Plum, Level, & Square

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Overview

As teachers, we often (without realizing it) push our students to reach the ultimate goal of attending college. What we fail to understand is that each of our students has different goals in their minds. Not all students have a need or desire to go on to college and therefore live with the idea that we will have no need for math, especially algebra and geometry. When teaching linear equations, they continue to ask daily, how and when will I use this. Their needs though great, seem to be very basic at times. They take an interest in things that only serve them here and now. Students fail to make the connection of math to their everyday world. They never see math as an important factor into what goes on in their home, school, and community. Students engage in effective learning when they are exposed to situations that affect their lives directly. They have to make the obvious one on one connection between math and something that they view as important.

Students lack problem-solving skills that are needed to help them to be productive adults. They are willing to solve problems if the problem contains both interest and relativity to their lives. The students have to be able to see the problem as something that matters to them. If a student does not see the problem as something important to them they will not push themselves to the full potential that they have. They will view the problem as just another boring math problem that must be done.

Teachers face the dilemma of being creative in what they need to teach and what their students want and need. Each student is different and learns in his or her own way. Teachers need to be flexible in their teaching and understanding so that no child is left behind. I know that I myself reflect upon my teaching to see how I can improve it in order to meet the needs of all of my students. Throughout my teaching career I have gained a better understanding of the importance of

having my students make connections to what they learn in my class and to the lives that they are living. One size doesn't always fit all, and sometimes we need to tailor make our content to fit the size of our students without compromising our curriculum and standards set forth by the PA Department of Education.

I would never sell my students short, by instilling in them the lack of confidence of attending college. I try to expose my students to the various opportunities there are in the world and the advantages of a college education. Yet I also need to realize that a lot of my students may follow in the footsteps of their fathers and look for a future in construction, plumbing, electricity and so on. These are occupations that are needed and respected, yet sometimes forgotten in the world of higher education. What I feel that has been neglected, is the obvious connection that these occupations have with math. With these occupations comes a great need for math in many forms. When building, designing, or renovating a house, students need to know a variety of math and problem solving skills. Some of these skills include how to calculate perimeter, area, etc. In the real world of working and taking care of everyday repairs, our students may encounter challenges they have no idea how to solve. That is why teaching students the need for math is so important. Our students will almost certainly come across a situation each and everyday in their life when they will have to use mathematical skills in some form. These situations might include giving change to a customer, ordering materials for a construction job, etc. We must change the way our students think about math in their future. We need to grab the interest of our students and expose them to realizations. If we do not make the students want and need to learn, then they will not. We as teachers have to be the driving force that guides them to the skills they need in order to be successful citizens. We have to force our students to see the need for math in everyday situations, as well as the need for math in their careers. This is an extremely important concept for our students to grasp so that they can live happy, fulfilled lives. It is our job as teachers to make sure that we give our students the best foundation possible so that they succeed in all they do.

Rationale

As an eighth grade teacher, I am always looking for interesting ideas that give eighth graders an opportunity to problem solve and make it relevant to their lives. I go out of my way to develop activities in connection to my curriculum that I know will benefit my students and help them to want to learn. I want them to see the important connection between math and everyday situations. Problem solving is both an important part of the PSSA exam and the future of our students. Problem solving is a common factor in everyday living. We are constantly faced with decisions that need to be made and problems that must be solved. In this fast world of instant gratification, our students expect the same reaction when

solving problems. They don't take the time to think through a problem and work towards solving it. If they don't know how to get the answers instantaneous, they lose interest. They fail to recognize that being able to solve the problem is just as important as coming up with the solution. They look at math as just another subject, ask me question and I should be able to give an answer without any type of application. They do not want to be forced to think and analyze anything. Whether it is because of lack of skills or lack of interest, our students need to practice and enjoy problem solving. They must be exposed to various problem solving situations so that they are prepared to handle situations in real life. They need to see the gratification they can get from going through the steps of solving a problem. They have to see how utilizing problem solving skills will help make their life easier. Our children need to see themselves as problem solvers. Making the problems relevant to their lives can do this.

