



Public Schools of North Carolina

2009 Essential Standards North Carolina Middle School Conference

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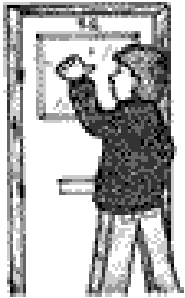
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Standard III:

Teachers Know the Content They Teach





knocking



walking

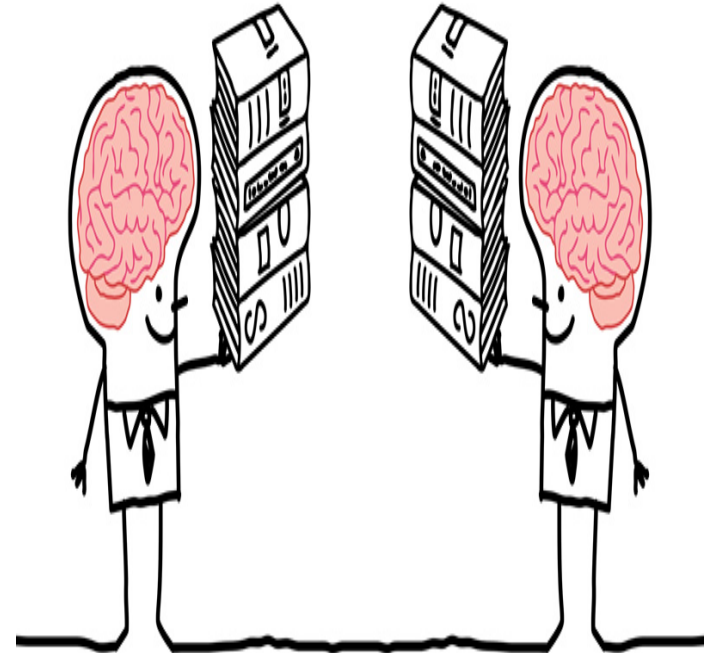
Encounters and Work With



waving



jumping



6.N.1 Understand the relationship between integers, non-negative decimals, fractions, and percents.



- **Demonstrates**
- **Listens**
- **Questions**
- **Share similarities**
- **Share differences**
- **Examines**

- **Explain**
- **Describe**
- **Outline**
- **Restate**
- **Translate**
- **Demonstrate**
- **Interpret**
- **Active participants**



7.N.2 Apply an understanding of percent and percent change to estimate and solve problems, including percents greater than 100.



- Shows
- Facilitates
- Observes
- Evaluates
- Organizes
- Questions

- Solves problems
- Demonstrates use of knowledge
- Calculates
- Compiles
- Completes
- Illustrates
- Constructs
- Active recipient





Number and Operations Progressions

Operations

- Grade 6:** Multiplication and division with non-negative rational numbers (adding and subtracting is in elementary)
- Grade 7:** Operations with integers only
- Grade 8:** Operations with all rational numbers

Ratios and Proportions

- Grade 6:** Unit rates and ratios (building on equipartitioning in elementary)
- Grade 7:** Proportional reasoning
- Grade 8:** Building blocks to slope





Number and Operations Progressions

Percents

- Grade 6:** Represent fractions as decimals, decimals as percents, percents as decimals and percents as fractions
- Grade 7:** Use percents and percent change to solve problems
- Grade 8:** Use in changing dimensions and problem solving

Comparison

- Grade 6:** Integers, non-negative fractions, decimals, and percents
- Grade 7:** Integers
- Grade 8:** Real number system

* *Scientific and exponential notation*



Number and Operations

Examples of differences in rational numbers

Grade 6

•A recipe needs the following ingredients: $3\frac{1}{2}$ cups of flour, $1\frac{1}{3}$ cups of sugar, and $\frac{3}{4}$ cup of brown sugar. What is the total amount of these ingredients needed for the recipe?

