Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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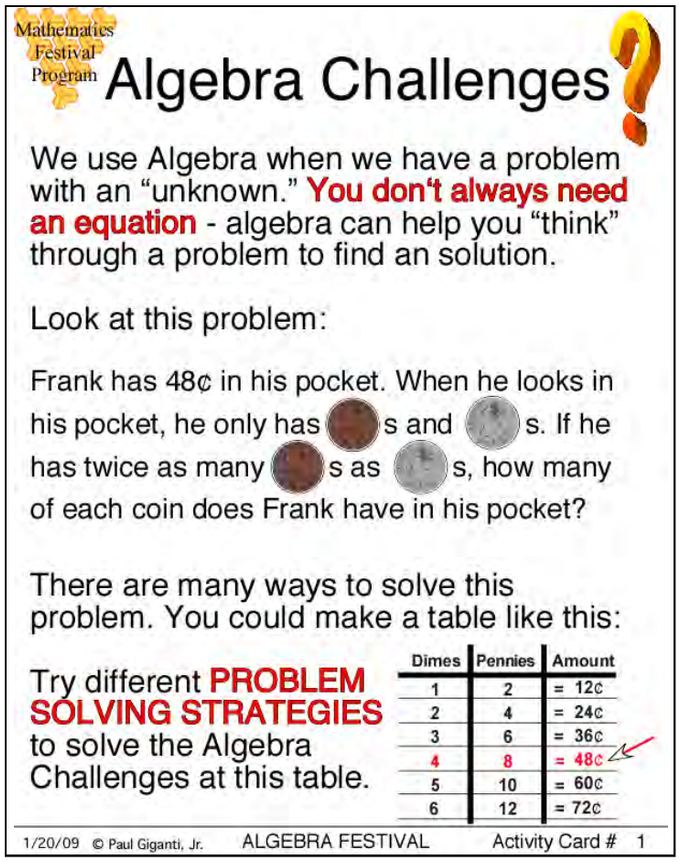
Math Festival: Algebra 2, 3, 4, 5, 6, 7, 8 **Grade Span**

Algebra Challenges

Materials used with this activity:

Task Cards
Thick Markers
Cloth Erasers



Comments:
This set is a variety of non-routine word problems that yield nicely to algebraic thinking and equations. A chart nearby listing problem solving strategies could be very helpful in reminding students what strategies to try. Various manipulatives can be made available to students for use in solving these problems.

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
3) Make viable arguments and critique others reasoning.
4) Model with mathematics.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

CC: Counting & Cardinality OA: Operations & Algebraic Thinking NBT: Number & Operations in Base Ten
MD: Measurement & Data G: Geometry NF: Number & Operations—Fractions NS: The Number System
EE: Expressions & Equations SP: Statistics & Probability RP: Ratio & Proportion Relationships F: Functions

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem

4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem. Understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Math Festival Stations Correlation

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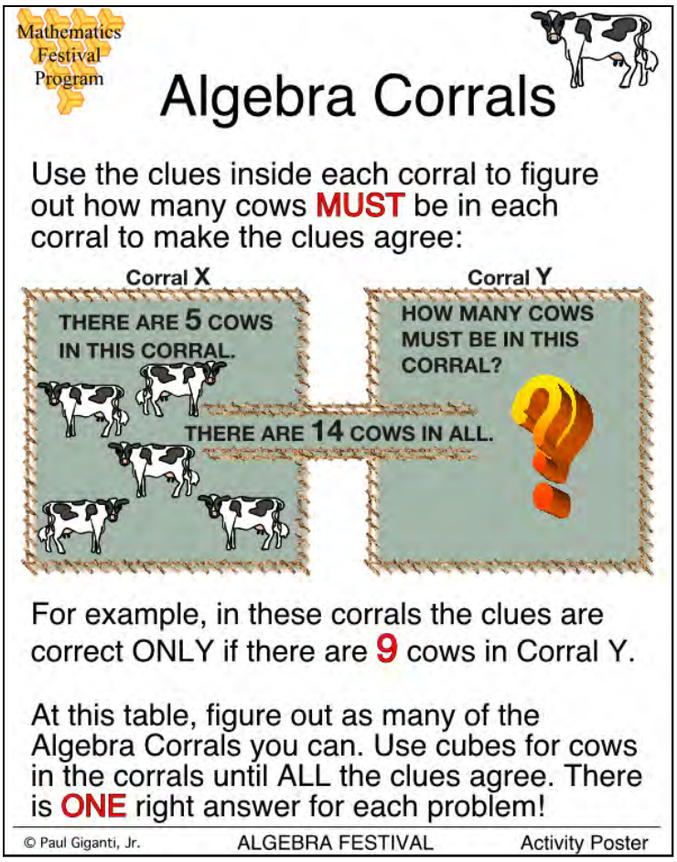
Math Festival: Algebra 1, 2, 3, 4, 5, 6, 7, 8 **Grade Span**

Algebra Corrals

Materials used with this activity:

Task Cards in Sheet Protectors

Tiles or Counters (for symbolic cows)



Comments:

These are essentially multi-variable equations with two or three unknowns. They can be done by younger students using guess & check and algebraic thinking, or Algebra I students can solve them using simultaneous equations or substitution.

Standard(s) for Mathematical Practice

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4) Model with mathematics.

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1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.4 Understand subtraction as an unknown-addend problem. Add and subtract within 20.1

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

6.EE.3 Apply the properties of operations to generate equivalent expressions.

6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Math Festival Stations Correlation

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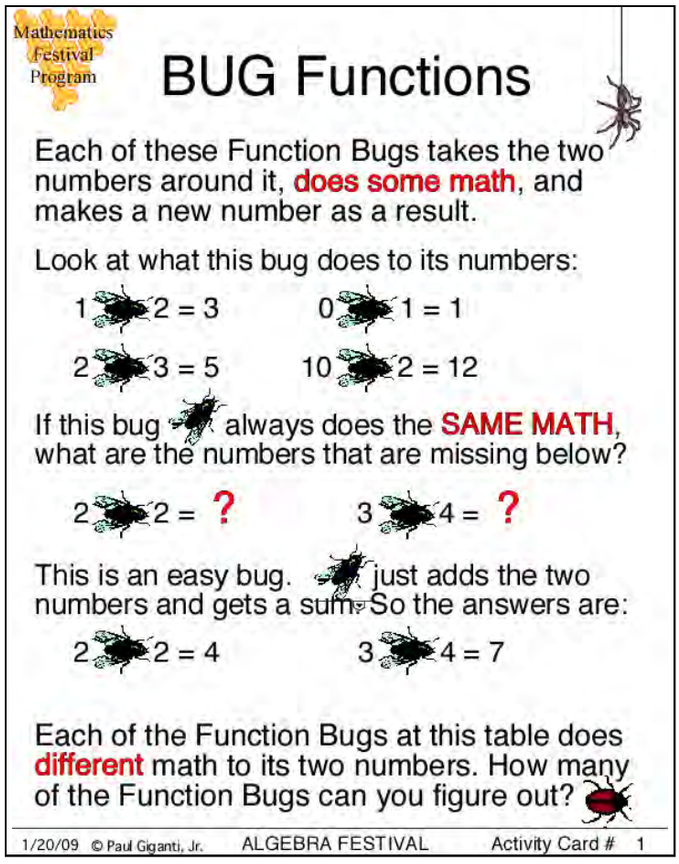
Math Festival: Algebra

BUG Functions

Grade Span 4, 5, 6, 7, 8

Materials used with this activity:

Task Cards
Thick Markers
Cloth Erasers



Comments:

Unlike single variable functions, each of these tasks has TWO variables interacting with each other to yield results based upon a "rule." They are much more complex than simple functions, and are among the most challenging of the algebra stations.

