GEOMETRY STANDARDS

Standard: Level B: **Geometric measurement: understand concepts of area and relate to area of multiplication and addition.** Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. (3.MD.7d)			
Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Understand Relate Recognize Find Decomposing Adding Applying	Area Rectilinear figures Rectangles	Real world problems	

DOK levels	**Activities**
1	You are given the measurements of a wall and of a window (Find areas). Figure out how much wall space needs to be wallpapered (subtract area of window from area of wall).
2	Use math manipulatives to find the area of shapes using decomposition. Then find the area of the classroom and hallway.
3	Redo an L-shaped classroom -- paint, floor, tile, ceiling, baseboard and decide color/ type of paint and amounts of materials. Sketch the relevant shapes.
2	You are laying carpet and tile in a living room/kitchen area. Calculate area for each section. Calculate costs of materials.
2	Students will calculate area of a room to determine how much carpet is needed. Estimate how many 16x16 inch carpet squares will be needed to cover the room.
1	Figure out amount of tile needed for classroom and hallway area.
3	Students measure irregular shapes that teacher put on the wall using tape to decompose and find area. Students work in groups to solve word problems addressing irregular shapes. Create own word problems.

Standard: Level B: **Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**

Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. (3.MD.8)

Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Recognize Distinguish Solve Finding Exhibiting	Measurement Perimeter Attribute Plane figures Measures Polygons Areas Side lengths Rectangles	Real world and mathematical problems	

DOK levels	**Activities**
2	Design a fence for a dog/yard with given dimensions and with posts every 6 feet. How many posts are necessary and how many feet of fencing? What if one side of the yard is next to the barn (and doesn't need a fence on that side)?
2	Draw a picture of the classroom include the doorways and closets. Find the square footage of the room to figure out how much carpet is needed.
3	Have students measure the perimeter of an irregular building, compile measurements, draw the perimeter of building, decompose into smaller rectangles, compute areas and recompose into a larger area.
1	You need to lay carpet in a room and put baseboard around it. Determine the amount of carpet and baseboard.
2	Design largest "rectangular shape" using a set perimeter. (Area shape is a "dog pen") How did you determine the best shape for the largest area?
3	Divide our school garden into enough plots for one for each class, with every class having the same planting area. Measure using tape measures. Calculate perimeter and area of each plot. Measure string to enclose plots.
2	Draw on graph paper or build with squares (manipulatives) as many rectangles as you can with an area of 24. Compare the perimeters of each rectangle. (2) Draw as many rectangles as you can with a perimeter of 36. Compare areas and make observations.
2	Determine amount of materials needed for a horse pasture fencing. Explain multi-step procedure for using area and perimeter formulas. Draw a diagram on graph paper.
2	Present a problem involving the renovation of a room comprised of a square, a rectangle, and a triangle. Figure out square footage of flooring. Figure out length of molding needed. There is a doorway on one of the walls that will be taken from the existing wall. Students will be asked to draw a picture to the dimensions provided. Calculate the answer.
1	Determine the area or perimeter of rectangles or triangles given a drawing and labels.
2	Figure out perimeter of room and calculate cost for baseboards. Figure out area of room and calculate cost of carpet. Use retail websites/ cost comparison.

Standard: Level C: **Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.**

Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. (5.MD.5)

• Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. (5.MD.5a)

• Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems. (5.MD.5c)

Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Understand Relate Solve Find Packing Show Multiplying Represent Recognize Adding Applying	Measurement Concepts Volume Operations Right rectangular prism Lengths Unit cubes Edge lengths Height Area base Products Property Solid Figures Parts Technique	Real world and mathematical problems	

DOK levels	**Activities**
1	Show model of rectangular prisms. Recognize examples of rectangular prisms. Measure and solve for volume of rectangular prism. Use associative property of multiplication. (ab) times c = a times (bc)
1	Calculate the volume of moving van. Calculate the volume of water needed to fill a fish tank.
2	Calculate the volume of filling needed per cannoli and multiply for an entire case of shells.
1	Draw a multitude of different 2D and 3D shapes, for example, different artistic representations of pools for a home. Determine the volumes of different fill levels of a pool (i.e., 50% filled. 80% filled. 100% filled).
2	Give students this info: # of planters, measure of side of cube-shaped planters, amount of soil per bag, price per bag. Calculate the volume of the planters. Determine how much soil is needed to fill the planters. Calculate total cost of soil.