Currently we use CMP 2 (Connected Math Project). It is a discovery-based curriculum. It consists of interesting math problems embedded with mathematical concepts. The approach is to launch, explore, and summarize. As the students explore problems, they start to develop a deeper understanding of mathematical concepts. The students apply skills that they have learned in previous lessons, as well as skills that were learned in previous years. It helps the students to recognize math as a way of thinking; making sense of situations rather than seeing math as a series of unrelated events. This mathematical process helps to connect students who struggle and usually end up with a dislike for the subject. Because of the connection that is made between math concepts and problems, the students begin to enjoy problem solving. They see a real connection between real life situations and math. They are usually familiar with the types of life circumstances in the book and relating to them helps them to find ways of solving the problems. The problems focus on algebra and sometimes the students have a hard time relating these situations to what they plan on doing with their future.

In the 8^{th} grade pre-algebra, students spend most of their time looking for patterns and expressing those patterns symbolically. Most of my students really struggle. The students who do well in seventh grade, (those making A's and B's in math), take Algebra I. The rest of them take pre-algebra (CMP 2). This again is problem centered and the students solve the problems by eventually writing equations. We start with linear equations, follow through to exponential equations and end the year with quadratic equations. The students seem to have an easier time creating tables and graphs than they do writing a rule to fit the pattern. We look at patterns using numbers in our tables and eventually write an equation to fit this pattern. Students have a hard time using symbols instead of numbers and relating this to life after school. I would like to give them a project where they can apply what they are learning in class with a real life "blue collar" situation. I feel that by doing this I will allow my students to see how they can

utilize the skills they have learned in math when they are working in the "real world". It is my role as their teacher to help my students see the relationship between the math that we are learning and their lives. In today's society every job requires mathematical thing and reasoning. It is my job to show them how to apply what they learn to their careers.

Problem solving in not only a major part of mathematics, it is strongly endorsed by the NCTM to be included in school mathematics. Mathematics has many applications and it is used in work as well as understanding and communicating within other disciplines. With in problems solving there is embedded an intrinsic motivation which can stimulate the interest and enthusiasm of students. For students to develop the art of problem solving, it must be part of the mathematics curriculum and an instructional goal. If students are taught to think and apply anything that works, then they would be open to solving problems. Problem solving should be a way of teaching to accomplish the learning of basic facts, concepts, and procedures. It is a way of introducing concepts through exploration and discovery. Through the problem solving approach, students can discover the creation of an algorithm and then learn to apply it. An algorithm is a procedure designed to give you an exact answer. Even though algorithms are an important part of mathematics they are not problem solving. However, creating and generalizing it to a specific set of applications can be. By having students create their own algorithms, problems can be incorporated into the curriculum.

One of my passions is spending my Saturday morning attending estate sales. They comprise of usually the entire contents of a house other wise known as someone's estate being sold. I found an old math book entitled "Graded Work in Arithmetic" at one of the estate sales that I recently attended. The copyright of the book is 1901. Old yes, but what a treasure. As I was reading through the book I found a particular chapter that really sparked my interest. It is titled "Practical Mensuration". The materials and prices were out dated, but the content was so relevant. Not only did I find it interesting, I thought about the students that I teach and how relevant it is to possibly their future. This is the bases for my unit.

Being married to an Ironworker, I know how important math is in his occupation. He has spent a lot of his time (when not on the iron) both building and renovating homes. He uses math constantly, both in planning and physically building. Not just adding and subtracting, but multiplying, dividing, algebraic equations, and geometry. He also uses measurement, estimating, and proportion. Math is a big part of his trade. This is not just with iron working, but plumbing, electric, and other trade unions, all of which you have to pass a math test in order

to be considered. All of these occupations have a considerable amount of mathematical skills that must be applied each day.

Whether students go on to college or enter the workforce immediately, they need to leave high school well prepared. They also need to enter high school well prepared and realized the importance and relativity of mathematics. Too many students go into high school ill prepared to what lies ahead of them. We need to focus on making connections in math and real life so that the students see the value in what they are learning. They need to realize that they will use what they have learned in the future and that these are not useless skills that will never be called upon again. This is why it is so important to make math in the eighth grade interesting and relevant. Sparking an interest before they leave the eighth grade is crucial. You want to hook them and give them a start as they enter high school. Once a student is hooked in math and sees the importance of it, they are going to do far better than if they never made that connection. If they are planning on entering a nonacademic career, they still need a strong mathematical background and problem solving skills. They need a strong number sense. All of these skills are vital to the students' success in and out of school.

