Dear Family,

The next Unit in your child's mathematics class is ***Covering and Surrounding: Two-Dimensional Measurement.*** Students' work in this Unit develops their understanding of various measurements, including perimeter (surrounding), area and surface area (covering), and volume (filling).

Unit Goals

The overarching goal of this Unit is to help students understand what it means to measure. Students study several types of measurements: perimeter, area and surface area, and volume. The Problems are structured so that students can build a deep understanding of what it means to measure perimeter (length), area (squares), and volume (cubes). The counting students do to find these measurements leads to the development of formulas.

Many ideas from previous Units will be revisited and extended in this Unit. For example, this Unit revisits the connection between factors and dimensions of rectangles made in *Prime Time*.

Helping With Homework and Conversations About the Mathematics

You can help with homework by asking questions such as the following:

- *How do you know which measurements of a figure are involved—perimeter, area, volume, or surface area?*
- *Is it possible to "count" the perimeter, area, volume, or surface area of the figure?*
- *How can you find the area and perimeter of an irregular shape?*
- *How do your counting methods relate to the formulas you have discovered?*
- *Is an exact answer required?*
- *Is there a relationship between area and perimeter that will help solve the Problem?*
- *Given the coordinates for a point, how do you locate it on a coordinate grid?*
- *How can you find the lengths of horizontal or vertical segments on a coordinate grid when given coordinates for two points on a segment?*

You can help your child with his or her work for this Unit in several ways:

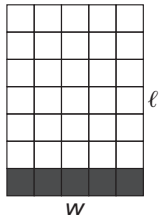
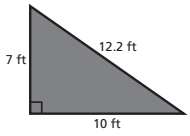
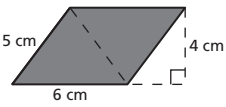
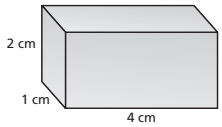
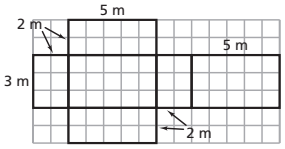
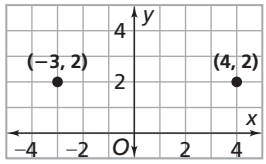
- Encourage him or her to use the measuring tools you have at home.
- Help him or her develop personal referents for estimating lengths, distances, and areas. For example, the distance from home to school might be one mile. Your child can use these referents to estimate other lengths, distances, and areas.
- Emphasize the use of length to measure perimeter, squares to measure area, and cubes to measure volume. Find the perimeters, areas, and volumes of some things at home.
- Review your child's homework. Make sure questions are answered and explanations are clear.

Common Core State Standards

Students develop and use all of the Standards for Mathematical Practice throughout the curriculum. In *Covering and Surrounding*, particular attention is paid to constructing viable arguments and critiquing the reasoning of others as students develop efficient methods for measuring (formulas) and justify their responses to others. This Unit focuses largely on the Geometry domain in the Common Core State Standards. Students also encounter parts of the Number System and Expression and Equations domains.

A few important mathematical ideas that your child will learn in *Covering and Surrounding* are given on the next page. As always, if you have any questions or concerns about this Unit or your child's progress in the class, please feel free to call.

Sincerely,

Important Concepts	Examples
The Measurement Process • Identify an object and the attribute you want to measure. • Select an appropriate unit. • Repeatedly "match" the unit to the attribute of the object. • Determine the number of units.	To find perimeter, count the number of linear units needed to surround an object. To find area, count the number of square units needed to cover an object.
Area and Perimeter of Rectangles To find the area, find the number of squares in one row (length) and multiply by the number of rows (width). So, the area formula is $A = \ell \times w$. To find the perimeter, add the length and width and double that sum. Or, calculate two lengths plus two widths. So, the perimeter formula is $P = 2(\ell + w)$ or $P = 2\ell + 2w$.	There are 5 squares in the first row and 7 rows in all. The area of the rectangle is $5 \times 7 = 35$ square units. The perimeter of the rectangle is $2(7 + 5)$ or $2 \times 7 + 2 \times 5 = 24$ units. 
Area and Perimeter of Triangles When you surround a triangle with a rectangle, you can see that the area of the triangle is half the area of the rectangle. You may turn the triangle to a convenient side as the base, if needed. So, the area formula is $\frac{1}{2}b \times h$, where b is the base of the triangle (length of the rectangle) and h is the height of the triangle (width of the rectangle). To find the perimeter, measure the lengths of the three sides and add them together.	 Triangle 1 is congruent to Triangle 2. Triangle 3 is congruent to Triangle 4. The perimeter of the triangle is $7 + 10 + 12.2$, or 29.2 ft. 
Area and Perimeter of Parallelograms When you draw a diagonal of a parallelogram, you form two congruent triangles. The parallelogram and triangle have the same base and height. So, the area formula is $2 \times \left(\frac{1}{2}b \times h\right)$ or $b \times h$. To find the perimeter, measure the lengths of the four sides and add them together.	The area of the parallelogram is 6×4, or 24 cm^2. The perimeter of the parallelogram is $2(5 + 6)$ or $2 \times 5 + 2 \times 6 = 22$ cm. 
Volume of Right Rectangular Prisms Count the number of unit cubes needed to fill an object. Find the number of cubes in the base layer and multiply by the height. So, the volume formula is $V = Bh$, where B is the area of base and h is the height. Or, you can multiply the three dimensions. So, another formula is $V = \ell \times w \times h$.	 The volume of the rectangular prism is $4(2)$ or $4 \times 1 \times 2 = 8$ cm^3.
Surface Area of Prisms Nets or "flat patterns" are two-dimensional representations of three-dimensional objects. To find the surface area of a prism, find the sum of the areas of each face of a net for that prism.	 S.A. $= (2 \times 3) + (5 \times 2) + (5 \times 3) + (5 \times 2) + (2 \times 3) + (5 \times 3) = 62$ m^2.
Finding Lengths in the Coordinate Plane If the x-coordinates (or y-coordinates) are the same for two points, you can find the distance between the points by finding the absolute value of the difference of their y-values (or x-values).	 The y-values are equal, so the distance between these points is $\lvert -3 - 4 \rvert$, or 7 units.