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
3) Make viable arguments and critique others reasoning.
7) Look for and make use of structure.
8) Look for and express regularity in repeated reasoning.

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1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers. Write expressions that record operations with numbers and with letters standing for numbers. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real- world problems. Perform arithmetic operations.

6.EE.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

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Math Festival: Algebra 2, 3, 4, 5, 6, 7, 8 **Grade Span**

Bunchs of Beans

Materials used with this activity:

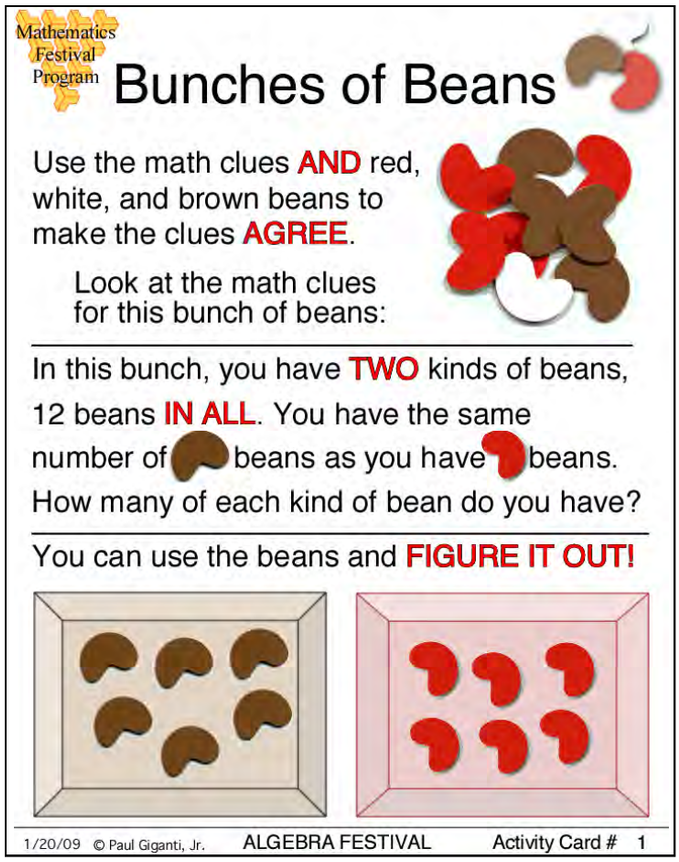
Task Cards

Plastic or Real Beans painted Red, White, and Brown

Task Cards in Sheet Protectors

Comments:

These problems are essentially two equations (or three) with two (or three) unknowns. They can be done by younger students using guess & check, or by older students using algebraic thinking and/or simultaneous equations.



Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
4) Model with mathematics.
6) Attend to precision.

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K.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.4 Understand subtraction as an unknown-addend problem. Add and subtract within 20.1

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

6.EE.3 Apply the properties of operations to generate equivalent expressions.

6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

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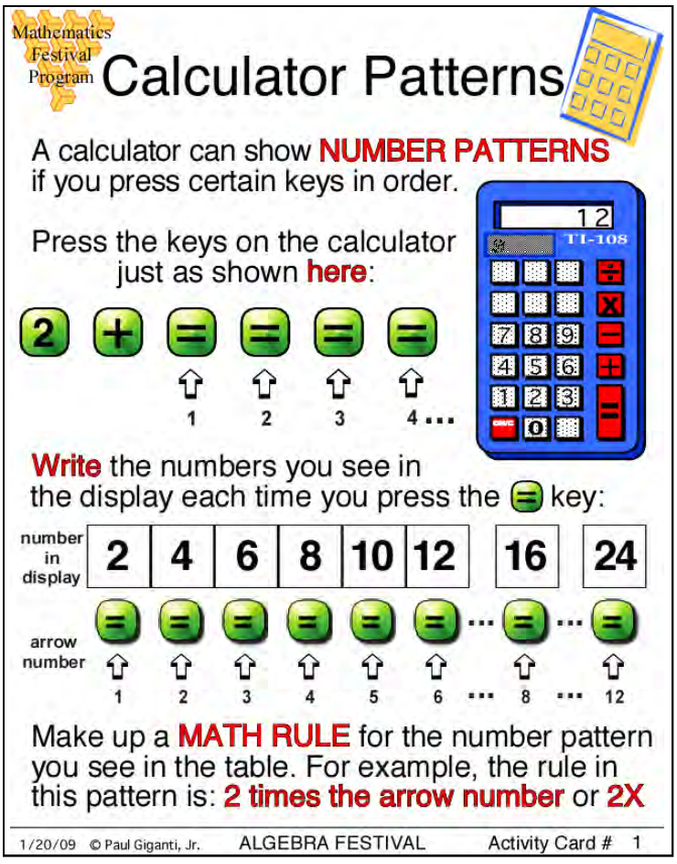
Math Festival: Algebra 1, 2, 3, 4, 5, 6, 7, 8

Calculator Patterns

Grade Span

Materials used with this activity:

Task Cards
Thick White Board Markers
Cloth Erasers
Four-Function Calculators*



Comments:

When is a common calculator a function generator? When you use it to generate number patterns. A non-routine use of calculators suitable and interesting for all grade levels.

*Note: The calculators used for this activity must have the automatic constant function built-in (most do).

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
4) Model with mathematics.
5) Use appropriate tools strategically.
7) Look for and make use of structure.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

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1.OA.5 Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra K, 1, 2, 3, 4, 5

Coloring Patterns

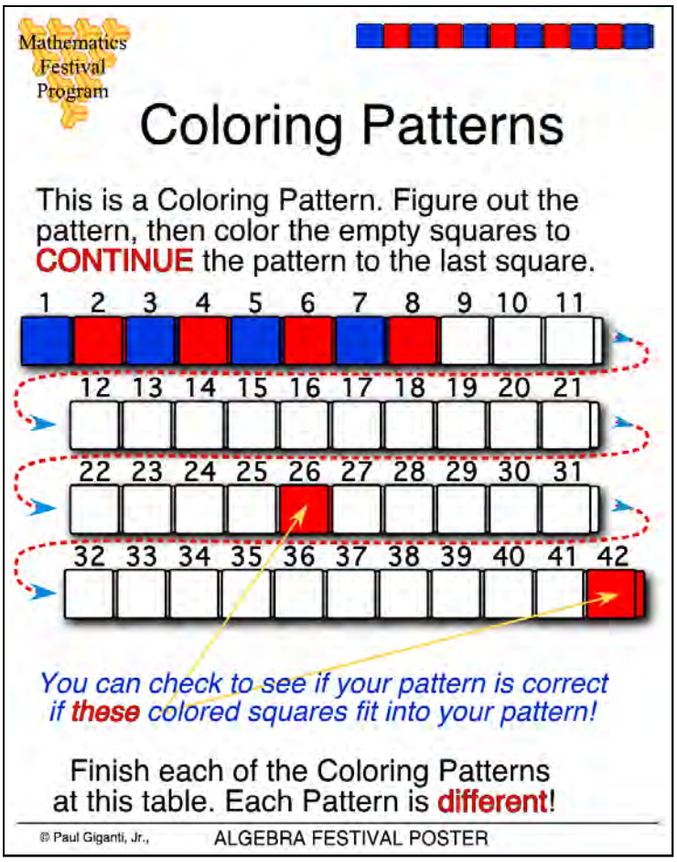
Grade Span

Materials used with this activity:

Task Cards

Thick Markers (red, green, blue, and black)

Cloth Erasers



Comments:

This is a coloring version of the classic hands-on A-B (or other) type cyclical patterns taught in the primary grades. Easy enough for Kindergarteners, but the harder tasks use much more sophisticated patterns in order to challenge upper elementary students as well. The task cards are self-checking.