Number sense is a student's conceptual understanding of basic numbers or recognizing how many objects are present in a set, and how a number represents this set. Students are able to translate real-world quantities into numerical expressions. Students with number sense know that 7 objects are more than 3 objects. They can recognize the relative size of numbers. Students in the middle grades realize that 2/3 is larger than 1/2. Number sense is critical and necessary for problem solving. Students must learn number sense in order to solve real-world problem. Sounds basic, but without a strong number sense, students will struggle with multiplication, division, and eventually algebra. They will also have problems with making sense of their answers. They have a hard time visualizing something as simple as 10% of a number. When applying multiplication to price and quantity, they are not sure if the answer makes sense. They use a calculator and just accept the answer. They rely on the calculator as a crutch. They do this because of their lack of number sense.

This is why I think this unit is so important. It makes math both interesting and important to inner city students who have a different idea about their future and may be considering building trades. I feel that we have truly gotten away from what the point of teaching should be. We are so focused with state testing that we have failed to ensure that our students are prepared with the basic foundations that they will need to succeed in and out of school. We need to worry less about scores on state exams and more on whether or not our students will be able to use the skills they have learned in the workplace. With gearing our students for college, we have lost sight of the importance of working with our

hands as well as our heads. We need to give our students the confidence and skills that they will need whether they choose to attend college or go into the trades.

The only way for a contractor to be successful in his career is to have a sound understanding for the mathematics involved in his business. Today's contractors use a wide range of mathematical formulas on a daily basis. They range from laying out plans, estimating cost of labor and materials, and keeping accurate financial records. If they don't fully understand these formulas or use them improperly, they can experience a devastating loss. Mathematical skills play a key role in a contractor's life.

Estimation also plays an important part in the success of any contractor. It is one of the most mathematical intense segments of any construction project. Contractors need to come up with realistic bids that will help win contracts. They need to come up with a list of materials needed for each job. If their estimate is too high, a contractor may have very little business resulting in little profit. On the other hand, if a contractor bids too low, even though they may win a contract, they may loose money on the job. Every bid contains many variables, and any one could make the difference in realizing a profit or loss, by winning or losing a bid. Labor cost is another significant variable in any job. In any case, with planning, bidding, or evaluating quotes, the key to profit is good estimating.

With estimating comes equations. The contractor must measure each phase of the job in order to come up with accurate numbers, which are used in each equation. Material, equipment, and labor expense are just some of the variables that are need to be adjusted over time before being applied to an equation. Students must be able to "plug in" the appropriate numbers into the appropriate equation for each job. Students need to make sense of these equations and apply the appropriate operations to come up with accurate bids.

Contracting can be as detailed as building a house or on a much simpler basis as painting or carpeting a room. As a contractor builds or creates, he soon realizes that his plans will not work out unless what he builds is plum, level, & square. These things can only be obtained when mathematical calculations and measurements are correct and their plans will be useless unless their building is plum, level, and square.

I want my students to have fun looking at prints of an actual floor of a house, while realizing how important math is in the real world. I want them to be able to clearly see that they will have to use the skills that I have taught them in math class and apply those skills to the prints of a house. This real world connection will help my students to see what I have been trying to teach them all along, that

math is everywhere. This unit will consist of an actual floor plan, designed by them, scaled down to accommodate the drawing. Scale factor and proportion will be discussed. A materials list will be provided along with relevant cost. Windows and doors will also be considered when the students have to calculate area and cost.

This unit will provide students with a taste of how math is used when considering options other than college. It will focus on the actual application of using math in a trade occupation or everyday care and maintenance of a home.

Objectives

In this unit students will be able to realize the importance of mathematical thinking and reasoning associated with every job. I want students to be able to apply mathematic skills to basic construction features of a one floor structure from creating a scale drawing to wallpapering the dining room. They will need to be able to add, subtract, multiply, and divide different kinds of number forms. They will use fractions and have to convert different units of measurement. They will have to determine the appropriateness of whether or not to estimate in a particular situation and round appropriately for the given situation. They will also have an opportunity to draw a scale model of a one floor structure designed by them. Students will develop formulas and procedures for determining measurement and draw squares and rectangles. They will also have an opportunity to be creative in their design. They will have to construct their one floor keeping within 1,000 square feet of area and compare the perimeter of their design with the perimeter of others.

