LEVEL F

Number Worlds™

Accelerate Math Success

English Learner Support Guide

Mc Graw Hill Education

Unit 5

Geometry and Measurement

Unit at a Glance

In this unit, students will learn the vocabulary associated with ***Number Worlds,*** Level F, Geometry and Measurement, including calculating area and perimeter; understanding angles and lines; and converting units of weight, capacity, length, and time. Before beginning the unit, assess students' general knowledge of math vocabulary using the Individual Oral Assessment on page 93.

How Students Learn Vocabulary

The use of realia will be useful in this unit. Using measuring cups and containers, for example, will help students visualize the meanings of *cup, pint, quart,* and *gallon*. Clocks with movable hands will help students remember *hour, minute,* and *second*.

Academic Vocabulary Taught in Unit 5

Week 1

area The measure of the interior, or inside, of a figure

dimensions The measurements of the sides of figures

length The measurement that shows how long a line or figure is

perimeter The distance around the boundary of a closed-plane figure

rectangle A parallelogram with four right angles

width The measurement that shows how wide a figure is

Week 2

acute angle An angle that measures less than 90 degrees

angle A figure formed by two rays extending from the same endpoint

obtuse angle An angle that is greater than 90 degrees

right angle An angle measuring 90 degrees

Week 3

acute angle An angle that measures less than 90 degrees

angle A figure formed by two rays extending from the same endpoint

intersecting lines Two lines that pass through the same point

line A straight path that extends infinitely in opposite directions; thought of as having length, but no thickness

line segment A straight path joining two points, called endpoints of the line segment

obtuse angle An angle that is greater than 90 degrees

parallel lines Lines that will never intersect

perpendicular lines Intersecting lines that create a 90-degree angle

point An exact location in space

ray A straight path that extends infinitely in one direction from a point, which is called its endpoint

right angle An angle measuring 90 degrees

straight angle An angle measuring 180 degrees

Week 4

polygon A closed plane figure consisting of line segments (sides) connected endpoint to endpoint

Week 5

convert To exchange for something of equal value

foot The basic unit of length in the customary system of measurement, equal to 12 inches

hour A measure of time equal to 60 minutes

meter (m) The basic unit of length in the metric system, equal to 10 decimeters, 100 centimeters, and 1,000 millimeters

minute A measure of time equal to 60 seconds

second A measure of time equal to one-sixtieth of a minute

Week 6

convert To exchange for something of equal value

gram The basic unit of weight in the metric system, equal to 1,000 milligrams

liter The basic unit of capacity in the metric system, equal to 1,000 milliliters

ounce A unit of weight in the customary system of measurement, equal to one-sixteenth of a pound

pound A unit of weight in the customary system of measurement, equal to 16 ounces

Unit 5 Individual Oral Assessment

Directions: Read each question to the student, and record his or her oral responses.
Some questions have teacher directions. Teacher directions are indicated in italics.
Allow students to use pencil and paper to work their responses.

1. Is this **area** or **perimeter**? *Draw a rectangle and make a bold line around the outside.* **perimeter**
2. Is this an **angle** or a **line**? *Draw an acute angle.* **angle**
3. Is it an **acute angle,** an **obtuse angle,** or a **right angle**? **an acute angle**
4. Are these **intersecting lines**? *Draw two parallel lines.* **no**
5. Are these **perpendicular lines** or **parallel lines**? **parallel lines**
6. How many sides does an **octagon** have? **8**
7. What type of **polygon** is this? *Show students a rectangle.* **rectangle**
8. How many **inches** are in a **foot**? *Show students a ruler.* **12**
9. How many **minutes** are in an **hour**? *Show students a clock.* **60**
10. How much does this hold? *Show students a gallon jug.* **a gallon**
11. What is the **area**? *Draw a rectangle. Label the sides with 3 ft and 4 ft.* **12 square feet**
12. Name a **polygon** with **parallel sides**. **Possible answers: square, rectangle, rhombus, trapezoid, parallelogram**
13. **Convert** 200 centimeters to meters. **2 meters**

- **Beginning English Learners:** 0–3 of Questions 1–10 correct
- **Intermediate English Learners:** 4–7 of Questions 1–10 correct
- **Advanced English Learners:** 8–10 of Questions 1–10 correct
- If the student is able to answer Questions 11–13, then he or she can understand the mathematics taught in this unit but may still have difficulty with the academic vocabulary.

Use the Student Assessment Record, page 143, to record the assessment results.

Week 1

Objective

Students can understand the meanings of the terms *area* and *perimeter*.