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
6) Attend to precision.
8) Look for and express regularity in repeated reasoning.

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K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/ækornersæ) and other attributes (e.g., having sides of equal length).

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

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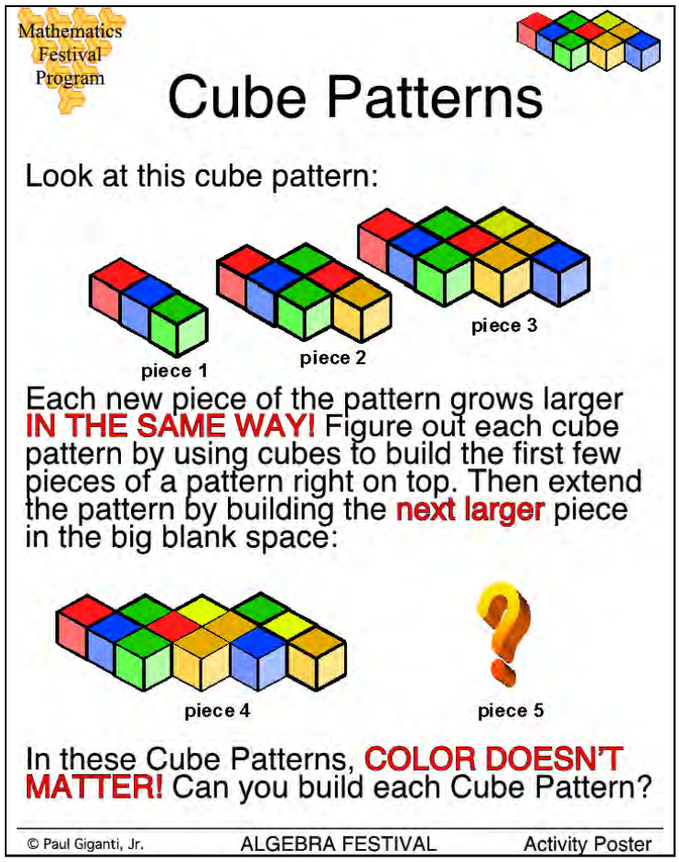
Math Festival: Algebra K, 1, 2, 3, 4, 5, 6, 7, 8 **Grade Span**

Cube Patterns

Materials used with this activity:

Task Cards

Many Baskets of MultiLink Cubes



Comments:

At the lower grades, students can merely copy, build, and extend the patterns. At the upper grades students are asked to "skip" several elements of a pattern to find the 20th element in that pattern, without building all the previous elements first (for example: Triangular Numbers: 1, 3, 6, 10... If 10 is the 4th element in this patter, what is the 20th element in this pattern?).

Standard(s) for Mathematical Practice

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4) Model with mathematics.
7) Look for and make use of structure.

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K.G.6 Compose simple shapes to form larger shapes.

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

7.RP.2 Recognize and represent proportional relationships between quantities. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. Represent proportional relationships by equations. Explain what

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra K, 1, 2, 3, 4, 5, 6, 7, 8 **Grade Span**

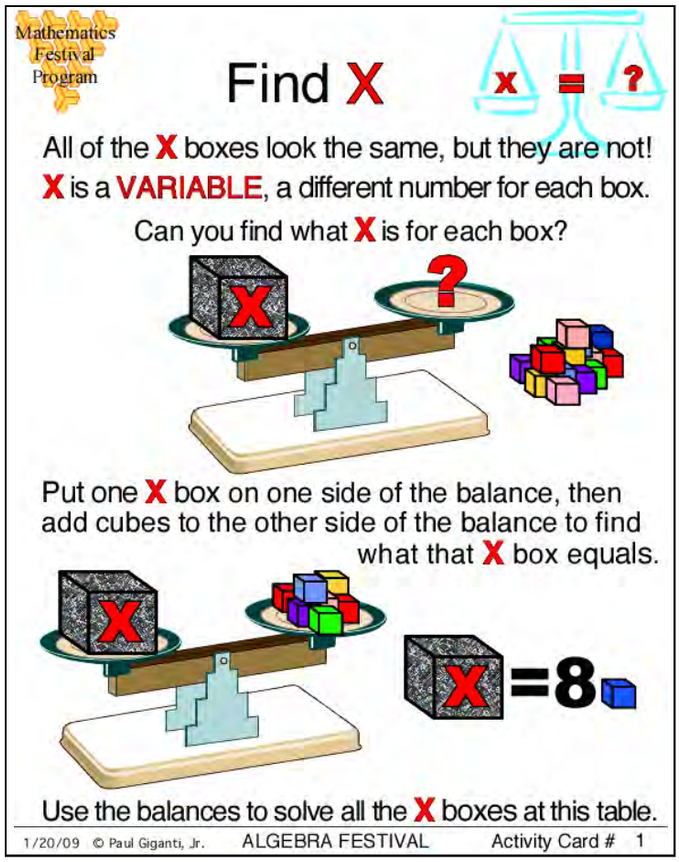
Find X

Materials used with this activity:

Balance Scales

Mystery "X" boxes filled with "stuff" of different weights

Wooden Cubes (for weights)



Comments:

This activity is meant to "define" a math variable in the minds of young students, where X can and does have multiple values. All of the "X" boxes look identical, but every box is a different weight; hence X is a variable. When we ask, "What is X?" at this station, the answer is always a different number.

Standard(s) for Mathematical Practice

2) Reason abstractly and quantitatively.
3) Make viable arguments and critique others reasoning.
5) Use appropriate tools strategically.
6) Attend to precision.
8) Look for and express regularity in repeated reasoning.

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K.CC.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects. Compare numbers.

K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies with up to 10 objects.

K.MD.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

2.MD.3 Estimate using units e.g. inches, feet, centimeters, and meters.