Strategies

I want students to accomplish these objectives by drawing a one story house based on required specifications. They will use a scale factor to draw a scale model of their first floor structure. They will have to place windows and doors through out their structure and follow basic building requirements when designing the floor plan. From there they will carpet, paint, and wallpaper the rooms with in their house. They will have to figure out how much materials they need to buy along with the cost of each project.

Classroom Activities

Lesson One: "Floor Plan"

First the students will design and draw their floor plan of a single-level house. It is one of the most common styles built because of the minimal expense involved. Because it provides a stair-free access to all rooms and easy to maintain, it is attractive to people with limited mobility.

Your house can be built in a variety of shapes. The shape must be given much consideration because it will affect the cost of your house. A square house is the most economical shape to build, but does not always lend itself to a pleasing exterior. The rectangular and "L" shapes are the most common and used for median-priced homes. After your house plan is completed, you will calculate the perimeter of the house. All walls in your house are 8' high. Your floor plan must have a total area of 1,000 sq. ft. and contain the following:

Living room: It should be between 12' x 15' to 14' x 20'. In a home without a family room, the living room will serves as a place where the family can entertain or relax. It is the area where the family will spend most of their leisure time. The living area can be made larger if it is attached to the dining area. If the living room is placed on the west side of the house, it will have natural light in the evening when the room is used the most.

Dining room: It can be as small as 9' x 11' but not larger then 11' x 14'. The dining room can be part of or adjoining the living room. If the dining room is considered a formal eating area it will be near but separate form the living area and larger in size. An informal or joining dining room is usually smaller. The dining room and living room are usually adjoining so family members can easily move from one area to the other without passing through the entire house.

Kitchen: The kitchen is used through most of the family's waking hours. It should be located close to the dining area to make serving meals easy. The kitchen needs to be centralized but you don't want all of your traffic to flow through it, you want traffic to flow around it. The size of your kitchen is up to you but must include a sink, refrigerator, and stove. Proper consideration needs to be taken when placing these appliances. There should be a work triangle that shows the relationship of the sink, refrigerator and the stove. The work triangle is an area created in the kitchen by drawing a line from the sink, to the refrigerator, and to the cooking area. The sink should be placed under a window to allow for natural lighting and supervision of outdoor activities. The refrigerator should be placed five or six feet from the sink and stove to allow for food preparation. The refrigerator should be at the end of a counter. The stove should <u>not</u> be placed

within the traffic pattern of the kitchen. The sizes of your appliances will be as follows:

- Refrigerator – 69" h x 33 ¾" d x 35 ¾" w
- Stove – 37 ¼" h x 26 ¼" d x 30" w
- Sink – 22" d x 33" w

The counter top in your kitchen will need to be 25" deep.

Master bedroom: 12' x 14' to 13' x 16'. The master bedroom should include two windows and one entry way.

Bedroom 2: 9' x 10' to 12' x 14'. It should be smaller than the master bedroom but give enough space so the children have a place to play or study away from the rest of the family. It should have at least one window.

Bedroom 3: 9' by 10' to 12' x 14'. It should not be larger than bedroom 2. It sold have at least one window.

Bathroom: The bathroom must have easy access form both the living and sleeping areas but should not require having to pass trough these areas. It should be accessed from a short hallway in order to provide privacy. The size of the bathroom is up to you and will need to accommodate the following fixtures:

- Sink – 22" d x 24" w
- Bathtub – 32"d x 5' w
- Toilet – 18" d x 32" w

Your house will be built using 2 x 4 studs, with drywall applied to each side, giving you walls that are 5 inches thick. (This will be important when figuring out the final dimensions of your house.)

You must include two separate entries into your house. The front door can be placed in an entry way or open up into part of the living area. The second door should enter into the kitchen or a separate entry way (i.e. utility room). All rooms should include windows and a door way to enter.

