**Pedaling for Pennies**

*Adapted from North Carolina Department of Public Instruction*

**Student Objective:** “I can find the perimeter of a polygon given the side lengths.”

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| **Common Core Standards to Measure** | **Mathematical Practices Addressed** |
| **3.MD.8** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different | #2 Reason abstractly and quantitatively.#4 Model with mathematics.#6 Attend to precision. |

**Materials:**

Pattern blocks

 Opening problem sheet

 Pedaling for Pennies sheet

Calculators

Error Analysis sheet

Book: Murphy, Stuart J. (2002). Racing Around, New York: Harper Collins Publishers

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| G**Engage Students with the Goal** | State and RateObjective: “I can find the perimeter of a polygon given the side lengths.” Students rate themselves to the goal (1, 2, 3, 4). | Setting Objectives and Providing Feedback |
| A**Access Prior****Knowledge** | Introduce the book, Racing Around to students. Show them the front cover and ask, “Have any of you ever entered a race? If so, what did you do?”Racing-Around-9780064462440 | Nonlinguistic Representations |
| N**New Information** | The book Racing Around describes Mike’s attempt to ride in a 15 km bike race. Although his big brother and sister believe he is too small to finish such a long distance, Mike trains around familiar paths and enters the race anyway. Along the route, he encounters challenges, but does not give up.At the end, he surprises his brother and sister by finishing the race. As the book is read, the illustrations of each path should be displayed. If the book is not available, begin the lesson with the Opening Problem.Present the Opening Problem: *Gina is entering a bike race to raise money for the local animal shelter. She will collect one dollar for each km (1 penny for each 10 m) she rides. How much money will she collect if she completes the race by riding the route one time?*Allow students to turn and talk to a partner about the problem. After about 1 minute, choose a student to answer the question and explain the problem solving process.Questions for discussion:• How is this problem like the ones we solved in the previous lesson?We have to find the perimeter of a polygon to solve the problem.• How is this problem different from the ones we solved in the previous lesson?We only solved for “units” in the previous lesson. This problem includes kilometers.Today we will find the perimeter of polygons using standard unit side lengths.Connect to: <http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html>Students work on rectangles and triangles perimeter tasks for Levels 1 and 2. They can copy their work into their interactive notebooks as you work them together with the class. | Providing FeedbackCues, Questions, and Advance OrganizersHomework and PracticeNonlinguistic RepresentationsSummarizing and Note-Taking |
| A**Application** | *Students will work to determine the perimeters for the figures in problems 1-4 in the activity below. It may be necessary to remind students to remember the unit when writing the perimeter.*Distribute the “Pedaling for Pennies” sheets and calculators. Allow students to work individually or in pairs to solve problems 1-4. As students work ask them, “How are you finding the perimeter of this figure?”*As students share their problem solving strategies, they should explicitly state whether they added the numbers around the figure, added the numbers in pairs, or multiplied.*Have students pair with different partners to compare and check their answers. After about 5 minutes, review the answers: 1) 8 km, 2) 9,300 ft, 3) 8 mi, 4) 2,540 mAsk student volunteers to share their problem solving process for the problems.*The Level 3 problems on the perimeter and area website work through finding missing side lengths. It is necessary for students to work through the examples to prepare for solving problems 5-6 on the “Pedaling for Pennies” sheet.*Connect to <http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html>Work through the perimeter problems for Level 3. Allow students to work individually or in pairs to solve problems 5-6. Have students work the problems in their interactive notebooks.Discuss the activity by reviewing the answers: 5) 8,800 m, 6) 28 miChoose students to demonstrate the methods they used to find the missing side lengths. Elicit alternative solution strategies for each problem.To Elaborate on the lesson, you can **a**llow students to complete an “Error Analysis” sheet on the activity. The students should reflect on their performance and revisit any problems they missed. The “Error Analysis” sheet may be used, or the students may copy the chart onto the back of the Pedaling for Pennies sheet or notebook paper. The “Error Analysis” sheet should be collected. | Cooperative LearningProviding FeedbackHomework and PracticeNonlinguistic RepresentationsSummarizing and Note-Taking |
| G**Revisit the Goal** |  In their interactive notebooks, have students respond to these cloze statements:*I know to find area when the problem\_\_\_\_\_\_. One example of when to find area is \_\_\_\_\_\_.**I know to find perimeter when the problem \_\_\_\_. One example of when to find perimeter is \_\_\_.***Example:**I know to find area when the problem asks about covering something.One example of when to find area is carpeting a room\_\_\_\_\_\_\_.I know to find perimeter when the problem asks about going around something.One example of when to find perimeter is \_\_framing a picture\_\_State and RateObjective: “I can find the perimeter of a polygon given the side lengths.” Students rate themselves to the goal (1, 2, 3, 4). | Setting Objectives and Providing FeedbackSummarizing and Note-Taking |

**Evaluation:**

**Formative**- As students work, pose questions and observe them.

**Summative-** Students’ work can be collected and reviewed.

**Plans for Individual Differences:**

**Intervention**- Students may need to complete number 6 before number 5 and draw the grid lines inside the figure to find the missing side lengths. Scaffolding questions should guide the solution of number 5.

**Extension-** If Gina raises $1 for each km she rides during the week, how much money would she raise for Monday, Thursday, and Friday? If Gina raises $2 for each mile she rides during the week, how much money would she raise for Tuesday, Wednesday, and Saturday?





