

### GED 2002 Teachers' Handbook of Lesson Plans

| Content Area<br>Mathematics  | Lesson Topic/Theme<br>Geometry – Perimeter of Polygons | Correlation to Math Framework<br>05.04/05.16  | Lesson Number - 49 |
|--|--|---|--------------------|
| <p><b>Title: Discovering Perimeter</b><br/><b>Objectives/Learner Outcomes</b></p> <p>At the end of this lesson, the learner will be able to:</p> <ul style="list-style-type: none"> <li>• Recall that perimeter is found by adding up the lengths of all sides of a polygon</li> <li>• Calculate the perimeter for a given polygon</li> <li>• Apply the concept of perimeter to a word problem</li> </ul>  |  | <p><b>Materials/Resources/Internet Sites/Handouts/Worksheets</b></p> <ul style="list-style-type: none"> <li>• Chart paper/white board</li> <li>• Markers</li> <li>• Rulers or tape measures</li> <li>• Advertisement for fencing</li> <li>• Lettered, pre-cut construction paper polygons (at least 10) in a bag</li> <li>• Handout – <i><b>Polygon Perimeter - Side A</b></i></li> <li>• Handout – <i><b>Using Perimeter at Home Depot – Side B</b></i></li> </ul> |                    |
| <p><b>Pre-Requisite Knowledge</b></p> <p>The learner should be able to:</p> <ul style="list-style-type: none"> <li>• Complete basic addition problems with whole numbers, decimals, and fractions</li> <li>• Use a ruler or tape measure to find the length of certain objects</li> </ul>  |  | <p><b>Key Words</b></p> <ul style="list-style-type: none"> <li>• Polygon</li> <li>• Regular polygon</li> <li>• Perimeter</li> <li>• Measurement units (i.e., inches, feet, yards, centimeters, meters, etc.)</li> </ul>   |                    |
| <p><b>Anticipatory Set/Introduction</b></p> <p>Find a polygon in your classroom (such as a bulletin board, a window, a door, etc.) or draw one on the board/chart paper.<br/> <b>Say:</b> Imagine that we want to put some ribbon (fabric or any type of trimming) around this shape.</p> <p><b>Ask:</b> What are some things that we'd need to know before getting started?</p>   |  |   |                    |
| <p><b>Preview Questions for Lesson</b></p> <ol style="list-style-type: none"> <li>1. Who has heard of the term perimeter?</li> <li>2. What are some objects that people might like to know the perimeter? (Answers could include: windows, doors, floors, yards, etc.)</li> <li>3. Who remembers how to find the length and width of an object?</li> <li>4. What types of units can be used when measuring the length or width of an object? (Answers could include: inches, feet, yards, miles, centimeters, meters, kilometers, etc.)</li> </ol> |  |   |                    |

### Instructional Outline

**Say:** Perimeter is the distance around the outside of a polygon. As we discussed, there are lots of objects that we can use to calculate the perimeter, such as a book, a window, a computer screen, etc. In fact, we can find the perimeter of any polygon.

**Ask:** Who can define what a polygon is? (Students may need to be guided to the answer that a polygon is a closed figure made up of at least three sides, all of which are straight lines.)

**Ask:** What shapes are examples of polygons? (Answers can include: triangles, squares, rectangles, rhombuses, parallelograms, pentagons, hexagons, octagons, etc. Stress that circles and ovals are not classified as polygons.)

Hand out the rulers and worksheets.

**Say:** Divide yourselves into groups of 3 or 4 students. Each of you should have your own worksheet. In this bag, there are different polygons. Each group will pick one polygon out of the bag and then will work together to find the perimeter. Be sure to write down how you're finding the perimeter. We will do the first one together. (Model how to do the calculations with one figure that you select from the bag. Once each group completes the perimeter calculation for their polygon, have them pass the polygon to the group to the right. Multiple rotations can occur as time permits.)

**Ask:** Who would like to share with us one of the objects that they measured? (Be sure to have students identify the polygon by its letter, the number of sides the polygon has, and how the group found the perimeter. Ask if any other groups measured that same polygon. If other groups did measure it, ask if they agree with the perimeter measurement.)

**Write:** Polygon letter: \_\_\_\_\_, # of sides: \_\_\_\_\_, Perimeter: \_\_\_\_\_ (filling in appropriate information for each polygon)

Explain to students that it's important to always include the unit of measure (i.e., inches, centimeters, etc.) in the answer. Next, draw two triangles on the board/chart paper (one being equilateral and one not being equilateral).

**Ask:** What makes these triangles different? (Many answers are acceptable. If needed, guide students to see that one triangle has all sides the same length (allow them to measure the sides) and the other triangle has three different length sides. Explain what a regular polygon is and show examples of regular versus non-regular polygons.

**Ask:** Are there any regular polygons you can find in this classroom? (Answers might include books, floor tiles, pictures on the walls, etc.)