Doors: The main entry door should be 3' wide. The second exterior door, usually from a garage, utility room, or kitchen should also be 3' wide. The interior doors should be 2' 8" wide and swing against a wall into the room being entered. They are typically placed within 3" of a corner. All doors are 6' 8" high.

Windows: The window in your house can be any size. Each room should contain at least one window. Use your imagination.

You can include a utility room if desired. It is often placed by the kitchen area or the bedrooms. By placing the utility room near the bath and sleeping areas, it places the washer and dryer near the primary source of the laundry. By placing the utilities near the kitchen, it allows for better traffic flow between these two work areas of the house. The utility room can serve as an entry way leading to the exterior of the house which allows it to serve as a mudroom. When entering form the outside, dirty clothes can be removed and this allows for easy cleanup near the service entry.

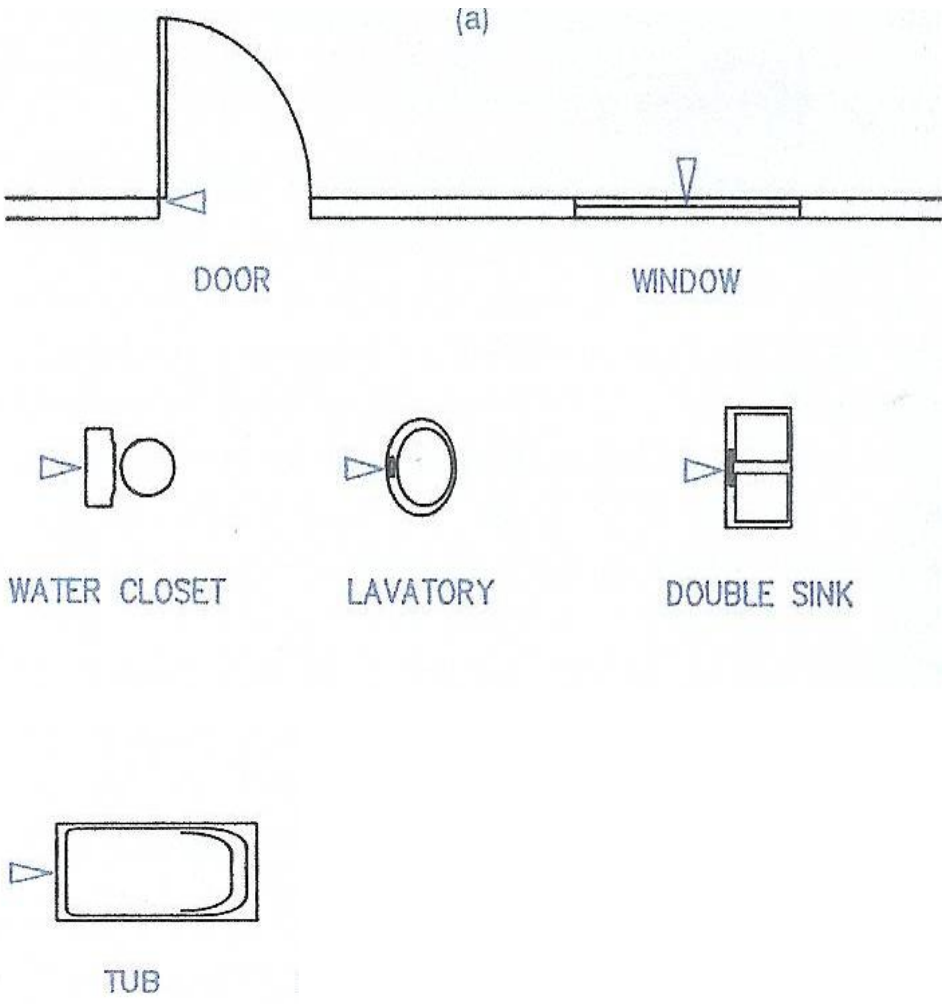
Your house plans can also include a garage or porch. A single-car garage should be a minimum of 10' wide and 22' deep. A double-car garage should be a minimum of 20' wide and 22' deep. Your porch can be any size. These will not count towards your 1,000 sq. ft. of housing.

When drawing your floor plan, you will use the following scale which is frequently used on architectural drawing:

$^1/_4$" = 1'

Your scale must be displayed at your bottom of your floor plan.