Vocabulary

- **area** The measure of the interior, or inside, of a figure
- **dimensions** The measurements of the sides of figures
- **length** The measurement that shows how long a line or figure is
- **perimeter** The distance around the boundary of a closed-plane figure
- **rectangle** A parallelogram with four right angles
- **width** The measurement that shows how wide a figure is

Materials

Program Materials
- Vocabulary Cards: *area, perimeter, rectangle*
- Area or Perimeter?, p. 140

Additional Materials
- graph paper
- pattern blocks

1 WARM UP

Introduce each vocabulary word to students. Say the word aloud and have students repeat it. Display the *rectangle* ***Vocabulary Card.*** Have students practice saying the word chorally and then individually.

Give each student a handful of pattern blocks.

► **Find a rectangle.**

Check that each student has found a rectangle. Hold up your own rectangle and say, *This is a rectangle*. Have students repeat the sentence, chorally and then individually.

► **How many sides does a rectangle have?** 4

Hold up a triangle pattern block.

► **Is this a rectangle?** no

Hold up the triangle pattern block and say, *This is not a rectangle*. Have students repeat, chorally and then individually.

Use rectangles and other pattern blocks to repeat the activity and check students' understanding. Check that students are forming their sentences correctly. Give plenty of choral and individual practice opportunities.

2 ENGAGE

Draw a large grid on the board or show a grid on an interactive whiteboard. Draw a rectangle on the grid that is 3 units wide and 5 units long.

► **Is this a rectangle?** Yes. It is a rectangle.

► **How many sides does it have?** 4; It has four sides.

► **How long is it? Gesture at the side that is 5 units long.** 5 units long

Tell students that the *length* of the side is 5 units. Say *The length is 5 units,* and have students repeat the sentence. Write *length* on the board.

Repeat for *The width is 3 units*. Check students' concept of the terms *length* and *width*.

Point again to the length and width measurements. Say, *These are the dimensions of the rectangle*. Say *dimensions,* and have students repeat. Write *dimensions* on the board.

► **Is a rectangle a dimension?** no

► **Is length a dimension?** yes

► **Is width a dimension?** yes

Draw a line around the outside of the rectangle on the board.

► **What is the distance around the rectangle? Allow students time to count.** 16 units

Say *The perimeter is 16 units,* and have students repeat until firm. Write *perimeter* on the board.

► **Is the perimeter inside or outside the rectangle?** outside

Point to the rectangle again.

► **How many squares are inside the rectangle?** 15

Say *The area is 15 square units,* and have students repeat until firm. Write *area* on the board.

► **Is the area inside or outside the rectangle?** inside

Check students' understanding of the terms *length, width, perimeter, area,* and *rectangle*. As you point and ask questions, encourage students to answer in complete sentences.

Teacher Note

Have partners draw rectangles of various sizes on graph paper. Then have them trade with a partner who should describe the rectangle using the terms *length, width, perimeter,* and *area*. Finally, have students complete the Area or Perimeter? worksheet and compare answers with a partner before reviewing as a group.

Progress Monitoring	
If… students are confused by the term *units,*	**Then…** explain that the word *units* could be any unit of measurement. Illustrate by measuring the length and width of a rectangular object, such as a book, in inches or centimeters.

3 REFLECT

Extended Response

- **Which is easier to find, area or perimeter? Why?**
- **You want to paint a wall. Do you need to know the area? Why?**
- **Is perimeter always less than area?**

Encourage student discussion of these questions and answers.

Progress Monitoring	
If… students are confused by the term *area,*	**Then…** tell them that the word has several uses. It can refer to a space that is often open or empty (such as *play area*), and it can refer to a section of a building (such as a *basement area*). In math, it refers to how much space is inside a shape.

4 ASSESS

Informal Assessment

Have students complete the following activity to make sure they understand the vocabulary. As students use each word:

1. Check understanding.
2. Correct errors.
3. Recheck for understanding.

- On grid paper, draw a rectangle with the following labels: $l = 12$, $w = 4$. Have students identify the length and width.
- Have students figure the area and perimeter.

For each word, use the following rubric to assign a score.

The student can repeat the word when prompted. (1 point)

The student knows the word but does not know its meaning. (2 points)

The student has a vague idea of the word's meaning. (3 points)

The student knows the word and can use the word in context. (4 points)

Week 2

Objective

Students can describe different types of angles and can talk about a protractor.

Vocabulary

- **acute angle** An angle that measures less than 90 degrees
- **angle** A figure formed by two rays extending from the same endpoint
- **obtuse angle** An angle that is greater than 90 degrees
- **right angle** An angle measuring 90 degrees

Materials

Program Materials
- Vocabulary Cards: *acute angle, obtuse angle, right angle*
- Angles, p. 141

Additional Materials
- clock face with moveable hands
- protractor
- ruler
- square pattern block

1 WARM UP

Introduce each vocabulary word to students. Say the word aloud and have students repeat it.