Grade 7

•Yesterday's high temperature was 22°F and the low temperature was -7°F . What was the temperature range?

Grade 8

•Mr. Benson gets a monthly statement of his investment account. The monthly changes in value of his account for the last six months were:

Month	1	2	3	4	5	6
Change in value	+\$37.50	-\$98.85	-\$63.77	-\$38.23	+22.97	+\$8.75

What was the net change over the last six months?





Algebra Progressions

Equations and Inequalities

Grade 6: One-step equations or inequalities

Grade 7: Two-step equations or inequalities

Grade 8: Single-variable equations and inequalities

Linear Relationship

Grade 6: Analyze patterns to predict the n^{th} term

Grade 7: Represent change in the relationship between two variables in an arithmetic sequence

Understand the rate of change

Grade 8: Interpret the meaning and value of slope and intercepts

Represent a linear equation in slope-intercept form

Solve problems using linear inequalities

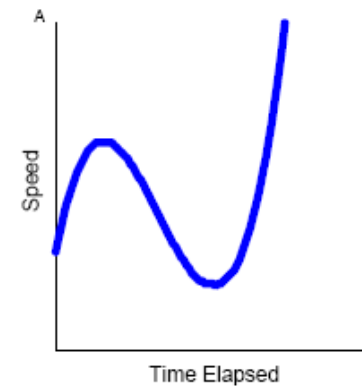
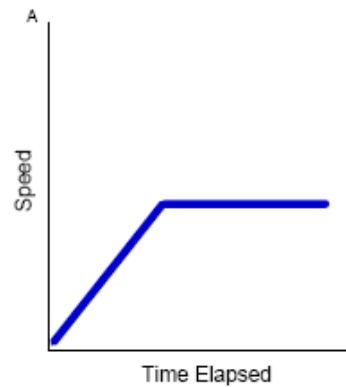
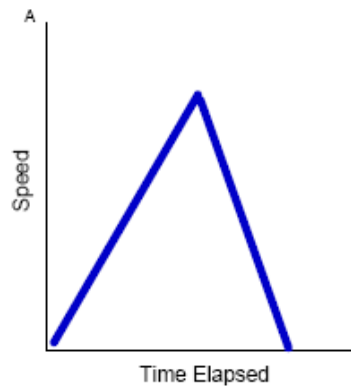
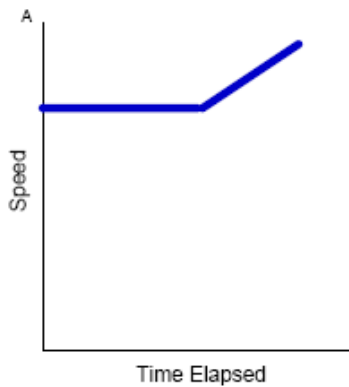
* *Analyze the data presented in a qualitative graph*

* *Use distributive property and combining like terms to write equivalent expressions*



Qualitative Graphs

A woman climbs a hill at a steady pace and then starts to run down one side.



Algebra

Examples of differences in equations

Grade 6

The floor in Mike's bedroom is in the shape of a rectangle. It has an area of $181\frac{1}{4}$ square feet. The floor has a length of $14\frac{1}{2}$ feet. What is the width of the floor?

Grade 7

Linda sells cars at a local car dealer. She earns \$1,100 a month plus a 3% commission on the total amount of her monthly sales. She needs to earn at least \$3,500 a month. Write an inequality that can be used to find the amount of sales, x , Linda needs. What is the minimum amount of sales Linda needs to earn \$3,500?

Grade 8

An isosceles triangle has two sides that measure x cm and a third side that measures $2x - 5$ cm. The perimeter of the triangle is 31 cm. What are the measurements of each side of the triangle?

What is the solution of the inequality $-3x + 6 < 4x - 8$?



