

Name: Mary Markham  
School phone: 906-523-4491  
Subject: Algebra

School: Chassell High School  
Email: mmarkham@ccisd.k12.mi.us  
Target Grade: 7<sup>th</sup>

## **OVERVIEW**

I have designed an activity that takes the journey of the Grand Island Chippewa Indians to the Battle of the Cavern and the return trip of Little Duck and turns it into a group math project for 8<sup>th</sup> and 9<sup>th</sup> grade Algebra students. They must read the third and fourth chapters of the book, “A Face in the Rock” and then find the path that they took on a laminated map of Lake Superior. From there, they need to determine how many miles the tribe must have traveled to get to the battle, and then how far Little Duck traveled on the return trip. The students must be able to read a map and be able to measure distances that are not in a straight line. They also need to use the map legend to find the distance. The students need to give a reasonable estimate of how long it took Little Duck to return to Grand Island. This will involve problem solving skills and scientific reasoning using the distance formula; distance = rate x time. In conclusion, the students must be able to transfer what they read to places on a map, take measurements, and use formulas in a real life situation to solve a problem. So many times, it is hard to relate algebra and math in general to a real life situation without doing story problems. I always try to give students real life applications in any class that I teach and it is not always easy in math classes. This unit gives the students some local history, an opportunity to read a map and use mathematics to solve a problem.

## **DAILY ACTIVITIES**

Day 1 – Introduction to the background of the Grand Island Chippewa and the book, “A Face in the Rock”. Read the third and fourth chapters of the book, “A Face in the Rock”, entitled “From Peace to War” and “The Battle of the Cavern”.

Day 2 – Working in groups of two or three, students will trace the path of the Grand Island Chippewa from Grand Island to the site of the Battle of the Cavern. They will have to devise a method to determine the number of miles traveled.

Day 3 – The same group of students will then need to determine the number of miles that Little Duck traveled on the return trip and a reasonable amount of time this should have taken. (This will take some brainstorming and science research using the equation distance = rate \* time.)

Day 4 – Presentations – Each group must tell the rest of the class the answers to the questions:

How many miles did the Grand Island Chippewa travel to the Battle of the Cavern?

How many miles did Little Duck travel on his return trip to Grand Island?

How long should it have taken Little Duck to return to Grand Island?

Each group will give their rationale for the answers that they came up with, hopefully eliciting questions and discussion from the rest of the class.

## **MICHIGAN CONTENT STANDARDS ADDRESSED**

There are many curriculum standards that this unit addresses and with the use of the new software program, MI Climb, it is easy to list them all.

### **MATHEMATICS**

#### Mathematics/Strand II/Content Standard 3/Measurement

Students compare attributes of two objects, or of one with a standard (unit), and analyze situations to determine what measurement(s) should be made and to what level of precision.

#### Mathematics/Strand II/Content Standard 3/High School/Benchmark 1

Select and use appropriate tools; make accurate measurements using both metric and common units, and measure angles in degrees and radians.

#### Mathematics/Strand II/Content Standard 3/High School/Benchmark 2

Continue to make and apply measurements of length, mass, weight, time, temperature, area, volume, angle; classify objects according to their dimensions.

#### Mathematics/Strand II/Content Standard 3/High School/Benchmark 3

Estimate measures with a specified degree of accuracy and evaluate measurements for accuracy, precision and tolerance.

#### Mathematics/Strand II/Content Standard 3/High School/Benchmark 4

Interpret measurements and explain how changes in one measure may affect other measures.

#### Mathematics/Strand II/Content Standard 3/High School/Benchmark 5

Use proportional reasoning and indirect measurements, including applications of trigonometric ratios to measure inaccessible distances and to determine derived measures such as density.

#### Mathematics/Strand II/Content Standard 3/High School/Benchmark 6

Apply measurement to describe the real world and to solve problems.

#### Mathematics/Strand III/Data Analysis and Statistics

Able to process and transform data into useful knowledge. Interpret data and make predictions and decisions based on data.