Show students a protractor. Say *protractor* and have students repeat the word. Write *protractor* on the board and draw a picture next to it.

Give each student a protractor. Have partners examine the protractors and make a list of what they notice. As necessary, elicit any of the following qualities, and model the descriptive sentence for students to repeat:

- It has a straight (flat) side.
- It is a half circle.
- It has numbers on it.

2 ENGAGE

Show students a clock face with both hands pointed to 12:00. Demonstrate the many angles that can be formed by moving the hands around the clock face. Create an angle with the hands, say *angle,* and have students repeat the word.

Move the clock hands to show 3:00. Put a small square pattern block at the intersection of the hands. Tell students that this is a *right angle*. Have students repeat the word.

Move the hands to 1:00.

► **Is this a right angle?** no

Move the hands to 9:00.

► **Is this a right angle?** yes

Move the clock hands to 4:00.

► **Is this a right angle?** no

► **Is the angle bigger or smaller than a right angle?** bigger

Tell students that angles that are bigger than right angles are called *obtuse angles*. Have students repeat the term *obtuse angle*. Use the clock face to check students' concept of obtuse angles.

Move the clock hands to 11:00.

► **Is this a right angle?** no

► **Is this an obtuse angle?** no

► **Is the angle bigger or smaller than a right angle?** smaller

Tell students that angles that are smaller than right angles are called *acute angles*. Have students repeat the term *acute angle*. Use the clock face to check students' concept of acute angles.

Show students the *acute angle, obtuse angle,* and *right angle* ***Vocabulary Cards*** and say each word again.

Distribute a ruler to each student. Have students draw five angles using a ruler. Encourage them to make at least one of each type of angle. Students should label each angle as *right, obtuse,* or *acute*.

Distribute a copy of the Angles worksheet and a protractor to each student. Organize students into pairs. Have students complete the worksheet with a partner.

Teacher Note

Allow students to work with a partner as often as possible. This maximizes opportunities for practicing English in a meaningful situation.

Point out some different meanings of *right*: the opposite of *left*, the opposite of *wrong,* fair. Tell students that *right* in the term *right angle* is another meaning of the word.

Progress Monitoring	
If… students tell you that all angles in a triangle are acute,	**Then…** draw a right triangle and an obtuse triangle on the board to show students that a triangle may have one right or obtuse angle and two smaller acute angles.

3 REFLECT

Extended Response

- **What does an obtuse angle look like?**
- **Describe the angles of a star.**
- **What objects in the room have acute angles?**

Encourage student discussion of these questions and answers.

Progress Monitoring	
If… students need practice naming angles,	**Then…** have partners practice forming different angles using pattern blocks.

4 ASSESS

Informal Assessment

Have students complete the following activity to make sure they understand the vocabulary. As students use each word:

1. Check understanding.
2. Correct errors.
3. Recheck for understanding.

- Draw a right angle, an acute angle, and an obtuse angle on the board. Have students identify each type of angle.

For each word, use the following rubric to assign a score.

The student can repeat the word when prompted. (1 point)

The student knows the word but does not know its meaning. (2 points)

The student has a vague idea of the word's meaning. (3 points)

The student knows the word and can use the word in context. (4 points)

Week 3

Objective

Students can identify vocabulary associated with points, lines, segments, rays, and angles.

Vocabulary

- **acute angle** An angle that measures less than 90 degrees
- **angle** A figure formed by two rays extending from the same endpoint
- **intersecting lines** Two lines that pass through the same point
- **line** A straight path that extends infinitely in opposite directions; thought of as having length, but no thickness
- **line segment** A straight path joining two points, called endpoints of the line segment
- **obtuse angle** An angle that is greater than 90 degrees
- **parallel lines** Lines that will never intersect
- **perpendicular lines** Intersecting lines that create a 90-degree angle
- **point** An exact location in space
- **ray** A straight path that extends infinitely in one direction from a point, which is called its endpoint
- **right angle** An angle measuring 90 degrees
- **straight angle** An angle measuring 180 degrees

Materials

Program Materials

- Vocabulary Cards: *acute angle, line, line segment, obtuse angle, intersecting lines, parallel lines, perpendicular lines, point, ray, right angle*
- Geometric Terms, p. 142

Additional Materials

- protractor
- realia, photographs, maps

1 WARM UP

Introduce each vocabulary word to students. Say the word aloud and have students repeat it.

Give each student a protractor. Point out the 180-degree mark on the protractor. Tell students that a straight angle equals 180 degrees. Say *straight angle,* and have students repeat.

As a challenge for students, put the straight edges of two protractors together.