3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

7.RP.2 Recognize and represent proportional relationships between quantities. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. Represent proportional relationships by equations. Explain what

Math Festival Stations Correlation

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Math Festival: Algebra

Grade Span 2, 3, 4, 5, 6, 7, 8

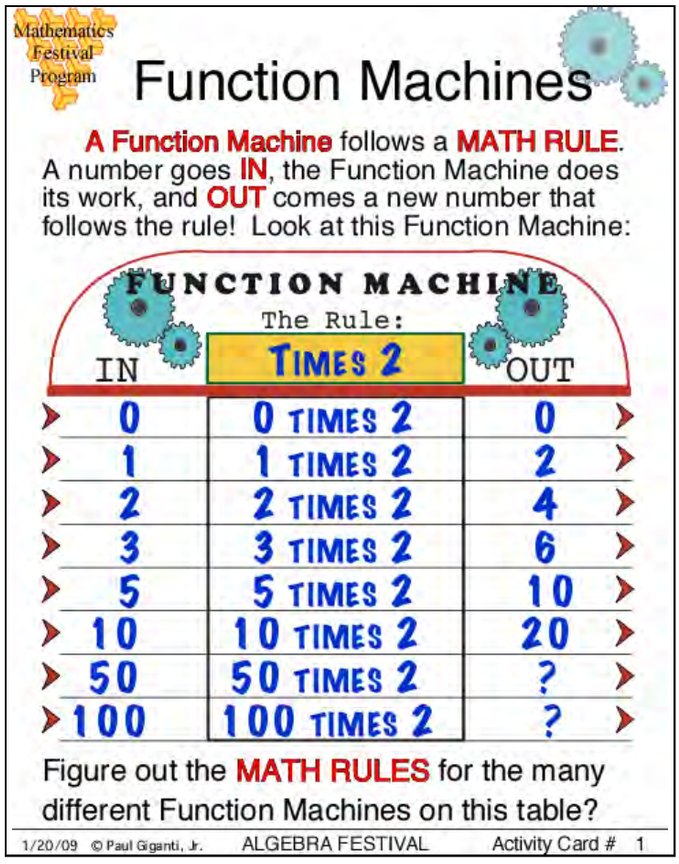
Function Machines

Materials used with this activity:

Task Cards in Sheet Protectors

Thick White Board Markers

Cloths or White Board Erasers



Comments:

The classic algebra "input,""rule," and "output" function activity. This station has both very easy and very hard functions for different ability-level students.

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3.OA.5 Apply properties of operations as strategies to multiply and divide (Associative property of multiplication and Distributive property).

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1

8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

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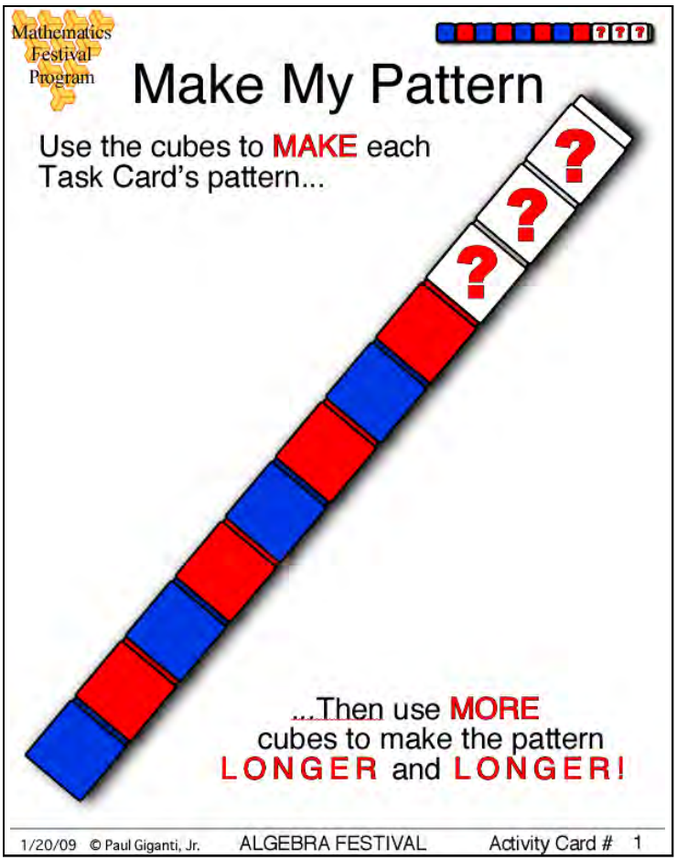
Math Festival: Algebra K, 1, 2, 3, 4, 5

Make My Pattern

Grade Span



Materials used with this activity:

Task Cards

Unifix Cubes (with white ones removed)

MultiLink cubes could be used in a pinch, but are not as good for this "straight-line" activity

Comments:

Among the easier algebra stations, these patterns are based upon the classic primary pattern activity (e.g.,AB, ABB, AABBB patterns). Suitable for Kindergarten, the hardest task cards are challenging for 5th graders.

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K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/ækornersæ) and other attributes (e.g., having sides of equal length).

K.G.6 Compose simple shapes to form larger shapes.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

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Math Festival: Algebra

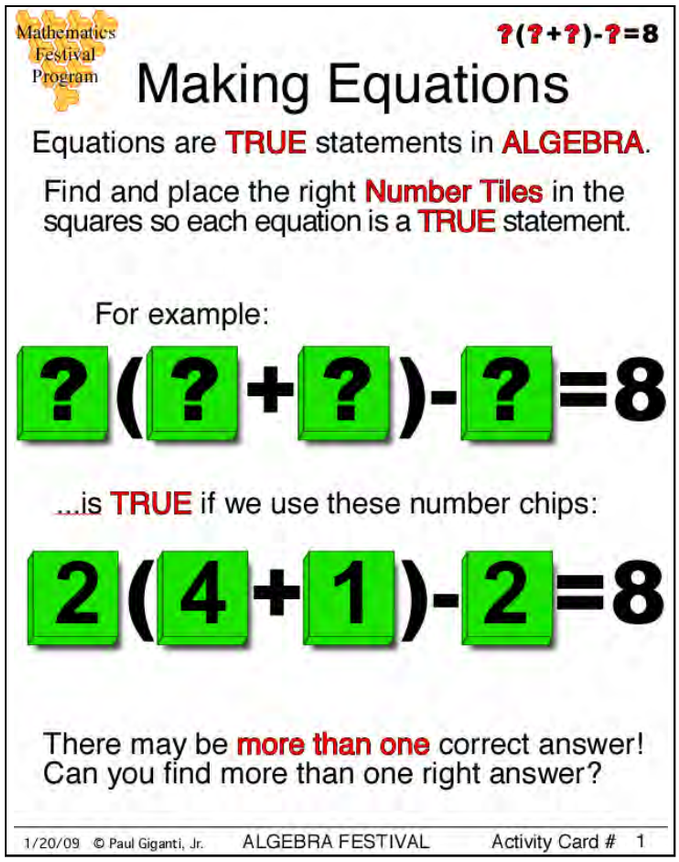
Grade Span 2, 3, 4, 5, 6, 7, 8

Making Equations

Materials used with this activity:

Task Cards

Numbered Plastic Tiles (using 1–9 only)



Comments:

All the way from simple addition to reciprocals, this station is algebraic equation manipulation without the need for an eraser!

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
7) Look for and make use of structure.

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1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers. Write expressions that record operations with numbers and with letters standing for numbers. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real- world problems. Perform arithmetic operations.

