STUDY LINK
2·11 | **Unit 3: Family Letter**

Geometry Explorations and the American Tour

In Unit 3, your child will set out on the American Tour, a yearlong series of mathematical activities examining historical, demographic, and environmental features of the United States. The American Tour activities will develop your child's ability to read, interpret, critically examine, and use mathematical information presented in text, tables, and graphics. These math skills are vital in our technological age.

Many American Tour activities rely on materials in the American Tour section of the *Student Reference Book.* This section—part historical atlas and part almanac—contains maps, data, and other information from a wide range of sources: the U.S. Census Bureau, the National Weather Service, and the National Geographic Society.

Unit 3 also will review some geometry concepts from earlier grades while introducing and expanding on others. In *Fourth Grade Everyday Mathematics,* students used a compass to construct basic shapes and create geometric designs. In this unit, your child will extend these skills and explore concepts of congruent figures (same size, same shape), using a compass and straightedge. In addition, students will use another tool, the Geometry Template. It contains protractors and rulers for measuring, as well as cutouts for drawing a variety of geometric figures.

Finally, students will explore the mathematics and art of tessellations—patterns of shapes that cover a surface without gaps or overlaps. They will use math tools to create their own designs.

You can help your child by asking questions about information presented in newspaper and magazine tables and graphics. Also, the world is filled with many 2-dimensional and 3-dimensional geometric forms: angles, line segments, curves, cubes, cylinders, spheres, pyramids, and so on. Many wonderful geometric patterns can be seen in nature as well as in the things that people create. It will be helpful for you and your child to look for and talk about geometric shapes throughout the year.
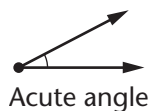
**Please keep this Family Letter for reference as your child works through Unit 3.**

Vocabulary

Important terms in Unit 3:

acute angle An angle with a measure greater than 0 degrees and less than 90 degrees.

Acute angle

adjacent angles Two angles with a common side and vertex that do not otherwise overlap. In the diagram, angles 1 and 2 are adjacent angles. Angles 2 and 3, angles 3 and 4, and angles 4 and 1 are also adjacent.
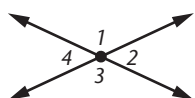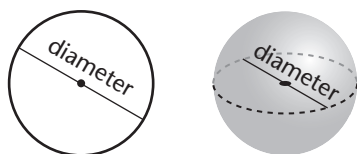
Adjacent angles

**congruent** Having exactly the same shape and size.

Congruent triangles

diameter A line segment that passes through the center of a circle (or sphere) and has endpoints on the circle (or sphere); also, the length of this line segment. The diameter of a circle or sphere is twice the length of its radius.
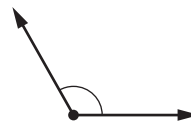
equilateral triangle A triangle with all three sides the same length. In an equilateral triangle, all three angles have the same measure.
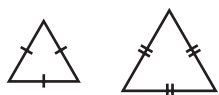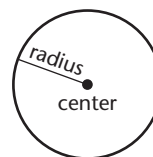
Equilateral triangles

obtuse angle An angle with a measure greater than 90 degrees and less than 180 degrees.
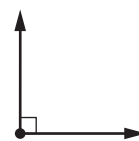
Obtuse angle

radius A line segment from the center of a circle (or sphere) to any point on the circle (or sphere); also, the length of this line segment.
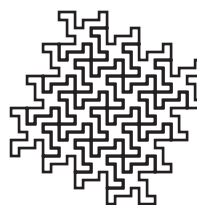
right angle An angle with a measure of 90 degrees.

Right angle

tessellation An arrangement of shapes that covers a surface completely without overlaps or gaps. Also called *tiling.*

A tessellation

vertical (opposite) angles The angles made by intersecting lines that do not share a common side. Vertical angles have equal measures. In the diagram, angles 2 and 4 are a pair of vertical angles. Angles 1 and 3 are another pair of vertical angles.
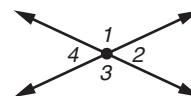
Vertical angles

Building Skills through Games

In Unit 3, your child will practice geometry and computation skills by playing the following games. For detailed instructions, see the *Student Reference Book.*

Angle Tangle See *Student Reference Book,* page 296

Two players will need a protractor and a straightedge to play this game. Playing *Angle Tangle* gives students practice in drawing and measuring angles.