The following symbols are to be used in your drawing:



You will be responsible for creating schedules of each of the following projects (i.e., drywall, painting, wallpapering, etc.). All schedules should show the total amount of material needed for each room of the house along with the total cost. Attached to each schedule, you will need to show all of your math work with a complete explanation of each step.

Lesson Two: Drywall

You need to apply drywall to all of your walls. It is an interior wall covering installed in large sheets made from gypsum board. Drywall measures 4' x 8' and costs $7 a sheet. You need to cover all of your walls with drywall along with the ceiling. Make sure you do not cover up the windows or doors. Figure out how

mush drywall you need for the interior of your house along with the cost. Drywall can be cut to size.

After you drywall you will want to paint your rooms. You will need to primer all of your walls and ceiling before you paint or wallpaper. It provides a base coat to you walls and cost $10.98 a gallon. A gallon will cover an area of 350 sq. ft. Figure out how much primer will be needed for the walls and ceilings and the total cost to primer the inside of your house. Remember to exclude the windows and doors.

Lesson Three: Painting and wall paper

The walls in your house need to be painted or covered with wallpaper. Painting is easier and usually less expensive but can be monotonous if every room were painted. Applying wallpaper makes your house unique in decorating. The best compromise is to wallpaper some rooms and only wallpaper one or two of the walls. You must wall paper at least one room in your house, but you can only do two walls if you choose. It can be any room or as many rooms as you choose. The rest of the rooms need to be painted. Colors need to be chosen and all of your ceilings need to be painted white.

Choose how you will cover the walls in each of your rooms. If painting, you need to decide on a color and determine how much paint you will need for each room. You will also need to determine how much paint you will need to cover all of the ceilings. Since you have applied primer to the walls first, you will only need one coat of paint on your walls and ceilings. Determine the cost to paint or wallpaper each room.

Paint is usually estimated by the square foot. It is sold in gallons and you usually can paint about 350 square feet with one gallon. A gallon of paint will cost you $22.48.

Wallpaper is commonly 18” wide and is sold in single rolls of 24’ or double rolls of 48’ long. The pattern you will be using repeats every 18”. This needs to be taken into consideration when calculating how much wall paper will be needed. You will be using wallpaper sold in single rolls. It will cost you $25.00 a roll.

This is where you need to let your students figure out on there own, how to come up with the exact calculations. It takes time and through questioning, you can help guide your students.

To help you determine the amount of wall paper needed for your room, start with the dimensions of each room. Start with a plain wall (one that does not contain any doors or windows). Take the length of the room and divide it by the width of the wall paper. You may need to change your dimensions into inches to match the units of the wall paper. This will give you the number of widths of paper needed for the wall. This calculation will need to be rounded up in order to paper the wall. Next you need to consider the reoccurring pattern of the paper. The height of the room will be considered the drop (how long the paper needs to be to accommodate the entire pattern). The pattern occurs every 18" so you need to determine how many complete patterns are needed for every drop. Take the drop and divide it by 18". Once again this figure will need to be rounded up (there will be some waste). To determine the total number of rolls of wallpaper required for the plain wall, multiply the length of the drop (with complete patterns) by the number of widths needed for the wall.

The walls with doors or windows will need the same amount of wallpaper as a plain wall less the area of the doors and windows. First calculated the amount of paper needed for the entire wall. Then calculate how many roll widths will be saved by each door and window. Take the width of the door and divide it by the width of the wall paper. This figure will be rounded down because for a fractional part of a roll, you will need the entire width of the roll to accommodate it. Next you will need to figure out the length of paper that will be saved. Subtract the height of the door from the drop height and multiply this by the number of widths you will be saving. Subtract this amount from the total amount of wallpaper needed for that wall. This will give you the correct amount of paper needed for that wall. Again convert this amount into the number of rolls. Apply the same calculations for the walls with windows as you did for the wall with the door. You should have a total of at least two walls that need to be wallpapered. Next you need to figure out the cost of the wallpaper.

As a quick check when wallpapering, take the total areas of the walls and divide it by the total area of 1 roll of wallpaper. With the repeating pattern and deducting for the windows and walls, you should get an idea if your calculations are correct.