Standard: Level C: **Solve real-world and mathematical problems involving area, surface area, and volume.** 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. (6.G.1)			
Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Solve Find Composing Decomposing Apply	Area Surface area Volume Triangles Quadrilaterals Polygons Rectangles Shapes Techniques	Real-world and mathematical problems	

DOK levels	**Activities**
3	You are a lawn contractor. You are given a plan of a backyard with trees and a swing set in place. You have to design an irregular shaped, raised flowerbed (raised 8 inches). You make up a drawing with measurements. Calculate planting area and volume of soil. Price out project using Lowe's prices.
2	Find the cost of redecorating a room (dimensions given) of a house by using lateral area to find the area of walls to be painted and "base area" to carpet the floor. Research different places to buy paint and carpeting (i.e. Lowe's) in order to find total cost.
2	Present scenario of snowy day in Dec. Driveways need to be plowed. Determine costs per driveway; many of which are odd-shaped. Measure volume of driveway (length, width and depth of snow). Calculate rate based on volume. Give estimate to customer.
1	Installing a pool in a backyard- Exercise determining: Area of yard. Area for pool. Volume for pool.
3	Painting the inside of a pool and filling it with water. You have the length and width of the pool. The bottom of the pool is 3 feet deep at the shallow end and 8 feet deep at the deep end, sloping at a steady rate from one end to the other. Determine the surface area of the pool to be painted and the volume of water needed to fill it.
1 2	Students are asked to calculate the amount of carpet needed to cover an irregularly shaped floor. Students use tape measures to measure and calculate. Can be extended to include conversions, budget, or price options.

Standard: Level D: **Draw, construct, and describe geometrical figures and describe the relationships between them.** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (7.G.1) [Also see 7.RP.3]			
Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Draw Construct Describe Solve Computing Reproducing	Figures Relationships Scale drawings Figures Lengths Areas Scale		

DOK levels	**Activities**
3	Given a bridge diagram with specific measurements, students are required to build a replica bridge to scale using manipulatives (popsicle sticks).
2	Reorganize classroom. Plant a garden. Plant a garden with defined parameters. Draw scale plans.
3	Have the students create a blueprint for a garden. Create: 1) Rough draft, 2) On graph paper, 3) On Computer. Add in budgeting by having them purchase supplies and plants.
3	Construct an actual model using Legos from room plans. Determine placement of furniture using graph paper. Determine scale.
2	Read a blueprint to determine area and scale (Determine materials needed to complete a relevant job (i.e. Carpeting).
2	Have students construct a scale drawing of their home or classroom.

ALGEBRA STANDARDS

Standard: Level B: Solve problems involving the four operations, and identify and explain patterns in arithmetic. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.* (3.OA.9)			
Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Solve Identify Explain Using	Operations Patterns Arithmetic Table Properties	Addition table Multiplication table	

DOK levels	**Activities**
2	Students will create a strategy in the game to reach a predetermined goal (i.e. 100 Gold coins) in the least amount of time using arithmetic patterns. (i.e.---> 10 bricks = 1 gold coin) How many bricks do you need to obtain 100 gold coins? Explain how the strategy works.
1	Find the next 5 numbers in a pattern. Fill in random missing numbers. Explain the pattern.
1	Identify something you buy regularly (i.e. cigarettes, tokens, coffee). Calculate how much you spend monthly. How much you would save if you gave it up? Would you save money by changing pattern (i.e. transpass vs. tokens)?

