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| **ESTABLISHED GOALS:** |
| **Major (m) Idaho Core cluster for the Unit:** **Solve real-world and mathematical problems involving area, surface area, and volume.*** **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.**
* **6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.**
* **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.**
* **6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.**

**Not previously in Idaho State Standards for 6th grade** | **Supporting and Additional (s/a) Idaho Core Standards for the Unit:*** 6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
* 6.NS.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
 | **Bridging Idaho Core Standards from Previous Grade(s):*** 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 axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
* 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.
* 5.G.3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
* 5.G.4. Classify two-dimensional figures in a hierarchy based on properties.
* 5.MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
* 5.MD.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
* 5.MD.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
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| **TRANSFER*****Students will be able to independently use their learning to…***Persevere in solving real-world problems involving area and volume. |
| **MEANING** |
| **Structure of Math/ Overarching Understanding(s):*** Area, volume, and surface area are used in solving real-world problems

*Teacher note: students will use triangles, special quadrilaterals, and polygons for area. Students will use a right rectangular prism with fractional edge for volume. Students will use nets made up of rectangles and triangles for surface area.* | **Understandings:****Students will understand that:*** Area, volume, and surface area are important in solving real-world problems.
* Formulas are consistent regardless of numbers.
* Ordered pairs can be connected to form polygons.
* Three-dimensional figures can be decomposed into nets on a coordinate plane.
 | **Essential Questions:****Students will keep considering:*** How are area, volume, and surface area related?
* Why are formulas consistent?
* How can ordered pairs be used to form polygons on a coordinate plane?
* How can a coordinate plane be helpful in finding surface area?
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| **ACQUISITION OF KNOWLEDGE AND SKILL****STUDENT-FRIENDLY LEARNING TARGET STATEMENTS** |
| 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. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.4 Model with mathematics.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.* Recognize that area is the amount of space in square units.
	+ I can model the area of a quadrilateral and special quadrilaterals
	+ I can model the area of a triangle
	+ I can describe the width and length, or base and height, of a triangle and quadrilateral
	+ I can compare and contrast attributes and formulas of different polygons.
	+ I can decompose a polygon into quadrilaterals and triangles
	+ I can model the area of a polygon
	+ I can describe why I need to find area of a given triangle, quadrilateral, or polygon
* Recognize that a formula is consistent.
	+ I can describe base and height as parts of a formula for any quadrilateral
	+ I can describe base and height as parts of a formula for any triangle
	+ I can model the base and height of a triangle or quadrilateral to find the area
	+ I can choose the appropriate formula for the situation.
	+ I can substitute values into a formula.
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| 6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.4 Model with mathematics.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.* Determine volume of a rectangular prism using unit cubes.
	+ I can model volume of a rectangular prism using unit cubes
	+ I recognize the relationship between the total volume and the area of the base
* Recognize the relationship between volume using area of the base and height.
	+ I can model the area of the base in a rectangular prism
	+ I can use the area of the base and the height to find the volume of a rectangular prism
	+ I can explain the relationship between the area of the base and the height in a rectangular prism
	+ I can compare and contrast volume and area
	+ I can compose the volume of a rectangular prism using V= lwh or V=bh
	+ I can decompose the volume of a rectangular prism using V= lwh or V=bh
* Validate formula for volume through exploration with manipulatives.
	+ I can model the volume of a rectangular prism using manipulatives
	+ I can justify and explain the formula for volume of a rectangular prism when solving real-world and mathematical problems
* Reconstruct the prism using unit cubes and analyze the fractional edge lengths.
	+ I can model volume of a rectangular prism using fractional edge lengths
	+ I can apply formula to find volume in context of solving real-world and mathematical problems.
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| 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. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.4 Model with mathematics.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.* Define coordinate plane, x-axis, y-axis, origin, and ordered pair.
	+ I can define the coordinate plane
	+ I can define the x-axis, y-axis, and origin on the coordinate plane
	+ I can define an ordered pair
* Show the relationship between an ordered pair and its location on a coordinate plane using positive and negative values for x and y. Write the ordered pair for a given point on a coordinate plane.
	+ I can model an ordered pair on a coordinate plane using positive and negative values
	+ I can write the ordered pair for a given point on a coordinate plane
	+ I can explain the relationship of an ordered pair and its location on a coordinate plane
* Locate and plot points on a coordinate plane creating the vertices of polygons.
	+ I can model the distance between two vertices of a polygon on a coordinate plane
	+ I can locate the vertices of a polygon on a coordinate plane
	+ I can draw a polygon on the coordinate plane given the vertices
	+ I can solve real-world and mathematical problems applying these techniques.
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| 6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.4 Model with mathematics.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.* Identify three dimensional figures.
	+ I can discuss the characteristics of three dimensional figures using base and height
	+ I can identify that three dimensional figures are made up of rectangles and triangles
	+ I can use the correct vocabulary to identify a three-dimensional figure using the terms edges, vertices, and faces
* Construct a net for three-dimensional figures with rectangular and triangular faces.
	+ I can decompose a three-dimensional figure into rectangle faces and triangle faces
	+ I can construct a net for a three-dimensional figure
	+ I can describe the figures using the number of edges, vertices, and faces
* Decompose the net onto a coordinate grid to determine area of each face to determine the surface area.
	+ I can decompose the net onto a coordinate grid
	+ I can find the area of each face of the three-dimensional figure
	+ I can use the area of each face to determine the total surface area
	+ I can find surface area of various figures
	+ I can apply this technique to solve real-world and mathematical problems.
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| **ASSESSMENT EVIDENCE:****Assessment Tasks that Provide Evidence for Claims including DOK**  | * **Claim #1/DOK 1, 2, 3, 4 (circle one):**