► **What is this?** a circle

► **How many degrees is a circle?** 360 degrees

Have students use the protractor to draw a right angle, an obtuse angle, an acute angle, and a straight angle in any order. Then have them trade papers with another student and label their partner's drawings. Finally, have them say a sentence about each drawing; for example, *I think this is a right angle*.

Show students the *acute angle, obtuse angle,* and *right angle* ***Vocabulary Cards*** and have them say the words one more time.

2 ENGAGE

Teach the following words in order: *point, ray, line, line segment, intersecting lines, perpendicular lines,* and *parallel lines*. Use the definitions and drawings to teach meanings, along with realia or photographs of real-world examples of each. For example, show a length of string for *line segment,* a photo of an intersection for *intersecting lines,* or a photo of a train track for *parallel lines*.

Have students try to find at least one example of each term somewhere in the classroom. Then check students' concept of geometric terms by showing a photo or drawing a picture of each. Have students name the figure using a complete sentence: *It is a* _____. or *They are* _____.

Erase the terms from the board, leaving only the drawings of the figures. Show students the *point, ray, line, line segment, intersecting lines, parallel lines,* and *perpendicular lines* ***Vocabulary Cards.*** Model each word and have students repeat, paying particular attention to the pronunciation of *parallel* and *perpendicular*. Have students identify an example of each term on the board.

Have partners complete the Geometric Terms worksheet. Review as a group. Encourage discussion by preteaching language that shows agreement or disagreement. For example:

- I agree because _____.
- I don't think it is a _____ because _____.
- I disagree because _____.

Teacher Note

Help students extend language by including the definition of the term in their sentences. For example, *It is a point. It is an exact location*. Another way to extend language is to relate the terms to each other. For example, *Perpendicular lines are also intersecting lines*. Model several examples, write them on the board, and allow students to refer to them during the activity.

Progress Monitoring	
If… students are ready for another real-world example,	**Then…** show them a map on a computer or interactive whiteboard. Have them locate points, line segments, intersecting lines, parallel lines, and perpendicular lines. Then challenge them to locate the different types of angles.

3 REFLECT

Extended Response

- **Where do you see angles?**
- **How are angles and lines related?**
- **How many angles are made by two intersecting lines? How do you know?**

Encourage student discussion of these questions and answers.

Progress Monitoring	
If… students struggle to respond to the Extended Response questions,	**Then…** partner them with another student and allow them to draw examples of their answers. Then help them formulate responses in short phrases.

4 ASSESS

Informal Assessment

Have students complete the following activity to make sure they understand the vocabulary. As students use each word:

1. Check understanding.
2. Correct errors.
3. Recheck for understanding.

- Draw a line with a point in the middle. Have student identify the line and the point.
- Repeat for the remaining vocabulary.

For each word, use the following rubric to assign a score.

The student can repeat the word when prompted. (1 point)

The student knows the word but does not know its meaning. (2 points)

The student has a vague idea of the word's meaning. (3 points)

The student knows the word and can use the word in context. (4 points)

Week 4

Objective
Students will learn language to name and describe polygons.

Vocabulary
polygon A closed plane figure consisting of line segments (sides) connected endpoint to endpoint

Materials
Additional Materials
- index cards
- pattern blocks
- realia, photos, maps

1 WARM UP

Introduce each vocabulary word to students. Say the word aloud and have students repeat it.

Use a map, photos, or realia to review the terms *intersecting lines, perpendicular lines, parallel lines,* and the types of angles (acute, obtuse, right).

Distribute a set of pattern blocks to each pair of students. Each set should have a triangle, square, rectangle, rhombus, trapezoid, pentagon, and parallelogram. Review the names of each shape. Use the sentence frame *It is a* _____.

Hold up a rectangle pattern block.

- **Does this shape have right angles? yes How many right angles? 4**
- **Does this shape have parallel lines? yes Have a student point to one pair of parallel lines.**
- **Does this shape have perpendicular lines? yes Have a student point to a pair or perpendicular lines.**

Encourage complete sentences. Use other pattern blocks to review terminology in this way.

2 ENGAGE

Show photos of a triangle, a tricyle, a tripod, and a triceratops. Name each photo, model the pronunciation, and have students repeat.

- **What do you notice about all of the photos? Possible answer: Each photo shows three of something.**
- **What is the same about each word? Each word starts with *tri-*.**

Tell students that the prefix *tri-* means "three." Say *Tri- means "three"* and have students repeat until firm.

Hold up a triangle pattern block.

