



Title: Using Your Head Pays Off!

Grade Level: 5-8

Time Allotment: Two class periods of 50 minutes each

Overview: Through an interactive lesson involving video, internet, and mental activities students will learn the value of mental math and an education in general.

Subject Matter: Math

Learning Objectives:

Students will be able to:

Do mental math in their heads

Understand what it took to graduate from eighth grade in the late 1800's or early 1900's

National Standards:

Math: All students should develop an understanding of numbers, ways of representing numbers, relationships among numbers, and number systems

Media Components:

Video: **Follow Your Dreams: The Bessie Coleman Story**

Website: **Eight Grade Final Exam: Salina, KS – 1895**

<http://skyways.lib.ks.us/kansas/genweb/ottawa/exam.html>

Materials:

Standard classroom supplies

Prep for Teachers:

Step 1: Bookmark the web site used in this lesson.

Step 2: Cue the videotape used in this lesson.

Step 3: When using media, provide students with a **Focus for Media Interaction**, a specific task to complete and/or information during or after viewing of video segments, websites or other multimedia elements.

Introductory Activity: Bessie Coleman found that math and science was of great importance in her life.

Step 1: **CUE and START** the video **Follow Your Dreams** where Bessie is standing in front of the ironing board discussing her days working in the cotton fields. This clip



goes from 8:25 to 9:50 on the timer. As a *Focus for Media Interaction* have students be able to explain how math was of importance to Bessie.

Step 2: **STOP** the video at 9:50 on the timer.

Step 3: Discuss that Bessie used mental math in the cotton fields to calculate how much money each family would get for their cotton when they sold it. This saved her from the backbreaking labor of picking the cotton. She was valued for her math skills.

Step 4: **START** the video where you stopped it and continue until the timer says 10:10. As a *Focus for Media Interaction* have students give an example of two subjects that are important to learn in order to make an airplane fly.

Step 5: The answer is that math and science are necessary to make an airplane fly.

Learning Activity: Doing mental math takes some practice and also thinking out of the box. In some instances you need to calculate from left to right, just opposite of what you are used to. Here are some mental math exercises to do with students.

Step 1: You want to multiply 27 by 8. Starting from the left, you would multiply 20 by 8 to get 160. Then, 7 times 8 equals 56, which is added to 160 to give 216.

Try multiplying 378 by 7. Multiply 300 by 7 to get 2,100. In the next step, 70 times 7 equals 490, which is added to 2,100 to give 2,590. Finally, 8 times 7 equals 56, which is added to 2,590 to give the answer 2,646.

By using the left-to-right method you start saying your answer while you are still figuring out the answer and this certainly impresses people.

Step 2: Squaring a number means multiplying it by itself. Let's try 37. Pick a round number that's close to 37, such as 40. The number 40 is 3 more than 37. Calculate the number that is 3 less than 37, which is 34. Use left-to-right multiplication to calculate 34 times 40, which is 1,360. Then add the difference (3) multiplied by itself (9) to get the final answer: 1,369.

It is important to choose the difference so that the multiplication is easy. For example, to square 59, choose a difference of 1. Go up to 60 and down to 58. Multiply 60 times 58 to get 3,480. Multiply 1 by itself to get 1, and add that to 3,480 to get the answer 3,481.

Culminating Activity: Bessie Coleman only went through the eighth grade before going on to attend the Agricultural & Normal School in Langston, Oklahoma. By today's standards this does not sound like enough education to go on to higher education. But let's find out what it was like!



Step 1: Take students to the computer lab and go to the website **Eight Grade Final Exam: Salina, KS – 1895** <http://skyways.lib.ks.us/kansas/genweb/ottawa/exam.html> As a *Focus for Media Interaction* ask students to write down as many answers to the test as they can. They will find the test as a whole quite difficult. This will let them understand that an eighth grade education at that time was very extensive and valued as much as a twelfth grade education now.

Cross Curricular Extensions:

Reading: Learn the Aviation Alphabet that pilots use when communicating with each other on the radio. It is as follows:

A = Alpha
B = Bravo
C = Charlie
D = Delta
E = Echo
F = Foxtrot
G = Golf
H = Hotel
I = India
J = Juliet
K = Kilo
L = Lima
M = Mike
N = November
O = Oscar
P = Papa
Q = Quebec
R = Romeo
S = Sierra
T = Tango
U = Uniform
V = Victor
W = Whiskey
X = X-Ray
Y = Yankee
Z = Zulu

Spelling: Have a spelling bee using the aviation alphabet.

Community Connections: Visit a local general aviation airport (small planes) and interview pilots and ask them to show how to plan an airplane trip. If this is not possible ask a pilot to come to the classroom. The number of passengers, weight of baggage, distance to travel, air temperature, wind speeds, and many other things must be taken into consideration. It is a very complicated process and requires a great deal of math.