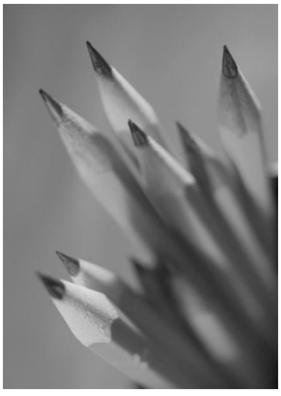
Novice Tasks

Tareas del Principiante



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Novice Task
Tarea del Principiante

As you work, please think about the following questions:
- What mathematics is in this task?
- What effect does the format have on students' mathematical thinking?
- What kind of knowledge or skill does this type of question tap into?

Mientras trabaja, por favor piense en las siguientes preguntas:
- Que matemáticas están involucradas en esta tarea?
- Que efecto tiene el formato en el razonamiento matemático del estudiante?
- Que tipo de conocimiento o habilidades se requiere para esta pregunta?

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Novice Task – Example
Tarea para el Principiante - Ejemplo

A company has 6 big trucks. Each truck has 18 wheels. How many wheels is this in all?
Una compañía tiene 6 camiones grandes. Cada camión tiene 18 llantas. Cuantas llantas son en total?

A 24
B 96
C 108
D 116

2009 California Standards Test Released Test Question pg. 14, #34

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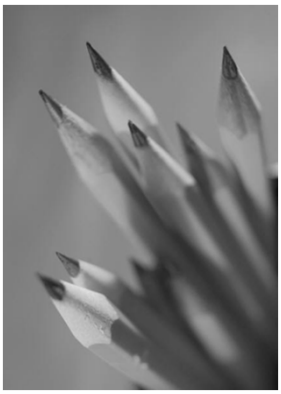
Apprentice Tasks

Tarea del Aprendiz



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Apprentice Task Design

Diseño Para Las Tareas del Aprendiz

Top

Cima

Core **Centro**

Ramp

Rampa

Access

Acceso

Entry level (access into task)
Nivel de entrada (acceso al trabajo)
Core Mathematics - (meeting standards)
Matemáticas básicas – (cumplimiento de los estandares)
Top of Ramp (conceptually deeper, beyond)
La Cima – (entendimiento profundo)

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Apprentice Task
Tarea del Aprendiz

As you work, please think about the following questions:
- What mathematics is in this task?
- What effect does the format have on students' mathematical thinking?
- What kind of knowledge or skill does this type of task tap into?
- How is this task different from the Novice Task?

Mientras trabaja, por favor piense en las siguientes preguntas:
- Que matemáticas están involucradas en esta tarea?
- Que efecto tiene el formato en el pensamiento matemático del estudiante?
- Que tipo de conocimiento o habilidades se requiere para esta pregunta?
- Como es esta tarea diferente de la tarea del Principiante?

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Apprentice Task Example-3rd Grade
Sponsored Walk
Ejemplo de la Tarea del Aprendiz – Caminata patrocinada del 3er grado

Students at the Mountain View Elementary School do a sponsored walk.

Los estudiantes de la escuela elemental de Mountain View participan en una caminata patrocinada.

1. Jack is sponsored for $6 for each lap.
   Bill is sponsored for $4 for each lap.
   Jack and Bill each do 5 laps.
   How much money do Jack and Bill raise in all? $ _____
   Show your work.

1. Jack esta patrocinado $6 por cada vuelta que camina. Bill esta patrocinado $4 por cada vuelta que camina. Jack y Bill caminan 5 vueltas cada uno. Cuanto dinero recaudan Jack y Bill en total?
   $_____

Explique como llego a su respuesta.

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Apprentice Task Example-3rd Grade
Sponsored Walk
Ejemplo de la Tarea del Aprendiz – Caminata patrocinada del 3er grado

Students at the Mountain View Elementary School do a sponsored walk.

Los estudiantes de la escuela elemental de Mountain View participan en una caminata patrocinada.