- **What is this? a triangle**
- **What does *tri-* mean? three**
- **So *triangle* means what? three angles**

Teach the following prefixes by repeating the same process: *quad-, poly-, pent-, hex-, hept-, oct-*. Use the corresponding polygons to help

Have partners create a matching game. Tell them to write a prefix on one index card and its corresponding number on another card. (For *poly-*, suggest students write *3, 4, 5,…* as the corresponding number.) Then have them shuffle the cards and play a game of Concentration. As a student turns over a pair of cards, have them describe the pair. For example, if they turn over *hex-* and the number 3, they should say, *Hex- does not mean "three."* Players keep any matches and continue play until all matches have been found.

Teacher Note

The word root *gon* means "angle," and the root *lateralus* means "side."

Progress Monitoring

If… students are firm in their understanding of number prefixes and their corresponding polygons,	**Then…** progress to teaching the different types of triangles, including *equilateral, scalene, isosceles, acute, obtuse,* and *right*.

3 REFLECT

Extended Response

- **How did a parallelogram get its name?**
- **Name four different quadrilaterals. How are they the same? How are they different?**
- **Look at a rhombus and a trapezoid. Discuss the sides using the terms *parallel* and *perpendicular*.**

Encourage student discussion of these questions and answers.

Progress Monitoring

If… students are easily able to participate in the Extended Response discussion and tend to overpower the other students,	**Then…** have them act as the teacher; give them the questions to ask, and have them "guide" the discussion without volunteering any answers.

4 ASSESS

Informal Assessment

Have students complete the following activity to make sure they understand the vocabulary. As students use each word:

1. Check understanding.
2. Correct errors.
3. Recheck for understanding.

- Have students give the meaning of the prefixes *tri-*, *quad-*, *pent-*, *hex-*, *hept-*, and *oct-*.
- Show students a pictorial example of each of the following polygons: triangle, rectangle, square, rhombus, trapezoid, parallelogram, pentagon, hexagon, heptagon, octagon. Have students identify five of the shapes.

For each word, use the following rubric to assign a score.

The student can repeat the word when prompted. (1 point)

The student knows the word but does not know its meaning. (2 points)

The student has a vague idea of the word's meaning. (3 points)

The student knows the word and can use the word in context. (4 points)

Week 5

Objective

Students will review customary and metric units of length and will also review units of time.

Vocabulary

- **convert** To exchange for something of equal value
- **foot** The basic unit of length in the customary system of measurement, equal to 12 inches
- **hour** A measure of time equal to 60 minutes
- **meter (m)** The basic unit of length in the metric system, equal to 10 decimeters, 100 centimeters, and 1,000 millimeters
- **minute** A measure of time equal to 60 seconds
- **second** A measure of time equal to one-sixtieth of a minute

Materials

Program Materials
Vocabulary Cards: *centimeter, foot, hour, inch, kilometer, mile, millimeter, minute, second, yard*

Additional Materials
- clocks with moveable hands
- metersticks
- rulers
- yardsticks

1 WARM UP

Introduce each vocabulary word to students. Say the word aloud and have students repeat it.

Tell students that in this lesson, they will learn to convert measurements. Say *Convert means to change into something equal*. Model the sentence again and have students repeat.

Give each pair of students a clock, a ruler, a meterstick, and a yardstick. Have them discuss the items and then create a few sentences to describe each one. If students need help, offer the following sentence frames:

- The (item name) is _____.
- The (item name) has _____.
- The (item name) is used for _____.

► **What does a clock measure?** time

► **What does a ruler (meterstick/yardstick) measure?** length

2 ENGAGE

Use the ruler and yardstick to introduce or review the following words: *foot, inch, yard.*

Give each student a ruler.

► **How long is the ruler?** a foot

► **How many inches on the ruler?** 12

► **So how many inches are in a foot?** 12

Teach and model the sentence *There are 12 inches in a foot*. Have students repeat the sentence chorally and individually. Then write the sentence on the board. Also write *12 in. = 1 ft* on the board.

Repeat the process to help students arrive at the following:

- There are 3 feet in a yard. (3 ft = 1 yd)
- There are 36 inches in a yard. (36 in. = 1 yd)
- There are 5,280 feet in a mile. (5,280 ft = 1 mi)
- There are 1,760 yards in a mile. (1,760 yd = 1 mi)

Give each student a meterstick. Introduce or review the meaning of *meter* and *centimeter*.

► **How long is the meterstick?** a meter

► **How many centimeters are on the meterstick? Give students a minute or two to count.** 100

Tell students that *centi-* means "one-hundredth." That means that a centimeter is one-hundredth of a meter.

► **So how many centimeters are in a meter?** 100

Repeat the process to help students arrive at the following:

- There are 1,000 millimeters in a meter. (1,000 mm = 1 m)
- There are 1,000 meters in a kilometer. (1,000 m = 1 km)

Give each student a clock with movable hands and repeat the process to help students arrive at the following:

- There are 60 minutes in an hour.
- There are 60 seconds in a minute.

