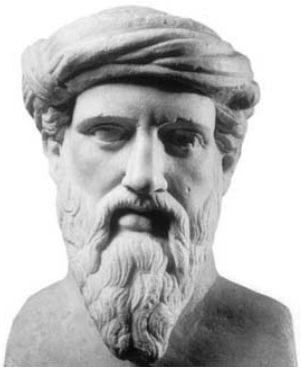
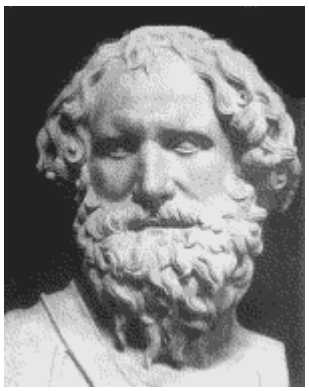


Pythagoras



Archimedes

Euclid

A MATHEMATICS Winter Number Land

Grade 5

Winter 2011-2012

Miami-Dade County Public Schools
Curriculum & Instruction

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Welcome to a Mathematics Winter Number Land

The realm of mathematics contains some of the greatest ideas of humankind. *A Mathematics Winter Number Land* activities included in this packet are a mathematical excursion designed to be read, fun to do, and fun to think and talk about. These activities will guide you in applying the concepts you have studied. Additionally, each activity addresses the Next Generation Sunshine State Standards for Mathematics Benchmarks. Each benchmark is listed at the end of the activity.

The journey to true mathematics understanding can be difficult and challenging but be patient and stay the course. Mathematics involves big ideas. As we make these ideas our own, they will empower us with strength, techniques, and the confidence to accomplish wonderful things. Enjoy working each activity.

Tip for Walking in a *Mathematics Winter Number Land*: the only rule is – HAVE FUN!

If you are in need of additional information about the Elementary Mathematics, *A Mathematics Winter Number Land*, Winter Break Activity Packet, please contact the Division of Mathematics, Science, and Advanced Academic Programs, at 305-995-1934.

Who Were They?

Pythagoras was a Greek mathematical genius and often described as the first pure mathematician. He invented the Pythagorean theorem which states that: "In any right triangle, the area of the square whose side is the hypotenuse (the side of a right triangle opposite the right angle) is equal to the sum of areas of the squares whose sides are the two legs (i.e. the two sides other than the hypotenuse)."

Euclid, the Greek mathematician, was known as the "Father of Geometry". He taught at the university in Alexandria, Egypt. While at the university, he compiled his famous 13 volume treatise called *Elements* that is still the basis of the geometry taught in schools to this day. He used axioms (accepted mathematical truths) to develop a deductive system of proof, which he wrote in his textbook *Elements*. Euclid's first three postulates, with which he begins his *Elements*, are familiar to anyone who has taken geometry: 1) it is possible to draw a straight line between any two points; 2) it is possible to produce a finite straight line continuously in a straight line; and 3) a circle may be described with any center and radius.

Euclid also proved that it is impossible to find the "largest prime number," because if you take the largest known prime number, add 1 to the product of all the primes up to and including it; you will get another prime number. Euclid's proof for this theorem is generally accepted as one of the "classic" proofs because of its conciseness and clarity. Millions of prime numbers are known to exist, and more are being added by mathematicians and computer scientists. Mathematicians since Euclid have attempted without success to find a pattern to the sequence of prime numbers.

Archimedes is one of the great scientists of antiquity also known for his mathematical work. It is believed he studied under followers of Euclid. He proved that an object plunged into liquid becomes lighter by an amount equal to the weight of liquid it displaces. Popular tradition has it that Archimedes made the discovery when he stepped into the bathtub, then celebrated by running through the streets shouting "Eureka!" ("I have found it!"). He also worked out the principle of levers, developed a method for expressing large numbers, discovered ways to determine the areas and volumes of solids, and calculated an approximation of pi (π).

Wastebasket Basketball!

Adapted from Education.com

Description:
This game not only gives kids and their parents a chance to play together, but it is an enjoyable way to demonstrate how recorded results can be expressed in whole numbers, fractions, and decimals.

Materials: Wastebasket, ball, paper, pencil

Directions:

1. Explain to your child that you are going to play *Wastebasket Basketball*. You will record your successes and failures. Have your child set up the wastebasket a reasonable distance from the throw line. Suggest that each of you attempt to throw the ball into the basket 10 times.
2. Rotating turns, throw the ball ten times each. After each throw, record your own results. You can make a chart to show successful and failed attempts or you can use a simple tally system.
3. Now that you have your data, it's time to find the fraction which reflects each of your results. Start by showing the fraction of your attempts and then let your child find his fractions. For example, if you were successful 4 times then the fraction of your successful attempts is 4 out of 10. The fraction that shows your failed attempts is 6 out of 10.
4. Next, show your child how to write the fraction in decimal form. In this example, the decimal 0.4 shows your successes and the decimal 0.6 shows your failures. If your child is confused by this representation, start with the fractions 4/10 and 6/10 and then convert them to decimal form by dividing the numerator by the denominator. Remind your child that the number 4 represents your successful tries and the number 10 represents the total number of attempts.
5. Repeat the game again at two later dates.
    a. Who made the most baskets altogether? [each of you needs to add his/her fractions to find out total wins]
    b. How many more baskets did one make over the other? [find the difference between your wins by subtracting the two final fractions]

To expand on this exercise, try looking over the sports section of the newspaper and identifying player statistics expressed as decimals. What do they mean? Is that a good statistic, or is the player doing poorly? Sports statistics are a great way to practice math.