2. Maria does 6 laps.
She raises $30.
How much for each lap was she sponsored? $ _____
Show how you figured it out.

2. María dio 6 vueltas. Ella recaudo $30. Cuanto se le fue patrocinado por cada vuelta? $_____

Explique como llego a su respuesta.

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Apprentice Task Example-3rd Grade
Sponsored Walk
Ejemplo de la Tarea del Aprendiz – Caminata patrocinada del 3er grado

Students at the Mountain View Elementary School do a sponsored walk.

Los estudiantes de la escuela elemental de Mountain View participan en una caminata patrocinada.

3. Sarah wants to raise at least $20.
She is sponsored for $3 for each lap.
What is the least number of whole laps she must walk? _____
Explain how you figured it out.
_____
_____
_____

3. Sara quiere recaudar por lo menos $20. Le han patrocinado $3 cada vuelta. Cual es el mínimo numero de vueltas que tiene que dar? $_____
Esplique como llego a su respuesta.
_____
_____
_____

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Expert Tasks
Tareas del Experto

The main point in mathematics teaching is to develop the tactics of problem solving.
Lo mas importante de la enseñanza de matemáticas es desarrollar las tácticas de la resolución de problemas.

George Polya

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Creating Active Learning
Creando Aprendizaje Activo

Mathematics is:

- An interconnected body of ideas and reasoning processes

Learning is:

- A collaborative activity where learners are challenged and arrive at understanding through discussion

Matemáticas es:

- Un esquema de ideas y proceso de razonamiento

Aprendizaje es:

- Un actividad de colaboración donde los alumnos son retados y llegan al entendimiento atreves de discusión(es)

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Creating Active Learning
Creando Aprendizaje Activo

Teaching is:

- Exploring meaning and connections through non-linear dialogue between teacher and learners
- Presenting problems before offering explanations
- Making misunderstandings explicit and learning from them

La enseñanza es:

- ***Explorando el significado y las conexiones atraves de conversaciones entre la maestra y los alumnos***
- ***Presentado problemas antes de ofrecer explicaciones***
- ***Hacer los malentendidos explícitos y aprender de ellos***

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Problem of the Month
Problema del Mes

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Expert Task
Tarea del Experto

As you work, please think about the following questions:
- What mathematics is in this task?
- What effect does the format have on students' mathematical thinking?
- What kind of knowledge or skill does this type of task tap into?
- How is this task different from the Novice Task and the Apprentice Task?

Mientras trabaja, por favor piense en las siguientes preguntas:
- Que matemáticas esta en esta tarea?
- Que efecto tiene este formato en el razonamiento matemático de los estudiantes?
- Que tipo de conocimiento o habilidades se requiere para esta tarea?
- Como se diferencia esta tarea de la del Principiante y el Aprendiz?

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Expert Task: *Squirreling it Away*
Tarea del Experto: Almacenando Lejos

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Reflective Focus Prompts
Reflexiones de Enfoque

As you reflect upon this part of the session, please think about the following prompts:

- Compare and contrast the Novice, Apprentice and Expert Tasks.
- What kind of mathematical thinking is required of our students in these different tasks?

Mientras usted reflexiona sobre esta parte de la sesión, por favor piense sobre los siguientes puntos:

- Compare y contraste las tareas del Principiante, Aprendiz, y Experto.
- Que tipo de razonamiento matemático se requiere de los estudiantes en las distintas tareas?