High-Number Toss: Decimal Version See *Student Reference Book,* page 321

This game practices concepts of place value and standard notation. It requires 2 players and number cards 0–9 (4 of each).

Multiplication Top-It See *Student Reference Book,* page 334

This game practices the basic multiplication facts. It requires a deck of cards with 4 each of the numbers 1–10, and can be played by 2–4 players.

Polygon Capture See *Student Reference Book,* page 328

This game uses 16 polygons and 16 Property Cards, and is played by partners or 2 teams each with 2 players. *Polygon Capture* practices identifying properties of polygons related to sides and angles.

Do-Anytime Activities

To work with your child on the concepts taught in this unit and in previous units, try these interesting and rewarding activities:

1. Together, read the book *A Cloak for the Dreamer* by Marilyn Burns.

2. When you are at home or at a store, ask your child to identify different types of polygons such as triangles, squares, pentagons, and hexagons.

3. Visit the Web site for the U.S. Bureau of the Census at http://www.census.gov/. Have your child write three interesting pieces of information that he or she learned from the Web site.

4. Look for examples of bar graphs in newspapers or magazines. Ask your child to explain the information shown by a graph.

As You Help Your Child with Homework

As your child brings assignments home, you may want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through this unit's Study Links.

Study Link 3·1

1. Illinois

2. 851,000; 4,822,000; 8,712,000; 12,051,000

3. 3,971,000   **4.** 3,890,000   **5.** 3,339,000

6. The population increases by about 4,000,000 every fifty years.

7. About 16,000,000   **8.** About 14,000,000

Study Link 3·2

1. A   **2.** 5,472,000   **3.** H

4. a. About 250,000,000   **b.** About 55%

Study Link 3·3

1. 60°; 90°; 60°   **2.** 120°; 60°; 60°

3. 90°; 135°; 135°   **4.** 30°; 75°

Study Link 3·4

1. 70°   **2.** 50°   **3.** 110°   **4.** 130°

5. 60°   **6.** 180°   **7.** 120°   **8.** 90°

9. 50°   **10.** 150°   **11.** 170°

Study Link 3·5

1. acute; 12°   **2.** acute; 65°   **3.** obtuse; 103°

4. Sample answer: Angle *D* and angle *E*

5. Sample answer: Angle *D* and angle *F*

6. Sample answer: Angle *G* and angle *H*

9. 14,670   **11.** 11R1

Study Link 3·6

1. scalene   **2.** isosceles   **3.** isosceles; right

4. equilateral; isosceles

5. Objects and types of angles vary.

6. 11,761   **7.** 5,750   **8.** 42,405   **9.** 11

Study Link 3·7

Sample answers are given for Problems 1–5.

1. The pentagon is the only shape that is not regular.

2. The oval is the only shape that is curved.

3. The crossed-out shape is the only shape that is not convex.

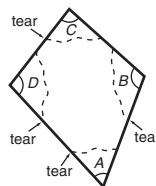**4.** The trapezoid is the only shape without two pairs of parallel sides.

Study Link 3·8

1.–3. Samples of tessellations vary.

Study Link 3·9

1. Sample answer: Draw a line between two of the vertices to create two triangles. Since the sum of the angles in each triangle is 180°, the sum of the angles in a quadrangle is 360°.

2. 360°

3. a.–b.   **c.–d.**
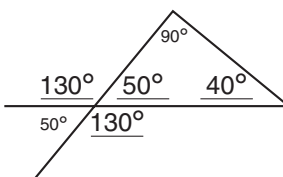
Study Link 3·10

1. Sample answers are given.

a.   **b.**

c.   **d.**

2.
90°
130° / 50°   40°
50° / 130°

3. a. 2   **b.** 70°   **c.** 360°   **d.** trapezoid