Geometry Progressions

Congruence, Similarity and Scaling

- Grade 6:** Unit rates and ratios in Number and Operation
- Grade 7:** Understand similar and congruent polygons
- Grade 8:** Square roots and cube roots
Pythagorean Theorem and its converse
Properties of angle relationships to solve problems

Transformations

- Grade 6:** Cartesian coordinate system
Reflections and translations
- Grade 7:** Dilations in the Measurement strand
- Grade 8:** Rotations of points and plane figures

**Intersections of figures in a plane*

**Represent three-dimensional shapes using multiple perspectives*



Geometry

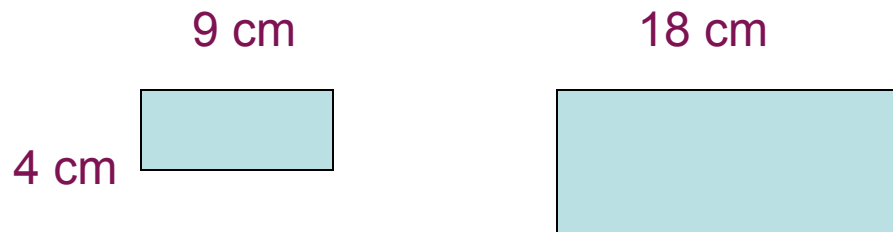
Examples of differences

Grade 6

$\triangle MNO$ is reflected across the y -axis. What will be the coordinates of Point M' ? (triangle is shown on a coordinate plane)

Grade 7

The two polygons below are similar.



What is the value of x ?



Geometry

Examples of differences

Grade 8

Point T with coordinates $(-3, 6)$ will be rotated 180° clockwise about the origin. What will be the coordinates of T' ?

Triangle JKL has the following vertices: $J(1, 1)$, $K(6, 2)$, and $L(3, 5)$. The triangle will be rotated 90° counterclockwise about the origin. What will be the vertices of triangle $J'K'L'$?



Measurement Progressions

Perimeter, Area, Volume

Grade 6: Perimeter and area of polygons
Circumference and area of circles

Grade 7: Volume and surface area of cylinders and prisms

Grade 8: Effect of dimension changes on perimeter and area
Effect of dimension changes on surface area and volume

* Make estimates between customary and metric systems



Measurement

Examples of differences

Grade 6

A triangle has a base of 20 cm and a height of 18 cm. What is the area of the triangle?

Grade 7

What is the *approximate* volume of a cylinder with a radius of 4 inches and a height of 14 inches?

Grade 8

If the length and the width of a rectangle are doubled, what will happen to the area of the rectangle?



Statistics and Probability Progressions

Probability

- Grade 6:** Identifying sample space and probability of simple events
 - Experimental and theoretical probability for simple events
- Grade 7:** Experimental and theoretical probability for compound, independent events
- Grade 8:** Probability of dependent and independent events



Statistics and Probability Progressions

Statistical Investigations (Distributions and Relationships)

Grade 6: Stem-and-leaf plots, dot plots, and histograms of one data set

Mean, median, mode, and range

Grade 7: Interpret data using box plots

Summarize two sets of data

Grade 8: Use scatter plots to summarize bivariate data

Understand misuse and distortion of data



Statistics and Probability

Examples of differences

Grade 6

A fair number cube, numbered 1-6, is rolled. What is the probability of rolling an odd number?