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More Information
Mas Información

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Proposed Timeline
Cronograma Propuesto

- **2011** – Development of formative tools, processes, and practices underway; Specifications for summative and interim assessments developed
- **2012** – Summative and interim item development completed ; Interim item pool become available for use
- **2013** – Field testing of items for adaptive summative assessment completed
- **2014** – Preliminary achievement standards proposed and other policy definitions adopted
- **2015** – Operational summative assessment administered; final achievement standards verified and adopted

Center for K-12 Assessment & Performance Management at ETS

- **2011** – Desarrollo de herramientas de formación, procesos, practicas en curso; Son desarrolladas las especificaciones para la evaluación acumulativa y provisional
- **2012** – El desarrollo acumulativo y provisional es terminado; los elementos provisionales se vuelven disponibles para el uso
- **2013** – Se completan las pruebas en el fil de los elementos de evaluación acumulativa
- **2014** – Se proponen los estándares preliminares de rendimiento y se adoptan otras definiciones de póliza
- **2015** – La evaluación funcional acumulativa es administrada; las normas finales de rendimiento son verificadas y aprobadas

Centro de K-12 Evaluación & Manejo de Rendimiento en ETS

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Common Core State Standards in conclusion
Estándares Académicos Estatales en conclusión

The Power of Common Standards

- Create one set of clear and consistent expectations- high goals- for ALL students
- Address student mobility issues
- Help to ensure a skilled workforce and an enlightened citizenry

El Poder de los Estándares Académicos Estatales

- Crear un conjunto de expectativas claras y consistentes-altas metas para TODOS los estudiantes
- Tratar los problemas de movilidad de estudiantes
- Ayuda a asegurar una fuerza laboral capacitada y una ciudadanía educada

The Power of Common Core Standards

- Offer economies of scale for development of curriculum, assessments, and teacher preparation programs.
- Internationally benchmarked, so that all students are prepared to succeed in our global economy and society
- Research-based

- Ofrecer economías de escala para el desarrollo del plan de estudios, evaluaciones y programas de preparación para maestros
- Internacionalmente punto de referencia, de modo que todos los estudiantes estén preparados para triunfar en nuestra economía global y la sociedad
- Basados en Investigaciones

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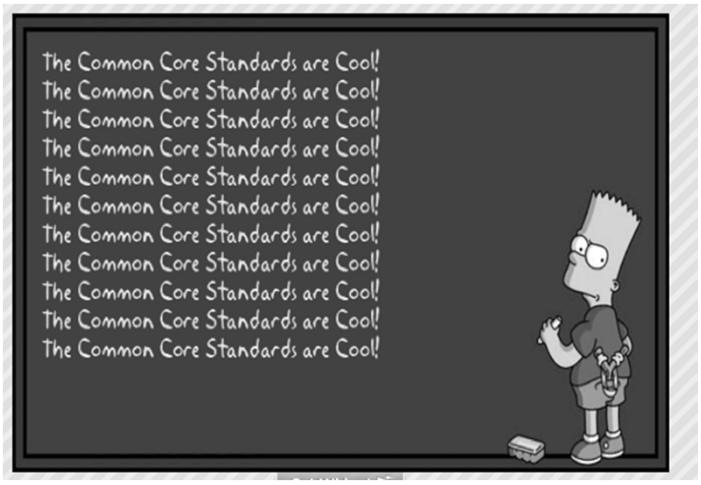
Criteria for the Standards
El criterio para los Estándares

- Fewer, clearer, and higher
- Aligned with college and work expectations
- Rigorous content and practical applications
- Builds upon the strengths of current state standards and lessons learned in 2 decades of experience with them.

- Menos, mas claros, mas altos
- Aliñado con las expectativas del colegio y la profesión
- Contendió riguroso y aplicaciones practicas
- Están construidos sobre la fortaleza del los Estándares actuales y lecciones aprendidas de 2 décadas de experiencia con ellas

Tell all your friends…..
Dile a todos tus Amigos….



