Lesson Plan #2: Kayaking around North Manitou Island: An Exercise in Rates and Physical Endurance!

Grade Level: 6th

Lesson Overview:
With sandy beaches, waterfowl and raptors aplenty, and sand cliffs, kayaking is a natural way to explore North Manitou Island. In this lesson, students have arrived on North Manitou Island (see lesson #1). They are embarking on a trip around the Island via kayak. To get them ready for the adventure, I’ll bring in my sea kayak loaded as if we’re traveling for several days (food, clothing, safety equipment, camping gear). Students will have the opportunity to see what’s involved in the planning process. My husband and I have circumnavigated the island this way, so I’ll also share my photos of the trip.

Students are to calculate distance around the island, determine the speed they will travel (they can use the internet to figure out about how fast they can expect to travel in knots), and finally determine the amount of time it will take to complete their journey. They ought to consider time of year, prevailing winds, camping regulations, and weather for August when charting their circumnavigation (which way will they travel?).

Students will work with a partner to create a PowerPoint slideshow incorporating the answers to the focus questions. This PowerPoint will demonstrate their preparedness for the trip.

Sources Consulted:


Nps.gov website on Sleeping Bear Dunes National Lakeshore/ North Manitou Island

Topo map of North Manitou Island
Materials needed: (in an ideal world .....)
Lake Michigan Charts for Leland/North Manitou (one for every three students)
Square Leg Divider (for measuring distance on charts) (1 for every 3 students)
Calculator (each student)
Laptops (each student)
Brochures of North Manitou Island from the NPS (each student)
Topo map of North Manitou Island (one for teacher display/demo)
Sea kayak with gear loaded

New Vocabulary:
Rate: A rate is a ratio that compares two quantities with different kinds of units.
Unit rate: A unit rate occurs when a rate is simplified so that it has a denominator of 1 unit.

Focus Questions:
1. What formula is used to solve problems involving rate? (distance = rate x time)
2. What is the distance around the island (approximation will be fine)?
3. How do you determine speed? (review resource book on kayaks for avg rate of travel)
4. What is your planned speed?
5. Based on your speed and paddling an average of four hours per day, how many days do you expect to take in order to circumnavigate the island?

Learning Objectives:
1. Students will learn how to read a nautical chart.
2. Students will learn how to utilize a square leg divider.
3. Students will calculate the distance around North Manitou Island.
4. Students will determine how fast they can expect to travel in a kayak.
5. Students will calculate how long it takes to kayak around North Manitou Island.
6. Students will create a PowerPoint slideshow that shows their work of the above learning objectives.

Michigan Sixth Grade GLCE’s:
A.PA.06.01 Solve applied problems involving rates including speed, e.g., if a car is going 50 mph, how far will it go in 3.5 hours?

N.FL.06.10 Add, subtract, multiply and divide positive rational numbers fluently.

N.FL.06.14 For applied situations, estimate the answers to calculations involving operations with rational numbers.

A.FO.06.06 Represent information given in words using algebraic expressions and equations.
**Classroom Activity:**

1. Show students the kayak loaded for a trip around North Manitou Island. Show all the gear necessary for a safe trip. This will surely get them in the mood for the adventure! Some may have already been to the island for hiking; they can share their stories.
2. This video shows a kayak trip around South Manitou Island (similar to N. Manitou Island topography)
   [http://www.youtube.com/watch?v=Vp7z8Ta-vkA&feature=related](http://www.youtube.com/watch?v=Vp7z8Ta-vkA&feature=related)
3. Students work in groups of three.
4. Students calculate distance around North Manitou Island (using the chart).
5. Students consult the Sea Kayaking book listed in resources to figure out average speed when paddling a kayak.
6. Students calculate the total time to travel around the island. Assume students will paddle an average of 4 hours/day. How many days will it take to circumnavigate the island?
7. Groups share their work and how they solved the problems. They must show their work to the teacher and then go to step eight.
8. Students create a PowerPoint that shows their work on above calculations. The slideshow should have at least eight slides: intro, distance, avg speed, time of travel, days of travel, wrap up, reflection, sources.

**Assessment:**

1. Student grades are based on completion of the problems assigned (see focus questions above/classroom activity). They are expected to show the steps of problem solving.
2. Student grades are also based on completion of a PowerPoint slideshow.