Show each ***Vocabulary Card*** to students, say the word again, and have students practice pronouncing each word. Then have them use each word in a math conversion sentence.

► **What does convert mean?** to change into something equal

Teacher Note

To help students understand *mile* and *kilometer,* give students approximate locations of places which are that distance from the school. Then ask clarifying questions, such as *The post office is a mile away. How many feet is that?* Use other realistic examples. Then have students ask and answer similar questions.

Progress Monitoring	
If… students have recently moved from another country,	**Then…** they may be very familiar with the metric system. Use this opportunity to help them with pronunciation and sentence formation.

3 REFLECT

Extended Response

- **Why is it helpful to convert?**
- **Is it easy to convert feet to inches? Why or why not?**
- **What unit do we use to measure the length of a pencil?**
- **What unit do we use to measure the distance to the Moon?**

Encourage student discussion of these questions and answers.

Progress Monitoring	
If… students have recently moved from another country,	**Then…** they may be very familiar with the metric system. Use this opportunity to help them with pronunciation and sentence formation.

4 ASSESS

Informal Assessment

Have students complete the following activity to make sure they understand the vocabulary. As students use each word:

1. Check understanding.
2. Correct errors.
3. Recheck for understanding.

- Have students identify *inch, foot,* and *yard* on a yardstick.
- Have students identify *meter, centimeter,* and *millimeter* on a meterstick.
- Ask students what *convert* means. Have them convert 2 hours to minutes.

For each word, use the following rubric to assign a score.

The student can repeat the word when prompted. (1 point)

The student knows the word but does not know its meaning. (2 points)

The student has a vague idea of the word's meaning. (3 points)

The student knows the word and can use the word in context. (4 points)

Week 6

Objective

Students will review customary and metric units of weight and capacity.

Vocabulary

- **convert** To exchange for something of equal value
- **gram** The basic unit of weight in the metric system, equal to 1,000 milligrams
- **liter** The basic unit of capacity in the metric system, equal to 1,000 milliliters
- **ounce** A unit of weight in the customary system of measurement, equal to one-sixteenth of a pound
- **pound** A unit of weight in the customary system of measurement, equal to 16 ounces

Materials

Additional Materials

- gallon-size jug
- items to weigh
- liter-size container
- measuring cup
- pint container
- platform scales and weights
- quart-size container
- water

1 WARM UP

Introduce each vocabulary word to students. Say the word aloud and have students repeat it.

► **What does *convert* mean?** to change into something equal

Have students give some examples of the conversions they have learned, such as

- There are 60 minutes in an hour.
- There are 1,760 yards in a mile.

2 ENGAGE

Tell students they are going to learn how to convert measures of weight and capacity.

► **What is weight?** how heavy something is

If students are unsure what *weight* is, give them two items that are of a similar size but have very different weights; for example, a kitchen sponge and a small block of wood.

► **Are they the same size?** yes

► **How are they different?** Possible answer: This one is heavy.

Tell students that how heavy the items are is their weight.

Use the scales to introduce the meanings of *ounce, pound, gram,* and *kilogram*. Use the scales and various weights to help students determine the following:

- There are 16 ounces in a pound.
- There are 1,000 grams in a kilogram.

► **What is capacity?** Possible answer: how much something can hold

If students are unsure what *capacity* is, demonstrate how much water different containers can hold. For example, fill a one-cup measuring cup and a one-quart container with water.

► **Are they the same size?** no

► **Which one holds more?** Students should point to the quart-size container.

Tell students that *capacity* is how much liquid a container can hold.

Use the measuring tools and containers to introduce the meanings of *cup, pint, quart, gallon, liter,* and *milliliter*. Help students discover the following:

- There are 1,000 milliliters in a liter.
- There are 2 cups in a pint.
- There are 2 pints in a quart.
- There are 4 quarts in a gallon.

Use the items and containers to have students practice the following sentences:

- The _____ is/isn't heavier than the _____.
- The _____ is/isn't lighter than the _____.
- The _____ holds more/less than the _____.

Teacher Note

Review the meanings of the prefixes *milli-* ("one-thousandth") and *kilo-* ("one thousand"). Have students use this known information to determine the values of *milliliter* and *kilogram*.

Using Student Worksheets

After students complete the activity, help them complete the appropriate practice page for their level of English development.

Beginning, p. 106

Intermediate, p. 107

Advanced, p. 108

3 REFLECT

Extended Response

- **Why is it helpful to convert?**
- **Is it easy to convert liters to milliliters? Why or why not?**
- **What unit do we use to measure the weight of a person?**
- **What unit do we use to measure how much water in a swimming pool?**

Encourage student discussion of these questions and answers.