Area of TrianglesNetsPlotting AreaTop ScoreVolume of Rectangular Prism |
| * **Claim #2/DOK 1, 2, 3, 4 (circle one):**
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| * **Claim #3/DOK 1, 2, 3, 4 (circle one):**

Cargo TruckNets and Surface Area |
| * **Claim #4/DOK 1, 2, 3, 4 (circle one):**

Design a Garden |
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| **Goal** |  |
| **Role** |  |
| **Audience** |  |
| **Situation** |  |
| **Product/Performance** |  |
| **Standards** |  |

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| **Materials/Resources** |  |
| **Teacher Notes** |  |

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| **Sample Learning Plan****This is not intended to be a scope and sequence** |
| **Exploring and Making Connections****(Conceptual Understanding)** | **Practice****(Procedural Fluency)** | **Assessments****(Application)** |
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| **Focus Task (to begin unit)**: Liz’s family is putting a pool in the backyard. Using one of the photos below, justify and model the area of the yard and the swimming pool. *Teacher note: These are sample pictures found on Google images. Please feel free to find your own.* | **Sample learning tasks:****Teacher note: These tasks may need refinement based on the needs of your students. Not all tasks have been vetted. These documents can be found in Moodle.****Sample Learning Tasks:**Area of a Right TriangleArea of Triangle using TrebuchetsAsher ParkCarpeting a RoomCarpeting a TriangleCarpeting the OfficeColor the SchoolComplex Polygon Area (student)Complex Polygon AreaFlooring for New HomeKitchen NightmaresLaying SodPlanting a GardenTile MosaicTree House PlatformWacky PlayhouseWacky Playhouse (PowerPoint)Rice Krispy DilemmaPolygon Battle ShipCandy Shop WarsIrrigating the FieldKhufu’s Pyramid (Lesson)Khufu’s Pyramid (PowerPoint)Khufu’s Pyramid (Student Task)Painting PyramidPet AquariumSt. George Nets**Materials Resources:**Prentice Hall Chapter 9.3, 9.4, 9.7, 9.8, 9.9, 10.6Story problem workbook page 80, 81, 83, 84, 93 | **Formative assessment by teacher using I Can statement checklist** |

**Stage 3 Learning Plan**

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| **Focus** | **Coherence** | **Rigor** |
| Learning Goal(s):Understand that the place of a digit inside a number determines its value. | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s):Understand that place value is essential in addition and subtraction. | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s):Understand that place value is essential in multiplication and division. | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s):Understand that multi-digit whole numbers can be read and written using base-ten numerals, number names, and expanded form. | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s): | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s): | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s): | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s): | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |
| Learning Goal(s): | Success Criteria: | Learning TargetsI can statements…(completed by PLCs): | Activate Prior Knowledge:Previous Grade Level:Number Talks:Number Strings: | Conceptual Understanding/Application: | Procedural Fluency: |