#### Mathematics/Strand III/Content Standard 1/High School/Benchmark 1

Collect and explore data through observation, measurement, surveys, sampling techniques and simulations.

Mathematics/Strand III/Content Standard 1/High School/Benchmark 3

Present data using the most appropriate representation and give a rationale for their choice; show how certain representations may skew the data or bias the presentation.

Mathematics/Strand III/Content Standard 1/High School/Benchmark 4

Identify what data are needed to answer a particular question or solve a given problem and design and implement strategies to obtain, organize and present those data.

Mathematics/Strand III/Content Standard 3/Inference and Prediction

Draw defensible inferences about unknown outcomes, make predictions, and identify the degree of confidence they have in their predictions.

Mathematics/Strand III/Content Standard 3/High School/Benchmark 3

Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.

Mathematics/Strand III/Content Standard 3/High School/Benchmark 4

Make predictions and decisions based on data, including interpolations and extrapolations.

Mathematics/Strand III/Content Standard 3/High School/Benchmark 5

Employ investigations, mathematical models, and simulations to make inferences and predictions to answer questions and solve problems.

## SOCIAL STUDIES

Social Studies/Strand V/ Inquiry /Content Standard 2      Conducting Investigations

All students will conduct investigations by formulating a clear statement of question, gathering and organizing information from a variety of sources, analyzing and interpreting information, formulating and testing hypotheses, reporting results both orally and in writing, and making use of appropriate technology.

## SCIENCE

Science/Strand I Construct New Scientific and Personal Knowledge/Content Standard 1

All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate findings of investigations using appropriate technology. (Constructing)

Science/Strand IV Physical Sciences/Content Standard 3

All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions. (Motion of Objects)

## ASSESSMENT

The handout that I gave to the students is as follows and includes the assessment rubric:

### ALGEBRA - A Face in the Rock Activity

Read the third and fourth chapters of the book, "A Face in the Rock", entitled "From Peace to War" and "The Battle of the Cavern".

Working in groups of two or three, trace the path of the Grand Island Chippewa from Grand Island to the site of the Battle of the Cavern. Devise a method to determine the number of miles traveled.

Determine the number of miles that Little Duck traveled on the return trip and determine a reasonable amount of time this should have taken.

Presentations – Each group must tell the rest of the class the answers to the questions:

- 1 - How many miles did the Grand Island Chippewa travel to the Battle of the Cavern?
- 2 - How many miles did Little Duck travel on his return trip to Grand Island?
- 3 - How long should it have taken Little Duck to return to Grand Island?

Each group will give their rationale for the answers that they came up with.

You will be graded according to the following rubric out of 40 points:

Participation in class	Actively involved (10)	1 reminder to keep busy (8)	2 reminders to keep busy (6)	More than 2 reminders (4)	TOTAL
Question # 1	Reasonable answer with rationale (6)	Reasonable answer, weak rationale (5)	Reasonable answer, no rationale (4)	Not a reasonable answer (3)	
Question # 2	Reasonable answer with rationale (6)	Reasonable answer, weak rationale (5)	Reasonable answer, no rationale (4)	Not a reasonable answer (3)	
Question # 3	Reasonable answer with rationale (6)	Reasonable answer, weak rationale (5)	Reasonable answer, no rationale (4)	Not a reasonable answer (3)	
Presentation skills	Clear, good eye contact, all members presenting (5)	Not all members presenting or lacking skill (4)	Lacking in presentations skills, not all presenting (3)	Hard to understand, goofing around (2)	
Questions and Answers	Asks for questions and gives good answers (7)	Asks for questions, cannot give good answers (6)	Asks for questions, cannot give rationale (5)	Doesn't ask for questions (3)	

## REFERENCES

Graham, Loren, *A Face in the Rock*. University of California Press. 1995.

*Lake Superior, The Official Map of the Lake Superior Circle Tour*. Lake Superior Magazine. 325 Lake Ave. S. Duluth, Minnesota 55802. Lake Superior Port Cities Inc. 2001.