4 ASSESS

Informal Assessment

Have students complete the following activity to make sure they understand the vocabulary. As students use each word:

1. Check understanding.
2. Correct errors.
3. Recheck for understanding.

- Have students identify *cup, pint, quart, gallon, liter, gram, pound, kilogram*.
- Ask students what *convert* means. Have them show one conversion they learned.

For each word, use the following rubric to assign a score.

The student can repeat the word when prompted. (1 point)

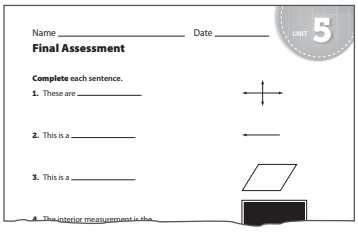
The student knows the word but does not know its meaning. (2 points)

The student has a vague idea of the word's meaning. (3 points)

The student knows the word and can use the word in context. (4 points)

Final Assessment

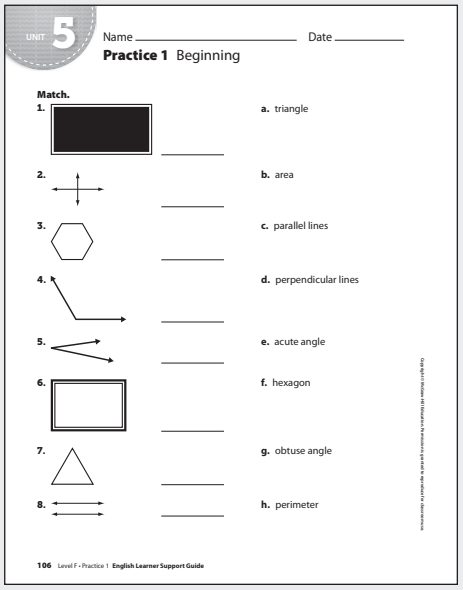
Distribute a copy of the Final Assessment, p. 109, to each student. Use the following rubric to determine each student's level of English development.


Name _____ Date _____
UNIT 5
Final Assessment
Complete each sentence.
1. These are _____
2. This is a _____
3. This is a _____
4. The interior measurement is the

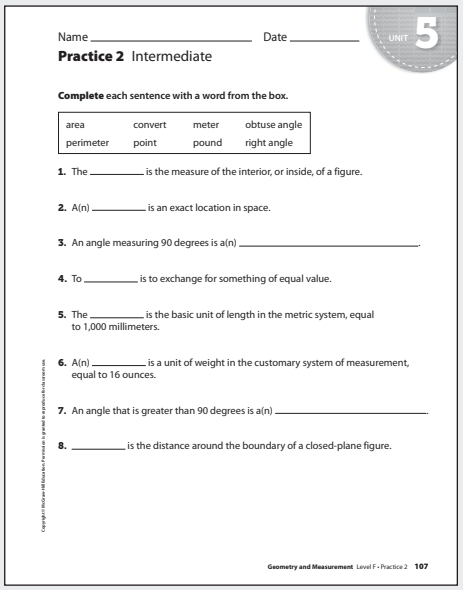
Final Assessment, p. 109

- **Beginning English Learners:** 0–3 of Questions 1–8 correct
- **Intermediate English Learners:** 4–6 of Questions 1–8 correct
- **Advanced English Learners:** 7–8 of Questions 1–8 correct

Use the Student Assessment Record, page 143, to record the assessment results.


UNIT 5
Name _____ Date _____
Practice 1 Beginning
Match.
1. _____ **a.** triangle
2. _____ **b.** area
3. _____ **c.** parallel lines
4. _____ **d.** perpendicular lines
5. _____ **e.** acute angle
6. _____ **f.** hexagon
7. _____ **g.** obtuse angle
8. _____ **h.** perimeter
106 Level F • Practice 1 **English Learner Support Guide**

Practice 1, Beginning, p. 106

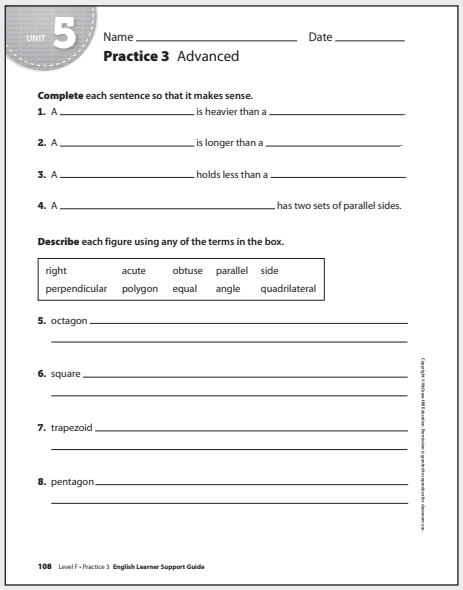

UNIT 5
Name _____ Date _____
Practice 2 Intermediate
Complete each sentence with a word from the box.