6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra K, 1, 2, 3, 4, 5, 6

Math & Literature

Grade Span

Materials used with this activity:

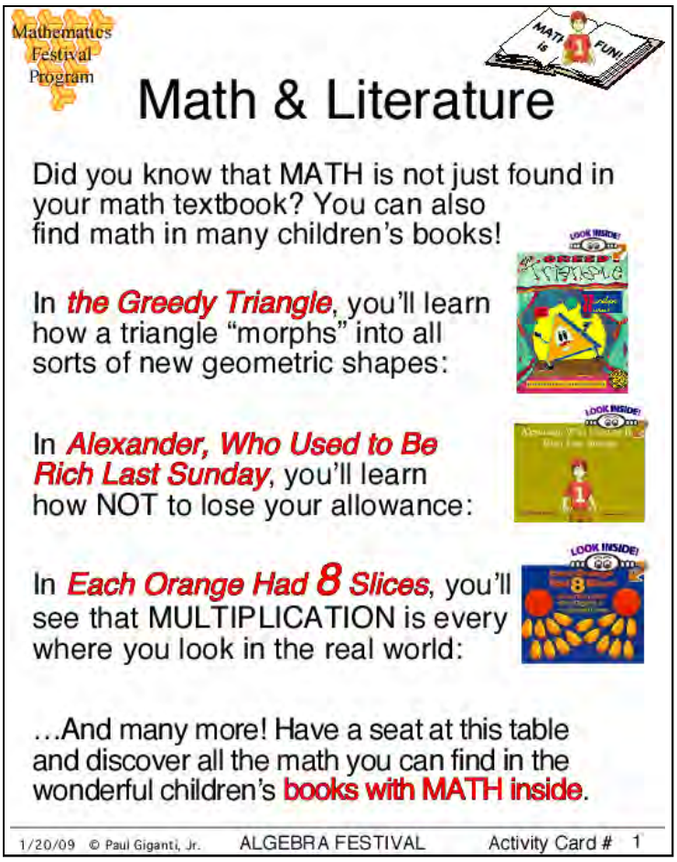
Children's Books

with math themes and problems to solve*

*There is a list of suggested math-themed children's book on the Math Festival CD.

Comments:

There are hundreds of children's literature books with math themes and math problems to solve. They range from Kinder (The Very Hungry Caterpillar) to middle school (the Phantom Tollbooth). This station should be stocked with an assortment of 20 or more different titles at a variety of grade levels.



Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
3) Make viable arguments and critique others reasoning.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

CC: Counting & Cardinality OA: Operations & Algebraic Thinking NBT: Number & Operations in Base Ten
MD: Measurement & Data G: Geometry NF: Number & Operations—Fractions NS: The Number System
EE: Expressions & Equations SP: Statistics & Probability RP: Ratio & Proportion Relationships F: Functions

There are MANY related CACCSSM Standards that go with this Math Festival station, but each depends on the book chosen and the math concepts within.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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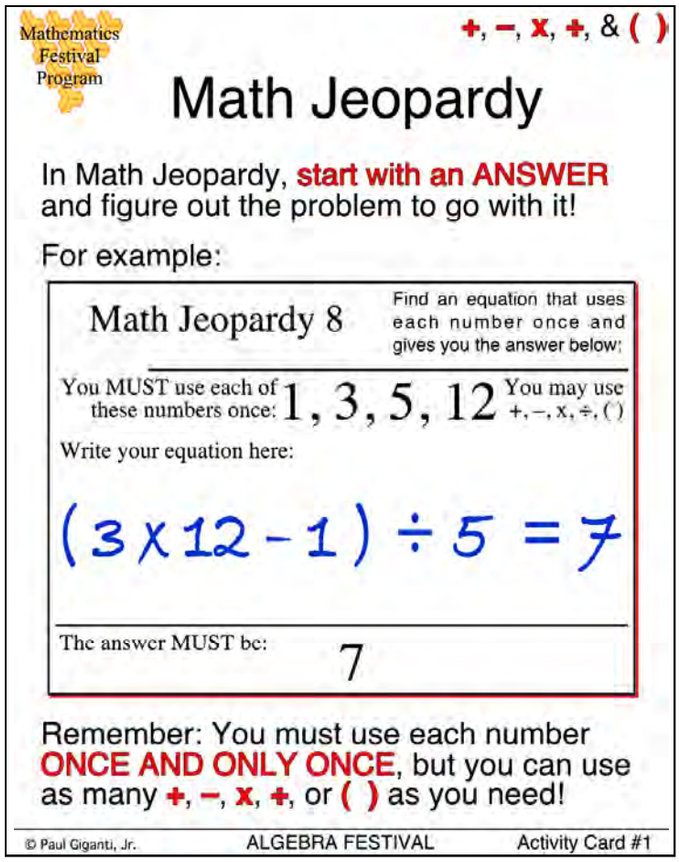
Math Festival: Algebra 2, 3, 4, 5, 6, 7, 8 **Grade Span**

Math Jeopardy

Materials used with this activity:

Task Cards in Sheet Protectors
Thick White Board Markers
Cloths or White Board Erasers



Comments:

This is the algebraic version of the TV game, Jeopardy, where the "question" that must be asked to a given an "answer", is an equation. One of the most engaging non-maniplulative based algebra activities, they are like algebra "candy;" do one and you want to do another!

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
6) Attend to precision.
7) Look for and make use of structure.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

CC: Counting & Cardinality OA: Operations & Algebraic Thinking NBT: Number & Operations in Base Ten
MD: Measurement & Data G: Geometry NF: Number & Operations—Fractions NS: The Number System
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1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra 2, 3, 4, 5, 6, 7, 8

Numbell Puzzles

Grade Span

Materials used with this activity:

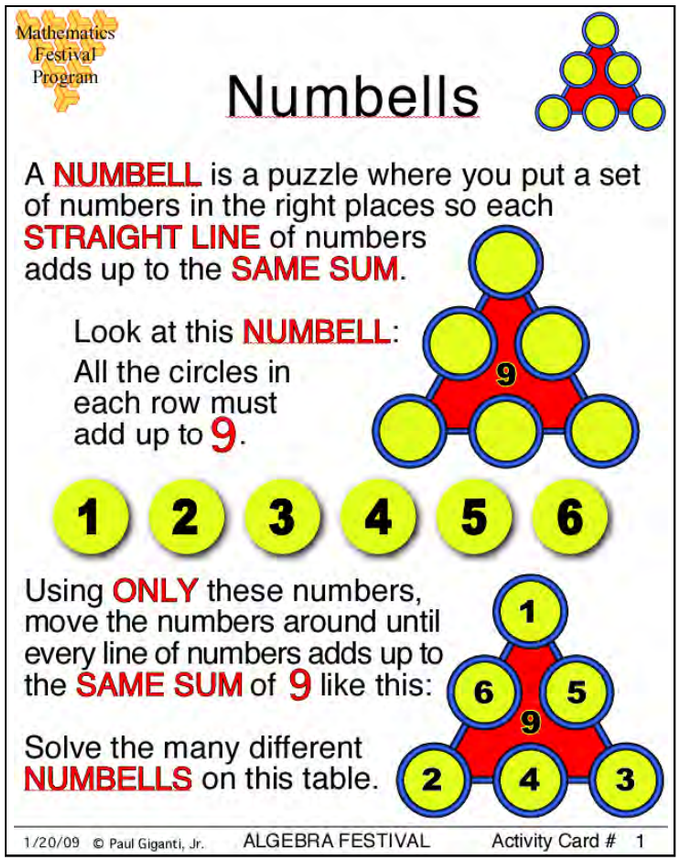
Task Cards

Numbered Counter Chips (either number tiles or 2-color

* The Numbells Activity on the Math Festival CD includes a list of the numbers you'll need on the chips.

