**Perimeter, Area, and Volume Across the Grade Levels 3-5**

**Standards** – 3.MD.7 (area) 4.MD.3 (area and perimeter) 5.NF.4b (area with fractions) 5.MD.3 (volume)

**Students will be able to**: Distinguish between a perimeter, area, and volume real-world problem. Describe the parts of the word problem that show its perimeter, area, and volume. Solve the problems using reasoning with pictures and math when given the perimeter, area, and volume formulas.

**Misconceptions**: Students confuse perimeter and area, their representation and formulas. Students forget to add all sides of figure for perimeter when they are only given two measurements.

**Vocabulary**: Perimeter 1-dimensional cm, mm, ft l + l+ w + w or 2l + 2w

Area 2-dimensional cm^2, mm^2, ft^2 length x width

Volume 3-dimensional cm^3, mm^3, ft^3 length x width x height

Quadrilateral

**Getting Started/Walk-In Work**:

Figure on board – 4in x 6in rectangle

Determine the perimeter and area of the quadrilateral. (Third and Fourth graders may not be able to do this Walk-In Work because they may not have the prior knowledge.)

Alternate Option for 3rd and 4th grade: Have a rectangle with squares in the middle and ask the students to count the total squares inside and the number of squares on the outside going around the rectangle.

**Guided Lesson**:

Go over walk-in work and explain to students that there is one more measurement that they are going to learn, volume. Describe volume, space that fills a 3-dimensional figure.

**Cooperative Learning Activity**:

Activity 1: Provide groups of three different objects that represent perimeter, area, and volume. You can also provide words on 3x5 cards to add to the sorting activity. Groups will sort objects and words into groups, things that represent perimeter, things that represent area, things that represent volume. Groups will share their items with the class, identify which measurement they represent, and explain their reasoning.

Activity 2: Students are placed back in seats, out of groups. Teacher reads a real-world word problem that has been written on a large paper. Each student decides whether the word problem is dealing with perimeter, area, or volume. Each student is given a small post-it note, they will write a P, A, or V for the problem and stick it on the word problem. This process is done for each word problem. Next, students are placed back in groups and teacher provides each group with a word problem poster. The groups will separate the post-it notes and group them into two groups, the right answer and wrong answer. Groups will then present the word problem poster and explain to the class the measurement that correctly represents the word problem and why the measurement represents the problem. Some groups may discuss the misconceptions that some students may have had when they chose the measurement. If not, teacher may want to bring up those misconceptions and make clarifications.

**Formative Assessment**:

Give each student a print out of the same word problems used in the class activity and ask them to label each problem with a P, A, or V. This will show you which students were paying attention during the presentations.

Ask students to describe perimeter, area, and volume in their own words and/or with pictures. Teacher collects their writing.

**Follow-Up Lesson**:

Use the same real-world word problems to demonstrate how to draw simple pictures to help solve the word problems. Students will solve problems, with modeling, using the three formulas.

Students create and solve their own real-world word problem for each measurement using diagrams and mathematics.

Solve for a missing length when given the perimeter, area, or volume measurement.