Grade 7

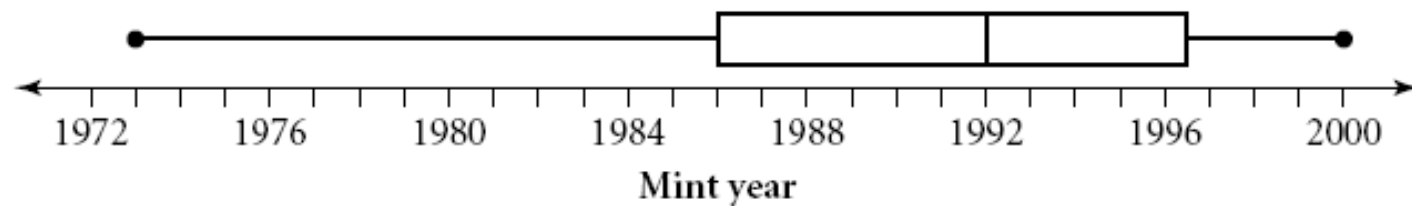
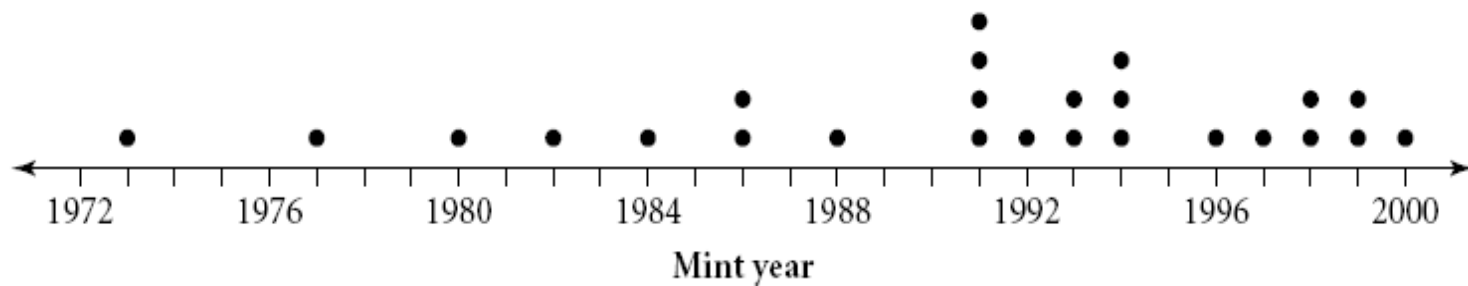
A fair coin is tossed three times. What is the probability that the coin will land showing tails on all three tosses?

Grade 8

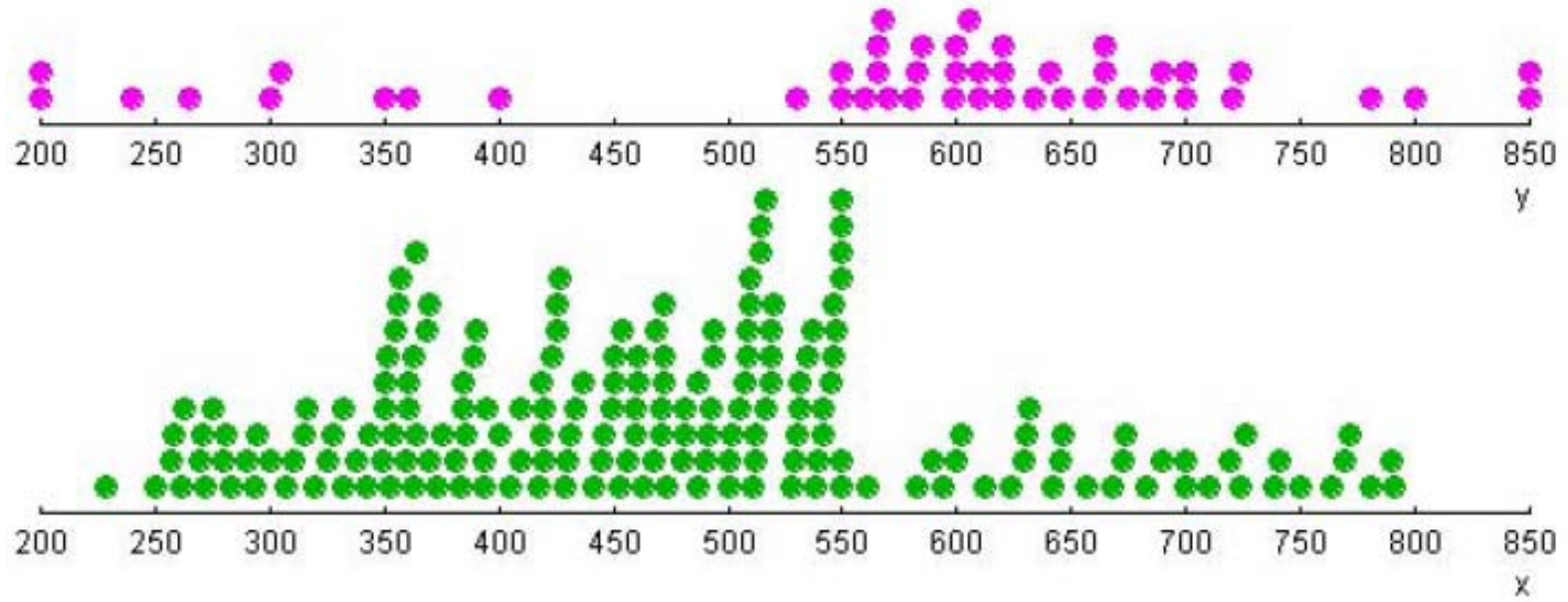
A bag contains 4 red marbles, 3 yellow marbles, and 5 blue marbles. Without looking, Bill will pull out a marble, keep it, and then pull out a second marble. He will win a prize if he pulls out a red marble and then a blue marble. What is the probability that Bill will win a prize?