For Additional Information

- Visit www.pta.org/common_core_state_standards.asp
- Talk to your State PTA or Local PTA (find yours at PTA.org)
- Learn more about the Common Core State Standards at http://educationnorthwest.org/resource/1547
- To find out about Common Core State Standards for California, go to www.cde.ca.gov/ci/cc/

Para Información Adicional

- Visite www.pta.org/common_core_state_standards.asp
- Hable con su PTA estatal o local (encuentre el de usted en PTA.org)
- Aprenda mas sobre los Estándares Académicos Estatales en http://educationnorthwest.org/resource/1547
- Para aprender mas sobre los Estándares Académicos Estatales en California, valla a www.cde.ca.gov/ci/cc/

Outcomes

- Understand how the Common Core State Standards for Mathematics will impact your child's learning.
- Learn how various instructional strategies can impact your child's mathematical development.
- Understand how the new mathematics assessment system will measure your child's mathematics understanding.

Resultados

- Obtendrá entendimiento sobre como los Estándares Académicos Estatales impactaran el aprendizaje de su hijo/a
- Aprenderá varias estrategias instruccionales que impactaran el desarrollo matemático de su hijo/a
- Obtendrá entendimiento sobre como el nuevo sistema de evaluación matemático medirá el entendimiento matemático de su hijo/a

Santa Clara County Office of Education

Common Core State Standards
Parent Overview
March 31, 2012

AGENDA

Outcomes:

- *Understand how the Common Core State Standards for Mathematics will impact your child's learning.*
- *Learn how various instructional strategies can impact your child's mathematical development.*
- *Understand how the new mathematics assessment system will measure your child's mathematics understanding.*

Welcome

CCSS Overview

Instruction

Assessment

Next Steps

Mathematics | Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

1 Make sense of problems and persevere in solving them.
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2 Reason abstractly and quantitatively.
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

3 Construct viable arguments and critique the reasoning of others.
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

3.1 Apply the method of mathematical induction to prove general statements about the positive integers. (CA Standard Algebra 2 – 21.0)
3.2 Write geometric proofs, including proofs by contradiction. (CA Standard Geometry - 2.0)
3.3 Give proofs of various formulas by using the technique of mathematical induction. (CA Standard Math Analysis - 3.0)

4 Model with mathematics.
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5 Use appropriate tools strategically.
Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

6 Attend to precision.
Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7 Look for and make use of structure.
Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 x 8 equals the well-remembered 7 x 5 + 7 x 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 x 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

8 Look for and express regularity in repeated reasoning.
Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content
The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word "understand" are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential "points of intersection" between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.

Questions Teachers (and Parents) Might Ask

- How did you think about that?
- How did you figure it out?
- What did you do next?
- What did you need to know?
- Why did you do that? Tell me more.
- Who would like to share their thinking?
- Did someone solve it a different way?
- Who else used this strategy to solve the problem?
- Which strategies do you see being used?

Santa Clara County Office of Education

Frayer Model
Modelo Frayer À

What would this standard look like in the classroom?
¿Cómo seria el salón si este Estándar fuera implementado?

How can you help your child implement this standard at home?
¿Como puede usted ayudar a su hijo/a implementar este Estándar en su hogar?

STANDARD:
ESTÁNDAR:

What would the classroom look like if this standard was **NOT** being implemented?
¿Como seria el salón si este Estándar **NO** fuera implementado?

What could you do at home to **inhibit** this standard from being implemented?
¿Que puede hacer usted para **impedir** que este Estándar sea implementado en su hogar?

Sponsored Walk

This problem gives you the chance to:
- choose and use number operations in a real context

Students at the Mountain View Elementary School do a sponsored walk.

1. Jack is sponsored for $6 for each lap.

   Bill is sponsored for $4 for each lap.

   Jack and Bill each do 5 laps.

   How much money do Jack and Bill raise in all? $ _____

   Show your work.

2. Maria does 6 laps.

   She raises $30.

   How much for each lap was she sponsored? $ _____

   Show how you figured it out.

3. Sarah wants to raise at least $20.

   She is sponsored for $3 for each lap.

   What is the least number of whole laps she must walk? _____

   Explain how you figured it out.

   _____

   _____

   _____

Problem of the Month

Squirreling It Away

Level A:

Austin has a bag of 17 acorns. Eight squirrels came up to him. He gave each squirrel an acorn. Then five more squirrels came up to him and he gave away one acorn to each of them. How many more squirrels can he still feed?

