Dog Yard Dilemma

Developed by: Jennifer Reiter, 2014 Iditarod Teacher on the Trail™

Discipline / Subject: Math

Topic: Area and Perimeter

Grade Level: Fourth, others with modification

Resources / References / Materials Teacher Needs:

Math Playground Activity: **Choose your favorite perimeter activity at mathplayground.com**

Lesson Summary:
Students will design dog runs and calculate their area and perimeter.

Standard's Addressed: (Local, State, or National):

CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Learning Objectives:	**Assessment:**
TLW calculate the area and perimeter of rectangles. TLW find the area of combined rectangles. TLW find the measurement of a missing side when given the area and perimeter.	The students can be assessed on their class assignment and homework sheets.

Procedural Activities:

Day One:

Note:

- *If your students have an understanding of calculating the area and perimeter of rectangles, you could skip to day two.*

1. As an introduction to calculating the area and perimeter of rectangles, I like to use a lesson from Math Playground.

   I use it on my Smartboard as a whole group activity, but the students could also work through it independently in a lab setting. This lesson is a perfect fit for the upcoming lessons because the kids in the lesson are building a pen for their dog!

2. After working through the problems on the lesson, I challenge the students to find the area and perimeter of several rectangles located in the classroom.

3. The included worksheet covers finding the area of combined rectangles and finding unknown measures.

Day Two:

1. Present the following scenario to the students:

   - ***You are a musher and kennel owner. You have been lucky enough to gain a fencing company as a sponsor. Instead of staking your dogs to their houses, you wish to build a run or pen for each dog so you can promote your sponsor's product.***

   - ***The company says they will provide you with 100 feet of fencing per dog.***

2. The students will experiment with various ways to use 100 feet of fencing to build a pen for one dog. For each pen they create, they will record a sketch of the pen and calculate the perimeter and area for each fence.

3. When students start to get stuck, remind them that they don't have to use all the fencing offered!

Day Three:

1. Ask the students to return to the chart they completed yesterday. What is the largest area of space they could provide a dog with using 100 feet of fencing? After discussing and comparing their discoveries with their classmates, have the students determine the largest area they are going to work with for today. This number will be important and they will be using it for the rest of the activity.

2. Present the students with the new challenge:

- ***You have 12 dogs in your kennel and each dog needs to be given the same area of space to run in.***
- ***What is the LEAST amount of fencing you could use to build pens for all twelve of your dogs?***

***Things to think about (you may or may not want to share these at this point).

- They can put pens next to each other and thus only need one run of fence for the sides of two pens.
- Someone always puts the pens together in such a way that there is no access to the interior pens! How will this dog get fed? How will he get out when he needs to? As long as the student can justify their reasoning, I usually accept the answer!

3. Introduce the idea of scale at this point for diagraming their kennel on the graph paper. Each square on the graph paper can be worth certain footage of fencing (2 feet or 5 feet per square depending on the size of your graph paper).

4. Provide lots of graph paper to experiment with.

5. The students must create a final sketch, to scale, on a clean sheet of graph paper. All the measurements must be labeled.

6. In addition, the students must explain with a number sentence and a description, the total amount of fencing they would need and how they arrived at their answer.

7. They are then challenged to create two additional puppy pens with the extra fencing and calculate the area of the combined rectangles.

8. There is an EXTRA bonus for early finishers where they can use their extra fencing to build items for their kennel.

Materials Students Need:
Day One: scrap paper, rulers, worksheets
Day Two: scrap graph paper, rulers, worksheets
Day Three: scrap graph paper, rulers, worksheets

Technology Utilized to Enhance Learning:
See Teacher Materials section

Other Information:

Modifications for Special Learners/ Enrichment Opportunities:

More advanced students may be able to experiment with shapes other than rectangles. Students could use and calculate the area and perimeter for parallelograms, triangles, etc.

Additional Information