area	convert	meter	obtuse angle
perimeter	point	pound	right angle

1. The _____ is the measure of the interior, or inside, of a figure.
2. A(n) _____ is an exact location in space.
3. An angle measuring 90 degrees is a(n) _____.
4. To _____ is to exchange for something of equal value.
5. The _____ is the basic unit of length in the metric system, equal to 1,000 millimeters.
6. A(n) _____ is a unit of weight in the customary system of measurement, equal to 16 ounces.
7. An angle that is greater than 90 degrees is a(n) _____.
8. _____ is the distance around the boundary of a closed-plane figure.

Geometry and Measurement Level F • Practice 2 **107**

Practice 2, Intermediate, p. 107


UNIT 5
Name _____ Date _____
Practice 3 Advanced
Complete each sentence so that it makes sense.
1. A _____ is heavier than a _____.
2. A _____ is longer than a _____.
3. A _____ holds less than a _____.
4. A _____ has two sets of parallel sides.

Describe each figure using any of the terms in the box.

right	acute	obtuse	parallel	side
perpendicular	polygon	equal	angle	quadrilateral

5. octagon _____
6. square _____
7. trapezoid _____
8. pentagon _____

108 Level F • Practice 3 **English Learner Support Guide**

Practice 3, Advanced, p. 108

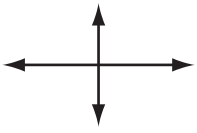
UNIT 5

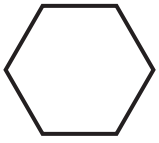
Name _____ Date _____

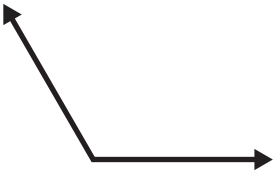
Practice 1 Beginning

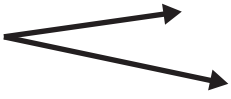
Match.

1. 

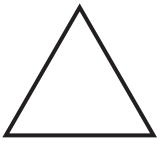
2. 

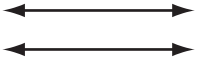
3. 

4. 

5. 

6. 

7. 

8. 

_____

_____

_____

_____

_____

_____

_____

_____

a. triangle

b. area

c. parallel lines

d. perpendicular lines

e. acute angle

f. hexagon

g. obtuse angle

h. perimeter

Name _____ Date _____

UNIT 5

Practice 2 Intermediate

Complete each sentence with a word from the box.

area	convert	meter	obtuse angle
perimeter	point	pound	right angle

1. The _____ is the measure of the interior, or inside, of a figure.

2. A(n) _____ is an exact location in space.

3. An angle measuring 90 degrees is a(n) _____.

4. To _____ is to exchange for something of equal value.

5. The _____ is the basic unit of length in the metric system, equal to 1,000 millimeters.

6. A(n) _____ is a unit of weight in the customary system of measurement, equal to 16 ounces.

7. An angle that is greater than 90 degrees is a(n) _____.

8. _____ is the distance around the boundary of a closed-plane figure.

UNIT 5

Name _____ Date _____

Practice 3 Advanced

Complete each sentence so that it makes sense.

1. A _____ is heavier than a _____.

2. A _____ is longer than a _____.

3. A _____ holds less than a _____.

4. A _____ has two sets of parallel sides.

Describe each figure using any of the terms in the box.

right	acute	obtuse	parallel	side
perpendicular	polygon	equal	angle	quadrilateral

5. octagon _____

_____

6. square _____

_____

7. trapezoid _____

_____

8. pentagon _____

_____

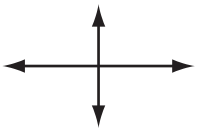
Name _____ Date _____

UNIT 5

Final Assessment

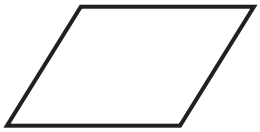
Complete each sentence.

1. These are _____.



2. This is a _____.

3. This is a _____.



4. The interior measurement is the _____.

Use a word from the box to complete each sentence.

centimeters
cups
feet
inches
kilogram
kilometers
meters
millimeters
pints
quarts

5. A meter equals 1,000 _____.

6. A yard equals 36 _____.

7. A _____ equals 1,000 grams.

8. A gallon equals 4 _____.

LEVEL F

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