Show how you figured it out?

How do you know you have the right answer?

Level B:

Austin likes to watch squirrels find and store acorns for the winter. Brown Squirrels can carry two acorns at a time. Gray Squirrels can carry three acorns at a time and Black Squirrels can carry five acorns at a time. There is a pile of 24 acorns.

How many trips would a Brown Squirrel need to make to store all of the acorns in the pile?

How many trips would a Gray Squirrel need to make to store all of the acorns in the pile?

How many trips would a Black Squirrel need to make to store all of the acorns in the pile?

If all three squirrels worked together to store the acorns how many trips would the squirrels need to make to store all of the acorns?

Explain your solution.

Level C:

Brown Squirrels can carry 2 acorns at a time. Gray Squirrels can carry 3 acorns at a time.
Black Squirrels can carry 5 acorns at a time.

Suppose the three squirrels all wanted to store acorns for the winter. Depending on how motivated each squirrel was they would end up with different amounts. For instance suppose the Brown Squirrel took 4 trips, the Gray Squirrel took 2 trips and the Black Squirrel took 2 trips. The Brown Squirrel would end up with 8 acorns, the Gray Squirrel would have 6 acorns and the Black Squirrel would have 10 . Between them they took every one of the 24 acorns.

How many different ways could the three Squirrels divide up the 24 acorns and not leave any left over? Each Squirrel must carry their maximum load each trip.

How do you know that you have found all of the ways?

Level D:

The Squirrels are rather smart. They realize that they can carry less than their maximum loads. How many different ways could the Squirrels divide up the 24 acorns.

Explain your solution.

Level E:

Suppose there are a different number of acorns than 24. Determine a generalization for finding how 3 squirrels can divide up any given number of acorns.

Explain your solutions.

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Estándares Académicos Estáteles
Repaso para Padres
31 de marzo de 2012

AGENDA

Resultados:

- *Obtendrá entendimiento sobre como los Estándares Académicos Estatales impactaran el aprendizaje de su hijo/a*
- *Aprenderá varias estrategias instruccionales que impactaran el desarrollo matemático de su hijo/a*
- *Obtendrá entendimiento sobre como el nuevo sistema de evaluación matemático medirá el entendimiento matemático de su hijo/a*

Bienvenida

Repaso de los Estándares Académicos Estatales

Instrucción

Evaluación

Próximos Pasos

El estudiante experto en matemáticas…

1

Comprende los problemas y persevera en resolverlos.

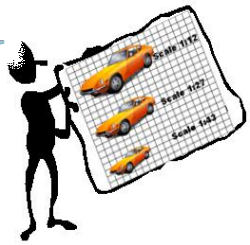
2

Razona de forma abstracta y cuantitativa.

3

Construye argumentos válidos y critica el razonamiento de otros.

4



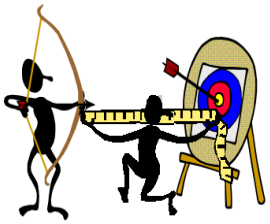
Usa las matemáticas para representar ideas y soluciones.

5

Usa estratégicamente, las herramientas apropiadas

6

Intenta lograr precisión.



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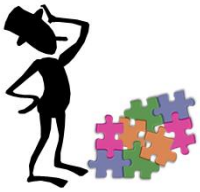

Busca y usa estructuras.

8

Busca y expresa regularidad en razonamiento repetitivo.

Questions Teachers (and Parents) Might Ask

- How did you think about that?
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- What did you need to know?
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- Who else used this strategy to solve the problem?
- Which strategies do you see being used?

Preguntas que Maestros y Padres Pueden Preguntar

- ¿Como pensaste en eso?
- ¿Cómo llegaste a esta conclusión?
- ¿Que hiciste después?
- ¿Qué era necesario que supieras?
- ¿Por qué hiciste eso? Dime más.
- ¿A quien le gustaría compartir su pensamiento?
- ¿Alguien lo resolvió de una manera distinta?
- ¿Alguien más utilizo esta estrategia para resolver este problema?
- ¿Qué estrategias miras que están siendo utilizadas?