Comments:

The easiest Numbell puzzle in this station can be completed by a 1st grader; the hardest Numbells will challenge even the best of 8th graders (and adults). Each Numbell's solution reveals a geometry pattern in the placement of the numbers, and these patterns are algebraic in nature. Finding the pattern helps in finding the solution!



Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
7) Look for and make use of structure.
8) Look for and express regularity in repeated reasoning.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

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EE: Expressions & Equations SP: Statistics & Probability RP: Ratio & Proportion Relationships F: Functions

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

6.EE.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra 1, 2, 3, 4, 5, 6, 7, 8

Number Patterns

Grade Span

Materials used with this activity:

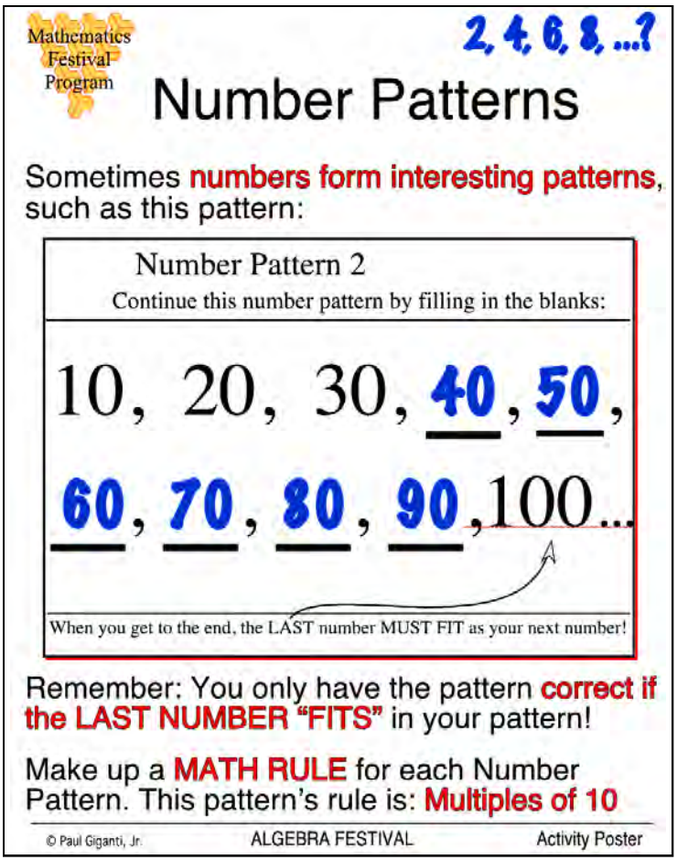
Task Cards

Thick White Board Markers

Cloth Erasers

Comments:

All the way from easy: 2, 4, 6, 8... to very hard: 1, 8, 27, 64... The task cards are self checking; if done incorrectly, the last number in the pattern WON'T fit!



Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
6) Attend to precision.
7) Look for and make use of structure.
8) Look for and express regularity in repeated reasoning.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

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MD: Measurement & Data G: Geometry NF: Number & Operations—Fractions NS: The Number System
EE: Expressions & Equations SP: Statistics & Probability RP: Ratio & Proportion Relationships F: Functions

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra

1, 2, 3, 4, 5

Number-Table Patterns

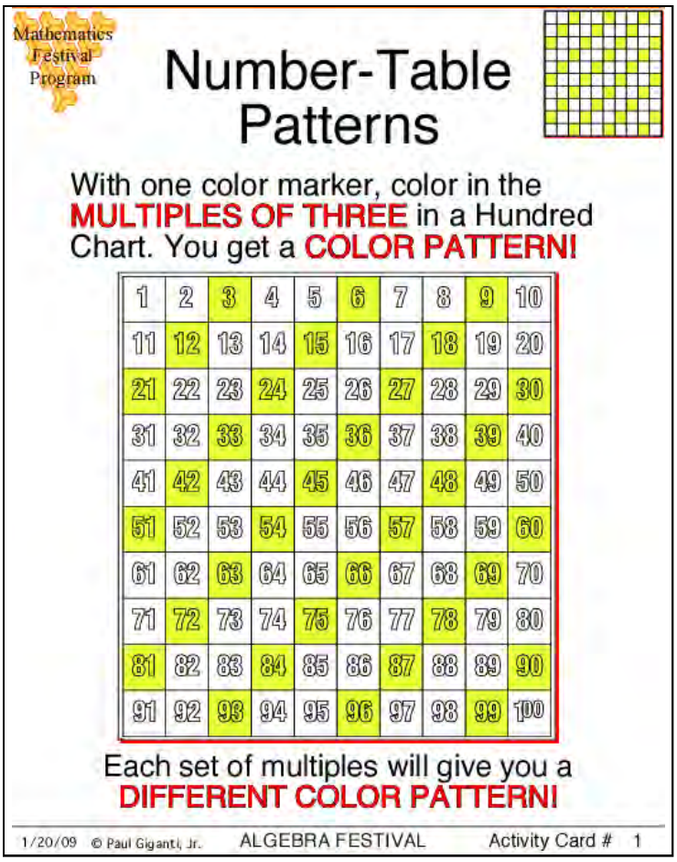
Grade Span

Materials used with this activity:

Task Cards

Thick Markers (light colors are recommended)

Cloth Erasers



Comments:

Students don't need to know all their math facts to complete these tables successfully; they can use skip-counting or follow the visual and geometry patterns that emerge.

Standard(s) for Mathematical Practice

2) Reason abstractly and quantitatively.
7) Look for and make use of structure.
8) Look for and express regularity in repeated reasoning.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

CC: Counting & Cardinality OA: Operations & Algebraic Thinking NBT: Number & Operations in Base Ten
MD: Measurement & Data G: Geometry NF: Number & Operations—Fractions NS: The Number System
EE: Expressions & Equations SP: Statistics & Probability RP: Ratio & Proportion Relationships F: Functions

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra K, 1, 2, 3, 4, 5, 6, 7, 8

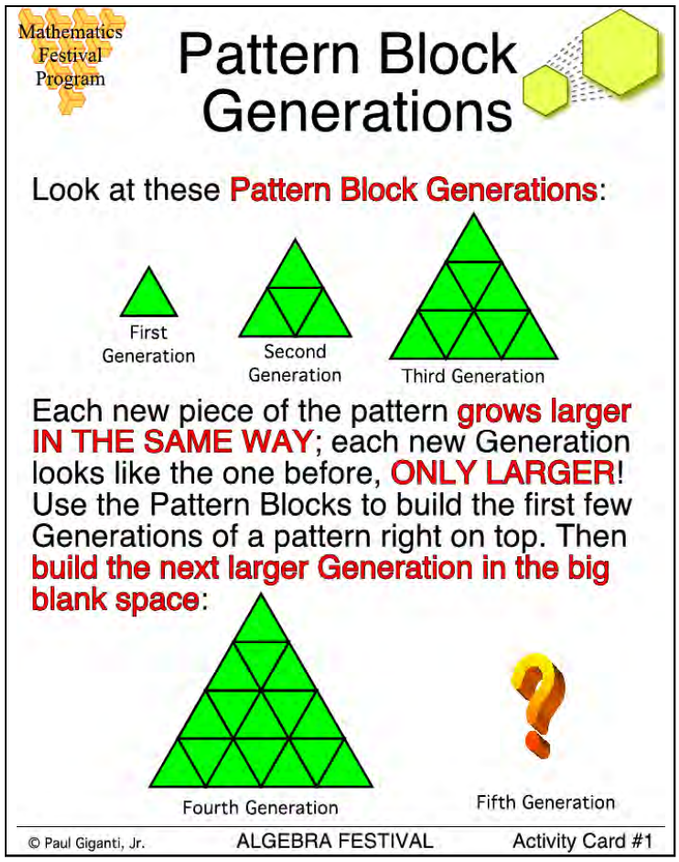
Pattern Block Generations

Grade Span

Materials used with this activity:

Task Cards

Many Baskets of Pattern Blocks—wooden or foam



Comments:

At the lower grades, students can merely copy, build, and extend the geometry patterns. At the upper grades students are asked to leap over several elements in a pattern to find the 20th element of the pattern (without building all the previous elements). To do this, the ability to generalize a growth pattern is required.