Standard: Level C: **Write and interpret numerical expressions.** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. (5.OA.1)			
Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Write Interpret Use Evaluate	Expressions Parentheses Brackets Braces Symbols		

DOK levels	**Activities**
2	Create algebraic expressions that apply to real life situations. i.e. paychecks, overtime. Evaluate the expressions for different numbers.

Standard: Level C: **Apply and extend previous understandings of arithmetic to algebraic expressions.** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2+x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x +3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* (6.EE.3)

Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Apply Extend Generate	Understandings Arithmetic Expressions Properties Operations		

DOK levels	**Activities**
2	Use the distributive property to model the areas of two adjoining properties with a common side, showing that different ways of getting the solution are equivalent. Write an algebraic expression for any length of adjoining property using a variable. (provide picture)
2	Calculate rate of pay/paycheck using varied hours per week and pay periods. Can extend to overtime rates, overtime rates, various tax rate deductions, gross net pay. Represent the procedure symbolically. Discuss different symbolic representations and their equivalence by using properties.

Standard: Level C: **Reason about and solve one-variable equations and inequalities.**
Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. (6.EE.8)

Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Reason Solve Write Recognize Represent	Equations Inequalities Form Constraint Condition Solutions Number line diagrams	Real-world or mathematical problem	

DOK levels	**Activities**
1	BMI (Body Mass Index) 1) Show the formula. 2) Define terms. 3) Calculate BMIs. 4) Categorize as obese (>28) or non-obese (<28). 5) Graph non-obese on a number line.

Standard: Level D: **Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (7.EE.4)

- Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* (7.EE.4b)

Skills	**Concepts**	**Context** (if listed in standard)	**DOK**
Solve Use Construct Reasoning Graph interpret	Problems Equations Inequalities Quantities Rational numbers Solution set Context	Real-world or mathematical problem	

DOK levels	**Activities**
2 3	Compare the cost of 2 child care centers. Give hourly rate, give transportation cost. Determine number of hours of care less than or equal to someone's budget. Represent this with an inequality, graphing the solution set. To make it more advanced… Give options and analyze which is more affordable and explaining and defending a decision.
2	Use car dealer advertisement. Students create formula and determine payment for specific term and interest rate. Then, figure for different term and interest rate.
2	Students have to develop a formula to figure out meal cost for a conference using a $15,000 budget. There will be 300 attendees and a $1,200 conference room fee. How much can be spent per attendee for lunches? What if there will be more or fewer attendees?
3	Students are given a certain amount of money and asked to plan a party for x number of people, purchasing a number of single items for the party and some other items for each guest or group of guests (i.e., table decorations). Represent the situation with an inequality.
2	X-mas club savings. Layaway. Rent-A-Center. Savings. Students use teacher provided real world problems to develop equations and inequalities to represent the situations, then solve for specific scenarios. Graph inequalities.
1	You receive two Bed, Bath and Beyond coupons in the mail. One offers $5 off a purchase, and the other offers 20% off. You want to buy a food scale that costs $50. Which coupon will give you the better price?
3	Saving $1000 in a Christmas club account in which the bank would contribute 1% for every $50 saved. Make an equation and find out how much needs to be contributed weekly to reach $1000 by Christmas.
1	Teacher models how to create relationships between deposits, withdrawals, and balances in checking account. Student applies this model to their monthly budgeting. (Balancing expenses and money received.)
2	Teacher reviews 1 and 2 step algebraic equations using conceptual examples (e.g. choosing cell phone, medicine dosage, etc.) Students work independently to construct algebraic problems using real life examples.

2	Relate cell phone plans to equations. ex: $50 per month for 200 minutes and 10 cents/minute for overage: 50+.10x. Compare/contrast alternative phone plans by graphing the plans. Explain the meaning of the intersections.