List each room in your house and how you will cover the walls. If painting, state the color chosen, the amount of paint needed and the cost. Remember you can only buy your paint in gallon cans. You can list the ceiling separate, since all ceilings will be painted white.

Lesson Four: Trim – Base and Crown molding

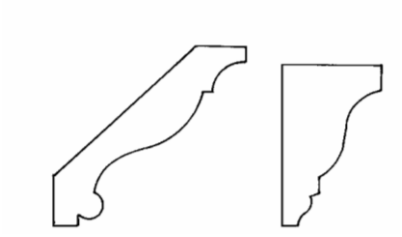
Trim is used to complement or create any architectural style from traditional to contemporary and comes in a variety of shapes and sizes. It can also be considered base or molding. Trim is used around the doors and windows. Base covers any gaps between the wall and the floor and protects the lower portion of the walls. Crown molding is a decorative strip placed around the top of the wall where it meets the ceiling.

You will need to apply trim around all of your doors and windows. It will be placed around all 4 sides of the windows but only the top and sides of the doors. This includes the inside of the exterior doors and both sides of the interior doors. It will cost you $.77 a linear foot and can be bought in any length. It comes in 12' lengths but is cut to size. You need to figure out how much trim is needed for your entire house (all doors and windows) and the cost for the trim.

You must place base around each room. It also comes in lengths of 12', cost a $1.34 a linear foot and can to cut to any size. You will need it at the base of each wall (except where there is a door opening). Again figure out how much base is needed for your house along with the cost.

Crown molding must be placed around the living room and dining room. You can place it in any or all the rooms of the house. Crown molding found in the kitchen or bathroom can be smaller in width than the molding used in the living and dining areas. The molding can be as elaborate or as simple as you wish. Two forms of crown molding are available for you to use. One is thick and recommended for most living and sleeping areas and cost a $1.65 a linear foot and the other is thinner, most commonly used for kitchens and bathrooms, but again can be used anywhere in your house and cost $1.25 a linear foot.

Crown molding A:
$1.65



Crown molding B:
$1.25

Figure out what molding you will use in the living and dining areas along with the cost. Again it is sold in 12' lengths but is cut to size. If you are using it in another room, determine which molding you will use along with the linear footage and the cost.

Lesson Five: Floor coverings

You will cover the floors of your home using different materials. You must use ceramic tile in at least one room, a wood covering in at least one room and carpeting in the rest of the rooms. The prices are as follows:

- Ceramic tile – $1.52 a square foot
- Wood laminate – $1.97 a square foot
- Carpeting – $21 a square yard.

Calculate the amount and cost of the floor covering need in your house.

Lesson Six:

After you have calculated the total amount of supplies and the cost for you house you need to calculate the perimeter of your house. Remember the walls between each room will be 5" as well as the outside walls. Compare and discuss the perimeter and shape of your house with students in your class. Remember all students should have a total area (without wall consideration) of 1,000 sq. ft.

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Appendix-Content Standards

M 8.2.1.A	Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
M 8.2.1.B	Simplify numerical expressions involving exponents, scientific notation and using order of operation.
M 8.2.2.A	Complete calculations by applying the order of operations.
M 8.2.2.B	Add, subtract, multiply, and divide different kinds and forms of rational numbers including integers, decimals, fractions, percents, and proper and improper fractions.
M 8.2.2.E	Determine the appropriateness of overestimation or underestimation in computation.
M 8.2.2.F	Identify the difference between exact value and approximation and determine which is appropriate for a given situation.
M 8.2.3.A	Develop formulas and procedures for determining measurement (e.g. area, volume).
M 8.2.3.D	Estimate, use and describe measures of perimeter, area, and volume.
M 8.2.3.E	Describe how a change in linear dimension of an object affects its perimeter, area and volume.
M 8.2.3.F	Use scale measurements to interpret maps or drawings.
M 8.2.3.G	Create and use scale models.
M 8.2.4.D	Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.
M 8.2.5.A	Invent, select, use and justify the appropriate methods, material

and strategies to solve problems.

M 8.2.5.B	Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equation, simple algebraic equation and formulas, charts, graphs, and diagrams.
M 8.2.9.D	Identify, name, draw, and list all properties of squares, rectangles, quadrilaterals.