Dear Family,

The next unit in your child's mathematics class this year is ***Stretching and Shrinking: Similarity***. Its focus is geometry, and it develops understanding of and skill in the use of concepts of similarity.

UNIT GOALS

In this unit, your child will use properties of similar figures to explore reductions and enlargements such as those made on copy machines. Similarity will also be used to estimate the height of real objects (such as buildings and flagpoles) and the distance across large areas (such as ponds).

The problems are designed to help students begin to reason proportionally by scaling in geometry situations. By the end of this unit, your child will know how to create similar figures, how to determine whether two figures are similar, and how to predict the relationship between lengths and areas for two similar figures. The next unit, *Comparing and Scaling*, continues to develop proportional ideas in numerical, rather than geometric, contexts.

HELPING WITH HOMEWORK

You can help with homework and encourage sound mathematical habits as your child studies this unit by asking questions such as:

- When two figures are similar, what is the same in each figure?
- When two figures are similar, what is different in each figure?
- How might we describe these differences?
- How do ratios relate to similarity?
- When two figures are similar, how can we describe the relationship between their areas?
- When two figures are similar, how can we describe the relationship between their perimeters?

In your child's notebook, you can find worked-out examples from problems done in class, notes on the mathematics of the unit, and descriptions of the vocabulary words.

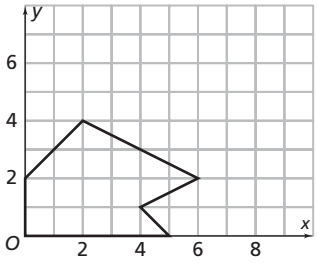
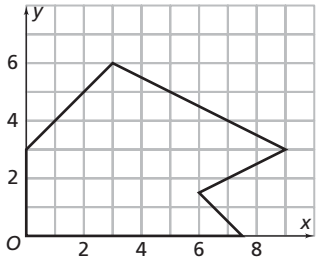
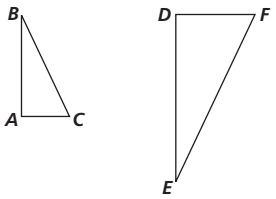
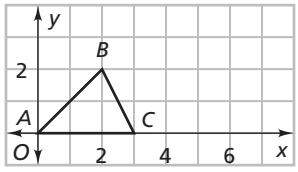
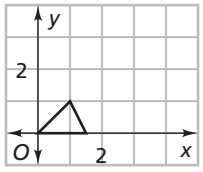
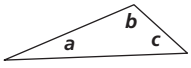
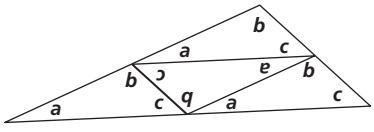
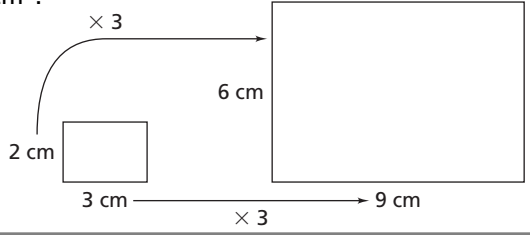
HAVING CONVERSATIONS ABOUT THE MATHEMATICS IN *STRETCHING AND SHRINKING*

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

- Talk with your child about any situations that are like those in this unit—places in the real world where items are reduced or enlarged, such as models.
- Continue to have your child share his or her mathematics notebook with you, showing you the different ideas about similarity that have been recorded. Ask your child why these ideas are important. Share any ways that reductions or enlargements help you in your work or hobbies.
- Look over your child's homework and make sure all questions are answered and that explanations are clear.

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

Sincerely,

Important Concepts	Examples
Similarity Two figures are similar if: (1) the measures of their **corresponding** angles are equal and (2) the lengths of their **corresponding** sides are related by the same factor, called the **scale factor**.	The Figures A and B below are similar.  **Figure A**  **Figure B** The corresponding angle measures are equal. The side lengths from Figure A to Figure B grow by a factor of 1.5—each side length from A to B is 1.5 times as long. So, the scale factor from Figure A to Figure B is 1.5. (The Figure A stretches or is enlarged to figure B.) We could also say the scale factor from Figure B to Figure A is $\frac{1}{1.5}$ or $\frac{2}{3}$. (The figure B shrinks to figure A.)
Corresponding Corresponding sides or angles have the same relative position in similar figures.	 **Corresponding Sides** *AC* and *DF* *AB* and *DE* *BC* and *EF* **Corresponding angles** *A* and *D* *B* and *E* *C* and *F*
Scale Factor The number used to multiply the lengths of a figure to stretch or shrink it to a similar image. A scale factor larger than 1 will enlarge a figure. A scale factor between 0 and 1 will shrink a figure. The scale factor of two similar figures can be found by a ratio that compares the corresponding sides: $\frac{\text{length of a side on the image}}{\text{length of the corresponding side on the original}}$	If we use a scale factor of $\frac{1}{2}$, all lengths in the image are $\frac{1}{2}$ as long as the corresponding lengths in the original.   The base of the original triangle is 3 units. The base of the image is 1.5 units. The scale factor is $\frac{1.5}{3} = \frac{3}{6}$ or $\frac{1}{2}$.
Area and Scale Factor Lengths of similar figures will stretch (or shrink) by a scale factor. Areas of the figures will not change by the same factor.	If we apply a scale factor of 2 to a figure, the area becomes 4 times as large.  **original**  **four copies** If we apply a scale factor of 3 to a figure, the area becomes 9 times as large. The original area is 6 cm^2. The area of the image is 9 times as large or 54 cm^2. 

On the **CMP Parent Web Site,** you can learn more about the mathematical goals of each unit, see an illustrated vocabulary list, and examine solutions of selected ACE problems.
http://PHSchool.com/cmp2parents