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Un paseo patrocinado

Este problema te da la oportunidad:
- escoger y usar operaciones de números en un contexto real

Los estudiantes en el Colegio Mountain View hacen un paseo patrocinado.

1. Jack está patrocinado $6 por cada vuelta.

   Bill está patrocinado por $4 cada vuelta.

   Jack y Bill dan 5 vueltas cada uno.

   ¿Cuánto dinero ganan Jack y Bill en total? $ _____

   Explica cómo llegaste a la respuesta.

2. María da 6 vueltas.

   Ella gana $30.

   ¿Por cuánto dinero cada vuelta estuvo patrocinada María? $ _____

   Explica cómo llegaste a la respuesta.

3. Sarah quiere ganar por lo menos $20.

   Ella está patrocinada por $3 cada vuelta.

   ¿Cuál es el menor número de vueltas que tiene que dar? _____

   Explica cómo llegaste a la respuesta.

   _____

   _____

   _____

El Problema de la Mesa

Almacenando Lejos

El Nivel A:

Austin tiene una caja de 17 bellotas. El fue abordado por ochos ardillas. Dio cada ardilla una bellota. Entoces Austin fue abordado por cinco mas ardillas y el dio una bellota a cada una. ¿Austin puede dar de comer a quantas mas ardillas?

Muestre como Ud lo entendió.

¿Cómo sabe Ud que su respuesta es correcta?

El Nivel B:

Le gusta Austin mira las ardillas encontrar y almancenar las bellotas para el invierno. Las ardillas marrón pueden tomar dos bellotas a la vez. Las ardillas gris pueden tomar tres bellotas a la vez y las ardillas negras pueden tomar cinco bellotas a la vez. Hay una pila de 24 bellotas.

¿Quantas viajes necesita una ardilla marrón para almancenar todos las bellotas en la pila?
¿Quantas viajes necesita una ardilla gris para almancenar todos las bellotas en la pila?
¿Quantas viajes necesita una ardilla negra para almancenar todos las bellotas en la pila?

¿Si las tres ardillas trabajan al mismo tiempo para almancenar las bellotas, quantas viajes necesitan para almancenar todos de las bellotas?

Explique su solución.

El Nivel C:

Ardillas marrón pueden llevar 2 bellotas a la vez.
Ardillas gris pueden llevar 3 bellotas a la vez.
Ardillas negras pueden llevar 5 bellotas a la vez.

Suponga que las tres ardillas quieren almancenar bellotas por el invierno. Según cómo motivado cada ardilla fue, ellos acabaría por cantidades differentes. Por ejemplo, suponga que la ardilla marrón tomó 4 viajes, la ardilla gris tomó 2 viajes, y la ardilla negra tomó 2 viajes. Entonces la ardilla marrón tendría 8 bellotas, la ardilla gris tendría 6 bellotas, y la ardilla negra tendría 10. Entre ellos tomaron cada uno de las 24 bellotas.

¿ Quantás maneras diferentes pueden las tres ardillas dividen las 24 bellotas y no salen ninguna izquierda sobre? Cada ardilla debe llevar el máximo cada vieja.

¿Cómo hágale sabe Ud que ha encontrado todas las maneras?

El Nivel D:

Las ardillas duela más bien. Ellos se dan cuenta de que pueden llevar menos que sum axiom carga.

¿ Quantás maneras diferentes pueden las tres ardillas dividen las 24 bellotas? Explique su solución.

El Nivel E:

Suponga que el número de las bellotas es diferente que 24. Suppose there are a different number of acorns than 24. Determine una generalización para encontrar cómo las 3 ardillas pueden dividir cualquier número de bellotas.

Explique su soluciónes.