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
4) Model with mathematics.
7) Look for and make use of structure.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

CC: Counting & Cardinality OA: Operations & Algebraic Thinking NBT: Number & Operations in Base Ten
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K.G.6 Compose simple shapes to form larger shapes.

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

7.RP.2 Recognize and represent proportional relationships between quantities. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. Represent proportional relationships by equations. Explain what

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra

Picture Graphing

4, 5, 6, 7, 8

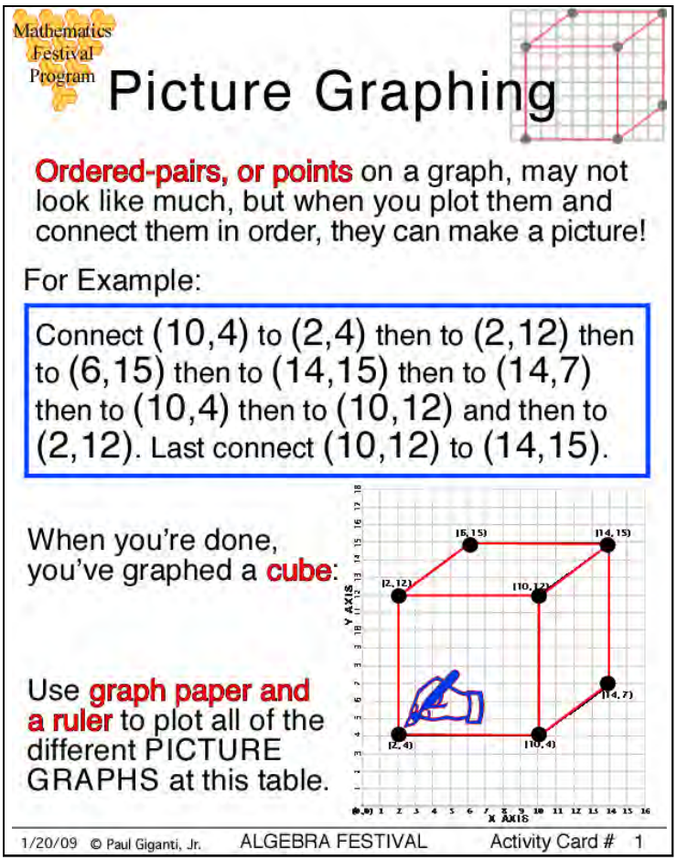
Grade Span

Materials used with this activity:

Task Cards
Thin Markers
Cloth Erasers
Rulers

Comments:

Students from 4th grade on up need practice in plotting Cartesian coordinates. The pictures resulting from these task cards encourage self-checking. This is an especially good activity for two students working together; one calling out the points and keeping track, the other plotting and connecting the points.



Standard(s) for Mathematical Practice

2) Reason abstractly and quantitatively.
5) Use appropriate tools strategically.
6) Attend to precision.
7) Look for and make use of structure.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

CC: Counting & Cardinality OA: Operations & Algebraic Thinking NBT: Number & Operations in Base Ten
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5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two

5.G.2 Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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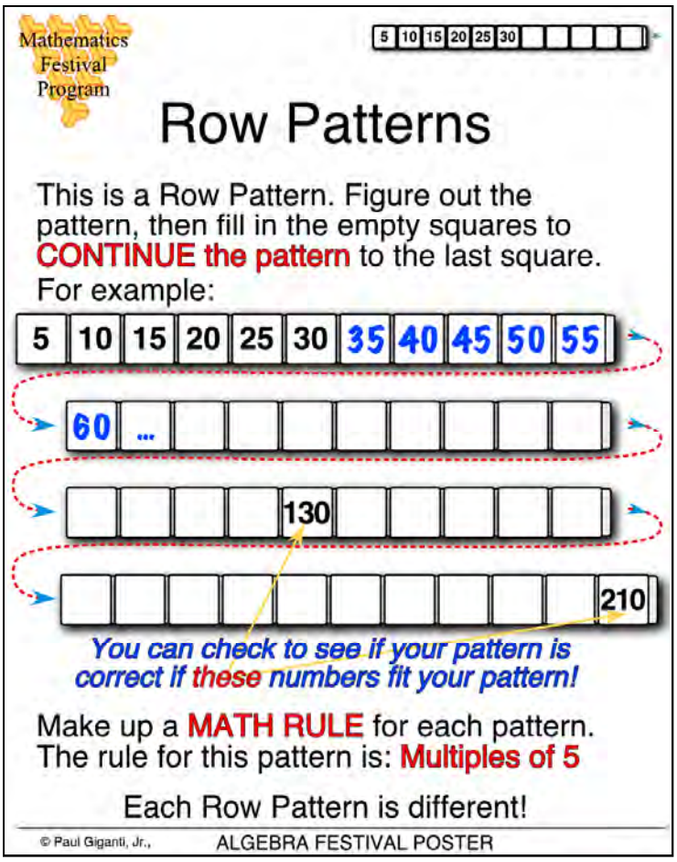
Math Festival: Algebra 1, 2, 3, 4, 5, 6, 7, 8

Row Patterns

Grade Span

Materials used with this activity:

Task Cards
Thin Markers
Cloth Erasers



Comments:

These tasks are a variety of classic math number patterns from the even and odd numbers, all the way to the Fibonacci Numbers—each with a built in self-checking checksum. The hardest number patterns in this set take a great deal of careful calculation and can be upset along the way by a simple computation error.

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
6) Attend to precision.
7) Look for and make use of structure.
8) Look for and express regularity in repeated reasoning.