**Process/Activities**

Divide the class into pairs. Show an advertisement from the newspaper for something that talks about a store selling an item sold by the foot or the yard (i.e., ribbon, wood trim, fencing, etc.).

Go through an example with the class that asks them to compute a total price. For example, if an apartment's bedroom measures 10 feet by 12 feet and the landlord wants to install wood trim that costs \$3.55 per square, what would the cost be to put trim around the room? (Stress that students should first sketch a picture of the shape, label the length of each side, find the perimeter, and then find the total price.)

**Say:** Flip over your worksheet to the side marked *Using Perimeter at Home Depot*. With your partner, decide how you'd figure out the cost for each job listed. Show your calculations and be ready to explain your steps. As you work together, discuss what you're doing.

Walk around the room to monitor progress and to keep each pair on task. Have volunteers share their answers and explanations. It may be helpful for students to sketch their figures on the board/chart paper and show their calculations.

**Product/Evaluation/Summary**

Check the answers on the *Using Perimeter at Home Depot* handout.

**Ask:** What are some characteristics of a polygon? (Answer: closed figure, at least 3 sides, straight edges)

**Ask:** What's special about a regular polygon? (Answer: sides are all the same length)

**Ask:** What is perimeter? (Answer: the distance around the polygon)

**Ask:** How do you find a polygon's perimeter? (Answer: add up all of the sides)

**Teaching to Different Types of Learners**

|   | <b>Visual</b>  | <b>Auditory</b>   | <b>Kinesthetic/Tactile</b>   |
|---|--|---|--|
| <b>Learning Activity</b>                  | Provide written directions, charts, and worksheets to students.  | Incorporate activities that allow students to work together and discuss what they have done. Have students repeat answers or directions to you. | Students can draw pictures or trace shapes with their fingers to demonstrate what perimeter is and how they do the calculations.                               |
| <b>Special Differentiation Strategies</b> | Use an overhead transparency to visually show the correct answers for the perimeter activities rather than just providing the answers verbally. When providing | Check for understanding by asking questions when giving directions or assignments in writing.   | Show students pictures of what's being discussed (i.e., rooms, floors, windows, gardens, yards, etc.). Allow students to get up and measure objects within the |

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|   | directions orally, have them in writing as well.                    |  | classroom (windows, desks, computer screens, books, etc.).   |
| <b>Evaluation</b>   | Allow learners to write their answers instead of saying them aloud. | Allow students to orally report what they have learned.  | Allow students to use drawings to demonstrate their understanding of how to find the perimeter of a polygon. |
| <b>The Family and Adult Literacy Connection</b>   |   | <b>ESE/ESOL Accommodations</b>   |  |
| <p>If students have school-age children, have them complete similar examples to find the perimeter of various polygons at home (i.e., books, doors, windows, cabinets, etc.). Students can have their children use rulers or measuring tapes or assist in holding a measuring tape. Students can draw different polygons and then color them and/or cut them out (emphasis should be placed on shape names and/or colors for small children).</p> <p>Students can connect the concept of perimeter to the real world by looking for examples presented in newspapers or magazines. Instructors can facilitate this by having periodicals that students can browse through in the classroom. A field trip can also be organized to a home improvement store.</p> |   | <p>Partner students with a peer buddy who can facilitate discussion and model tasks. Allow for non-verbal responses such as pointing, nodding, or showing numbers on fingers. Games can also be incorporated into the lesson.</p> <p>Show students how to use manipulatives or draw pictures to represent the problems that need to be solved.</p> |  |

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**Polygon Perimeter – Side A**

1. A. Polygon Letter: \_\_\_\_\_

B. Number of Sides: \_\_\_\_\_

C. Perimeter Calculations:

D. Perimeter: \_\_\_\_\_

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2. A. Polygon Letter: \_\_\_\_\_

B. Number of Sides: \_\_\_\_\_

C. Perimeter Calculations:

D. Perimeter: \_\_\_\_\_

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3. A. Polygon Letter: \_\_\_\_\_

B. Number of Sides: \_\_\_\_\_

C. Perimeter Calculations:

D. Perimeter: \_\_\_\_\_

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**Using Perimeter at Home Depot**

1. A mirror measures 5 feet long by 3 feet wide. Karen wants to put red garland around it. The garland costs \$1.70 per foot. If she buys this garland, how much will the job cost?
2. Mr. Hernandez needs to put up a fence around his garden to keep the rabbits away. This week, fencing is on sale for \$2.15 per foot. If his garden is a square with each side measuring 6 feet, how much will the fence cost?
3. Warren has a Japanese rock garden at his school. He wants to buy some stone trim for the edges. The garden is a triangle with sides that measure 3 feet, 4 feet, and 4 feet. The stone trim costs \$1.05 per foot. What's the cost to buy the material?
4. Orlando wants to put a fence around his backyard. The fence will be connected to his house and will extend back 15 yards on each side and then across 30 yards. If he wants to buy a type of fencing that costs \$12.30 per yard, how much will he pay?  
*(Hint: sketch the figure, including the house!)*