Next Generation Sunshine State Standards: Grade 5, Big Idea/Supporting Idea & Benchmarks
BIG IDEA 2: Develop an understanding of and fluency with addition and subtraction of fractions and decimals.

- **MA.5.A.2.1:** Represent addition and subtraction of decimals and fractions with like and unlike denominators using models, place value or properties.

Deck It Out

Compiled directly from Education.com

Description:
Here's an activity that will help your child strengthen and develop his understanding of positive and negative numbers by playing this simple card game. Work in a small group of 2 to 5 players. Help each other determine which cards have the greatest value by comparing “positive” and “negative” numbers.

Materials: one deck of playing cards

Directions:

1. Shuffle the deck of cards. Divide the deck evenly among the players. Players should each keep their cards face down in a single stack.
2. For the purposes of this game, red cards will represent negative numbers and black cards will represent positive numbers. (aces = +/-1, jacks = +/-11, queens = +/-12, kings = +/-13)
3. Begin with players simultaneously turning over one card from the top of their packs. The winner of the round is determined by who turns over the card with the highest value (for example, a black 7 beats a red 4; a red 4 beats to a red 7; a black 4 beats a red 7; and so on). The winner gathers the cards from that round and places them at the bottom of their stack.
4. The winner of the game is the player who accumulates all of the cards, or has the most cards when time runs out.

Next Generation Sunshine State Standards: Grade 5, Big Idea/Supporting Idea & Benchmarks
Supporting Idea 6: Number and Operations.

- **MA.5.A.6.3**: Describe real-world situations using positive and negative numbers.
- **MA.5.A.6.4**: Compare, order, and graph integers, including integers shown on a number line.

At Grade 5, these two benchmarks will be assessed using multiple choice (MC) items.
For MA.5.A.6.3:

- Students will solve real-world problems involving positive or negative numbers.
- Items may include, but are not limited to, situations of owing money, measuring elevations above and below sea level, riding elevators up and down, temperature, ascending and descending mountains, football yardage, etc.

For MA.5.A.6.4:

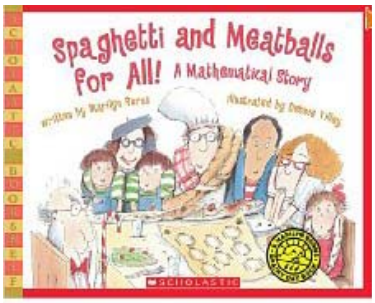
- Students will compare or order integers.
- Students will compare or order integers using inequalities.
- Students will compare and order or identify integers on a number line.
- Items may include, but are not limited to, rocket countdowns, elevations, temperatures, etc.
- Items may include integers -500 through 500.
- Items may include the inequality symbols ($<$, $>$, $\leq$, $\geq$, $\neq$)
- Items will not include timelines (years).

My Math Literature Connection

This activity has literature connections to enhance literacy and mathematics skills. The local public library is a good resource to find the recommended books.

Description:
You will have volumes of mathematics fun as you explore the concept of shapes, perimeter and area in the story.

Spaghetti and Meatballs for All by Marilyn Burns



The plot of the story revolves around Mr. and Mrs. Comforts' dinner party and the rearrangement the furniture as the guests arrive so they can sit together. How did they at first seat the 32 guests and what happened to the plan? Your child will consider different shapes and work with the concept of perimeter.

Things to do-

- Elementary students have difficulty grasping the concept of perimeter and area. Because of the "Fair Game Principal", previous grade level math concepts may appear on the current grade level assessment. Keep this in mind when having "math talk" with your child.
- Use this book as a discussion point to help your child be an expert in the mathematical terms of area, perimeter, rectangle, square, length, and width.
- Look around your home and neighborhood and talk about what things for which you would need to know the perimeter and area.

Next Generation Sunshine State Standards: Grade 5, Big Idea/Supporting Idea & Benchmarks
Supporting Idea 5: Geometry and Measurement

- **MA.5.G.5.4**: Derive and apply formulas for areas of parallelograms, triangles, and trapezoids from the area of a rectangle.

At Grade 5, these two benchmarks will be assessed using multiple choice (MC) and gridded (GR) response items.

- Students will find the areas of parallelograms, triangles, and trapezoids.

ANTI-DISCRIMINATION POLICY

Federal and State Laws

The School Board of Miami-Dade County, Florida adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by law:

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Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Educational Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits gender discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to “eligible” employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulates categorical preferences for employment.

Revised 9/2008