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3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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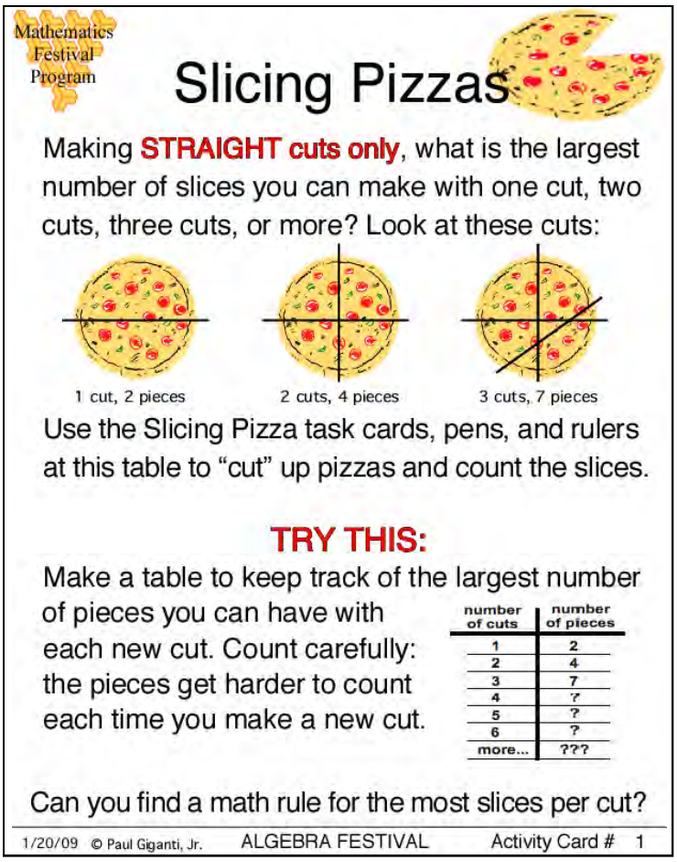
Math Festival: Algebra K, 1, 2, 3, 4, 5, 6, 7, 8

Slicing Pizzas

Grade Span

Materials used with this activity:

Task Cards
Thick Markers
Rulers
Cloth Erasers



Comments:

This activity can be done very simply by younger children just counting (without looking for the pattern), but is much more sophisticated mathematically when upper graders follow the pattern correctly and try to generalize it. This pizza-cutting situation yields a variation of the Triangular Numbers, and is a hard pattern to generalize for most 8th grade algebra

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
3) Make viable arguments and critique others reasoning.
4) Model with mathematics.
8) Look for and express regularity in repeated reasoning.

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2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces (sizes are compared directly or visually, not compared by measuring). Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra

T–Tables

4, 5, 6, 7, 8

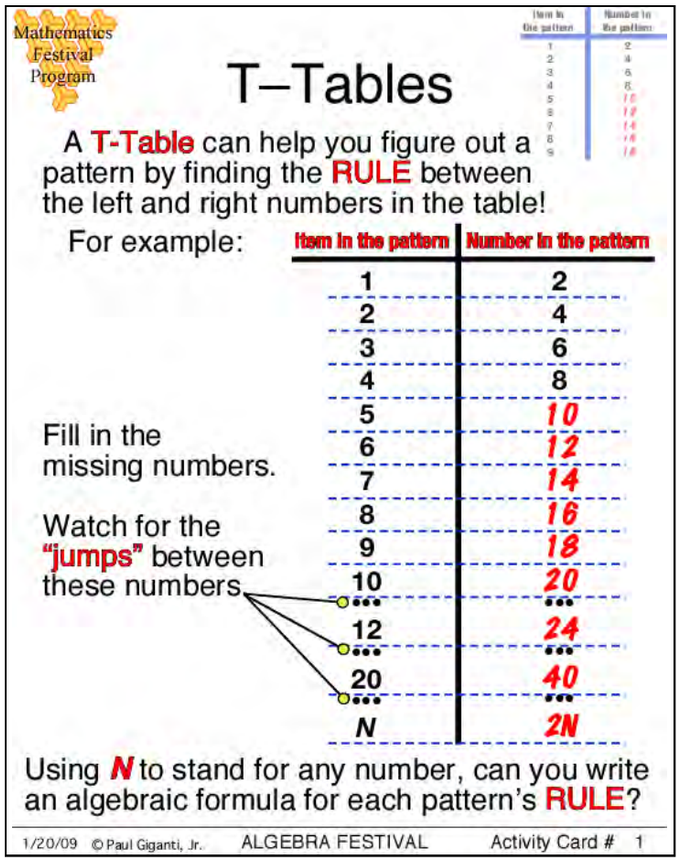
Grade Span

Materials used with this activity:

Task Cards

Thin White Board Markers

Cloths or White Board Erasers



Comments:

While this station includes T-Tables that are easy enough for 2nd graders to complete, the hardest T-Table problems here are the most difficult "problems" in the Algebra Math Festival. This station is designed to challenge even the smartest 8th grade algebra students (and their teachers).

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
3) Make viable arguments and critique others reasoning.
7) Look for and make use of structure.
8) Look for and express regularity in repeated reasoning.

Related K, 1, 2, 3, 4, 5, 6, 7, or 8th grade Standards:

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3.OA.5 Apply properties of operations as strategies to multiply and divide (Associative property of multiplication and Distributive property).

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Math Festival Stations Correlation

to the COMMON CORE Standards in Mathematics

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Math Festival: Algebra

Grade Span 2, 3, 4, 5, 6, 7, 8

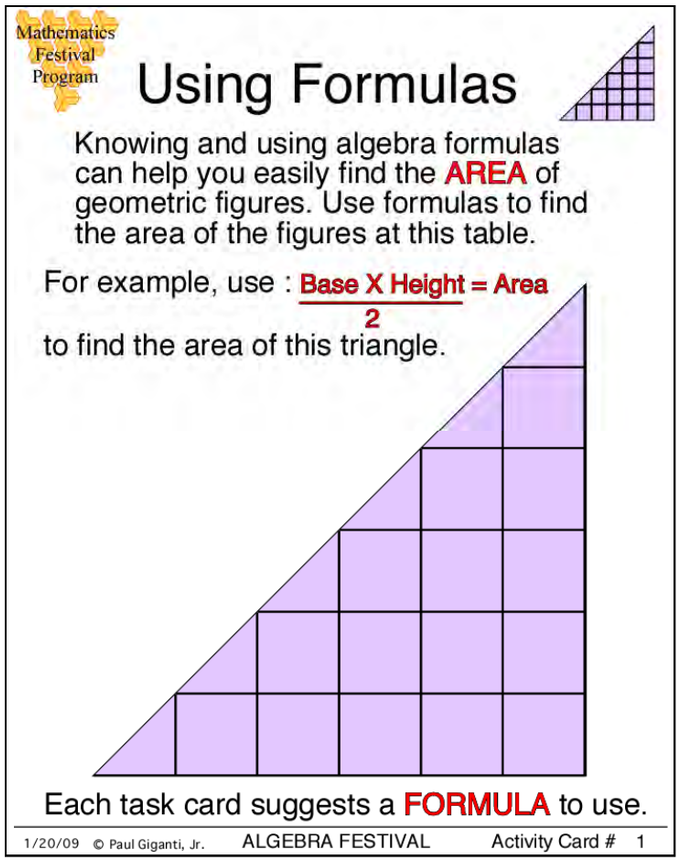
Using Formulas

Materials used with this activity:

Task Cards

Thick White Board Markers

Cloth Erasers



Comments:

While younger students can simply count squares and parts of squares to find the area, older students have the opportunity to utilize the many area formulas they've learned from 4th though 8th grade.

Standard(s) for Mathematical Practice

1) Make sense of problems, persevere in solving them.
2) Reason abstractly and quantitatively.
4) Model with mathematics.
6) Attend to precision.
7) Look for and make use of structure.

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3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.

3.MD.7 Relate area to the operations of multiplication and addition.

4.MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems.

4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.