**Estimating Ecosystem Value**

**Subject:**

Math: Geometry, Measurement, Problem Solving, Area.

**Grade Level:**

Target Grade: 8th

Upper Bound: 8th

Lower Bound: 6th

**Activity Introduction/Motivation:**

Explain to students that often in life you may not be able to get exact answers to problems and the ability to accurately estimate can be important. For example, a farmer may view aerial photos to estimate how many acres there are in a plot of farmland. The teacher may tie this activity to the “The Value of Native Ecosystems” powerpoint by introducing it in such a way: A recent increase in the demand for biofuels has resulted in an increase in the market value of biofuels crops (including switchgrass) A farmer has piece of land that is dominated by switchgrass (Panicum virgatum) and that would yield an average of 2.5 tons of switchgrass per acre. The farmer would like to determine the area of this piece of land in order to estimate the revenue that he could earn by harvesting & selling the switchgrass at the current market price of $49/ton. However, the area has some oddly shaped borders. How can he estimate the area as accurately as possible?

**Activity Plan:**

Prior to class print enough of the aerial photographs (provided at the end of this lesson plan) for each student to have at least two in case they try a method that involves cutting one of them up. Also provide the students with paper, graphing paper, scissors, string, rulers, and any other materials that they could possibly use to estimate the area. At the beginning of class introduce the problem as explained above and provide each student with one aerial photo. First, let the students attempt to devise their own methods for estimating the area. Encourage them to use any of the materials that you have provided and give guidance only if the students are well off track.

After they have had some time to try their own methods, hand out the worksheet outlining two popular methods for estimating complex areas and go through it with them. Hand out the “Estimating Farm Area” worksheet & more aerial photos if anyone needs them. Allow the students to try the two methods on their own and answer the questions (or they may work in groups of two so that when they are answering the questions in their worksheet they can share their own methods for estimating the area with each other and whether or not it was successful).

**Learning Objectives:**

8th grade Math TEKS:

8.7 (A)

8.14 (A)

8.14 (B)

8.14 (C)

8.14 (D)

7th grade Math TEKS:

7.8 (C)

7.9

7.13 (B)

7.15 (B)

**Prerequisites:**

The students must be comfortable finding the area of shapes such as triangles, rectangles, and parallelograms.

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