Dot Plots



Dot Plots



High School Courses in Middle School Getting Students Ready

Grade	Grade 6, Option 1 Grade 7, Option 1		
6	100% 6th grade content; 50% 7th grade content		
7	50% 7th grade content; 100% 8th grade content		
8	Math A Standards		

www.math.ncwiseowl.org



High School Courses in Middle School Getting Students Ready

Grade	Grade 6, Option 1 Grade 7, Option 1	Grade 7, Option 2	
6	100% 6th grade content; 50% 7th grade content	100% 6th grade content	
7	50% 7th grade content; 100% 8th grade content	7th and 8th grade content blended so that 100% of both years' content is taught	
8	Math A Standards	Math A Standards	



High School Courses in Middle School Getting Students Ready

Grade	Grade 6, Option 1 Grade 7, Option 1	Grade 7, Option 2	Grade 8, Option 3
6	100% 6th grade content; 50% 7th grade content	100% 6th grade content	100% 6th grade content
7	50% 7th grade content; 100% 8th grade content	7th and 8th grade content blended so that 100% of both years' content is taught	100% 7th grade content
8	Math A Standards	Math A Standards	8th grade content and Math A Standards blended so that 100% of both years' content is taught



Math Contests

- Excellent source of challenging problems for enrichment
- Sites have past contests with solutions
- See handout for a list of Math Contests



NAEP Questions Tool



- Released questions from NAEP for grades 4, 8 and 12
- Highlights student responses and student performance data

Access it today for **FREE** at:

<http://www.dpi.state.nc.us/accountability/policies/naep/5>

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Presidential Awards for Excellence in Mathematics and Science Teaching

www.paemst.org

Year	Who Can Apply	Nomination Deadline	Application Deadline
2009	Elementary Teachers Grades K - 6	April 1, 2010	May 1, 2010
2010	Secondary Teachers Grades 7 - 12	April 1, 2011	May 1, 2011



Math Science Partnership Grants

To improve academic achievement of students in mathematics and science by **strengthening the quality of mathematics and science instruction**



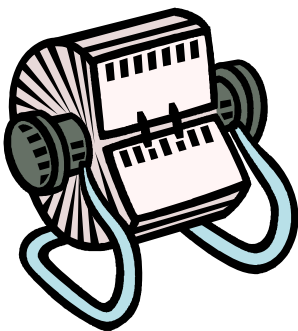
QUESTIONS / COMMENTS



EVALUATION



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