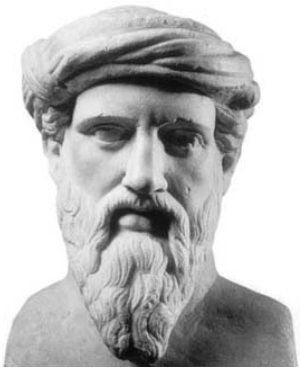
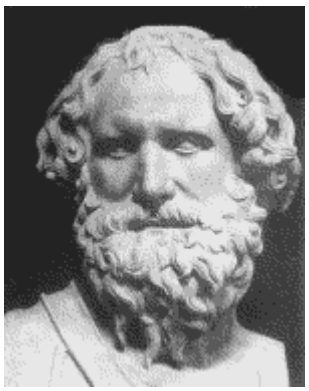


Pythagoras



Archimedes

Euclid

A MATHEMATICS Winter Number Land

Grade 4

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).

What's My Product

Description:
Let's see who can create a multiplication problem the fastest! Players will use their knowledge of multiplication to combine numbers and create a product within a given range. Each correct problem will earn a point. You may use a calculator to check work. Your child, though, needs to show you techniques learned in class to multiply effectively. He will love being able to make his own problems to solve, and this game rewards his correct inventions. We hope your child becomes more comfortable with multiplication as he practices when playing cards.

Materials: one deck of playing cards, one calculator (optional), Scratch paper and pencils (for every player), and timer (or use a watch)

Directions:
1. Remove the face cards from the deck. Shuffle the remaining cards.
2. Deal 3 cards for each player, face up, in the center of the playing area. Set the timer for 2 minutes.
3. Players use the numbers on the cards to create multiplication problems that have a product between 350 and 500. They may use estimation or work out problems to find their answers. Numbers can be combined to make 2 or 3-digit numbers. (For example, the problem 51 x 8 = 408 could be created from the cards 1, 5, and 8.)
4. When time is up, players share the problems they've created. Use the calculator to see if their results fall within the required range. Correct problems each earn one point.
5. Discard the played cards and replace them with new cards (3 cards for each player) in order to begin another round.
6. 25 points are required to win (or whatever amount of points decided).

Option: You may set the time at 3 minutes in the first rounds.

Next Generation Sunshine State Standards: Grade 4, Big Idea/Supporting Idea & Benchmarks
BIG IDEA 1: Develop quick recall of multiplication facts and related division facts and fluency with whole number multiplication.
- **MA.4.A.1.2:** Multiply multi-digit whole numbers through four digits fluently, demonstrating understanding of the standard algorithm, and checking for reasonableness of results, including solving real-world problems.

Decimals on a Budget

Adapted from Education.com

Description:
During this season, let's not put those catalogs that come in your mail go to waste. This math activity will place those catalogs to good use: add and subtract decimals while "shopping" under a budget.

Materials: Mail order catalogs/flyers, paper, pencil, scissors, sheets of white construction paper (regular white paper is good too), scissors, glue, stapler, and markers or crayons

Directions:
Your child will be creating *Decimals on a Budget* packet. Maybe he can convince you to do some after holiday season shopping…

1. Gather several mail order catalogs. Explain to your child that he is going to "shop" from the catalog/flyers of his choice. Tell him he can choose whatever items he wishes, as long as he stays within his budget. Give him a *pretend budget*, $25 or $50, depending on the cost of the items in the catalog/flyer.
2. Ask your child to start shopping! On a sheet of paper, he needs to write down the name of the item and the cost. While "shopping," he needs to cut out the item and prepare a *Decimals on a Budget* packet to later convince you to reward him for his math skills.
3. After he shops for each item, have him estimate how much money he has left in his budget. Encourage him to "shop" until he has reached his limit. At this time, tell him you will not consider shipping and sales tax.
4. Now, have your child add up the cost of his purchases, reminding him to line up his digits and decimals correctly. If he's under-budget, ask him how much he has left. Can he add another purchase to his *Decimals on a Budget* packet? If he's over-budget, ask him to subtract one item (or items) until he is within his budget.
5. You child need to create his *Decimals on a Budget* packet. Work with your child to label the bottom of each of the pages of white paper with a page number. He needs to write the store name on the top, glue the picture of the item and write the price by the picture. He needs to create a title page for the book: "*Decimals on a Budget*." Have your child decorate the title page as he likes. Staple the pages along the left hand margin with the title page on the top, and the numbered pages, using as many pages as he needs to paste the picture of the items. The last page needs to include the cost of his purchases, showing all the math work.

Adding up the items in a wish list is an enjoyable way for your child to strengthen his understanding of decimals and the value of money!

Next Generation Sunshine State Standards: Grade 4, Big Idea/Supporting Idea & Benchmarks
BIG IDEA 2: Develop an understanding of decimals, including the connection between fractions and decimals.

- **MA.4.A.2.4**: Compare and order decimals, and estimate fraction and decimal amounts in real-world problems.

Square Feet

Adapted from Education.com

Description:
In this hands-on activity, your fourth-grader will directly apply the concept of area to any place. It is always important to review the concept of measurement, one of the mathematics concepts with which students have difficulty. Your child will be using a measuring tape to measure each room of a place. Challenge your child to guess the largest and smallest rooms of the house/apartment/location of choice; he might be surprised at how big some rooms really are!

Materials: measuring tape, paper/pencil, clipboard (optional)

Directions:
1. Begin by taking a walk around, for example, the house and asking your child to take some guesses. Which room does he think has the smallest area? Which has the largest area? Which bathroom has the smallest area?
2. Explain to your fourth-grader that he will be measuring each room in the house to check if he guessed correctly. Offer a small reward depending on how many of his guesses are correct.
3. Give her a sheet of paper and ask her to write the following on the top:
   A = L x W (Area = Length x Width) 12 inches = 1 foot
   Explain to your child:
   - How to use a measuring tape and record measurements.
   - He can use the length of the room as the measurement of the longer side, and the width of the room as the measurement of the shorter side.
4. Let him go on a math exploration, measuring and recording the length and width of each room in the house.
5. When he's finished, help your fourth-grader find the area of each room by multiplying the length and width. Point out that the area is reported in square feet. Compare the results with his guesses. Hopefully, he has earned a reward. If not, a small "participation" reward for his effort will keep him motivated to learn more!

Extension: As an extension of this activity, have your child measure and cut out 12 inch by 12 inch squares from construction paper. Explain that the square represents one square foot. If a room is 168 square feet, you would be able to fit exactly 168 of the squares on the floor!

Please note that your child may not have been exposed to the concept of area so far this school year. This activity will give a natural head start to learning about area right in your own home!

Next Generation Sunshine State Standards: Grade 4, Big Idea/Supporting Idea & Benchmarks
BIG IDEA 3: Develop an understanding of area and determine the area of two-dimensional shapes.
- **MA.4.G.3.3:** Select and use appropriate units, both customary and metric, strategies, and measuring tools to estimate and solve real-world area problems.

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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.

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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.

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

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Revised 9/2008