



New Mexico and the World

Curriculum Resources for New Mexico Teachers



Cowboy Math in the Pantanal

I want my students to use unit multipliers to convert one unit to another. I want the students to work with metric/English units, foreign exchange currencies, and ratios of various units. I want students to read information in context and understand the process of writing an equivalent mathematical equation or phrase from the given information.

PREREQUISITES: Multiplying ratios with units and canceling out appropriate units.

Submitted by: Ed Kerr

Grade Level: 9-12

Area: Mathematics; Science

Strand(s): Algebra, Functions and Graphs; Content of Science

NM Benchmark(s): MATH STANDARDS 9-12
Strand: ALGEBRA, FUNCTIONS, AND GRAPHS
Standard: Students will understand algebraic concepts and applications.
Benchmark: Represent and analyze mathematical situations and structures using algebraic symbols.
Benchmark: Use mathematical models to represent and understand quantitative relationships.

SCIENCE STANDARDS 9-12

Strand II: The Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark I: Understand how the survival of species depends on biodiversity and on complex interactions, including the cycling of matter and the flow of energy.

Length: 1-2 Days

of Students:

Learning Objectives: Determine units of ratio given information in context with carrying capacity as defined in the lesson.

Be able to convert Brazilian currency (reals) to dollars and vice versa.

Be able to use unit multipliers to convert ratios of one unit to new ratios in different units.

Use information he/she assimilates to compare/contrast the Brazil cattle industry with that of the United States.

Introduction:

Materials: Paper and pencil. Calculators optional.

Procedures: Review fractions, canceling, using unit conversion exercises they have seen previously. A common example is using miles and gallons to find miles/gallon. Teacher or students read the introduction to the unit on the Pantanal to become familiar with the context of the Pantanal in Brazil. Discuss with students the process of using unit multipliers to change units from English to Metric and back. Have students work in small groups on the problems, monitor the class and help as needed to reinforce the instruction of using unit multipliers to convert one unit to another. Discuss some of the results together to summarize the learning experience.

Background Info:

References-Resources: http://wcs.org/sw-around_the_globe/latinamerica/brazilhub/brazil_pantanal
The Pantanal of Brazil, Bolivia and Paraguay, Hudson MacArthur Publishers, copyright 2000 by Waterland Research Institute.) Interviews with fazenda owners/managers: June 2004 by Ed Kerr

Student Activities: In visiting the Pantanal area of Brazil we experienced several fazendas (ranches) and saw hundreds of cattle grazing in the pastures.

As a manager, you must know your land and carrying capacity (the number of cow units per land unit or it can be expressed in land unit per cow). In the following problems find the carrying capacity of each ranch in hectares per cow. Hint: To find carrying capacity divide number of hectares by number of cows.

1. In the southern Pantanal, the fazenda at Rio Bonito runs 6500 cows on 8400 hectares, calculate the carrying capacity of this fazenda. Report your answer in hectares/cow (hectares per cow).
2. In the central Pantanal at the fazenda Pausada Baia Bonita the manager informs us that they have 800 cows at present and the ranch contains 1,560 hectares. Find the carrying capacity.
3. In the north Pantanal at the fazenda Carunda there is 8,000 hectares and the owner is running 1,000 cows. What is the carrying capacity of this fazenda?

4. While visiting EMBRAPA, the government institute that works with landowners and cattlemen, we were told the average carrying capacity for the Pantanal was 3-4 hectares per cow. How do the three fazendas in problems 1-3 compare with the average for the area?
5. In the desert southwest of the United States, the average carrying capacity is 10 cows per section. Use the following information to change to acres per cow. (1 section = 640 acres)
6. Change 3 hectares/cow to acres/cow by using the following example. 1 hectare=2.5 acres, therefore: 3 hectares/cow x 2.5 acres/1 hectare = 7.5 acres/cow. Now change 4 hectares/cow to acres/cow.
7. Compare the carrying capacity of the fazenda Carunda to a ranch in Southwest New Mexico (Use the 10 cows per section for a ranch in Southwest NM). Express in the same units: i.e. hectares/cow or acres/cow.
8. Brazilian money is in Reals (he-eyes), the exchange rate is \$1 = \$R3 (one dollar equals 3 reals). Convert \$R200 (200 reals) to US dollars, then convert \$15 to reals.
9. The market for cattle in Brazil at present (2004) is \$R275 per head. Find the income in reals for the fazenda Pausada Baia Bonita if they sell 600 yearlings (market sized cattle one year old) for \$R275/head. Then change that answer to \$US.
10. A pantaneiro receives a monthly wage of \$R250 plus housing, food, and transportation. Change his wages paid in cash from reals to \$US.

Assessment:

Use a subjective evaluation as class is working on the problems given to assess students that need more reinforcement and/or to measure competency of individuals and the group. Use completed work to assess competency and understanding of individuals in converting units.

ANSWERS: 1.) 1.3 hectares/cow 2.) 2 hectares/cow 3.) 8 hectares/cow 4.) Carunda has less carrying capacity as the average; Rio Bonito and Pausada Baia Bonito have more than the average. 5.) 64 acres/cow 6.) 10 acres/cow 7.) Carunda = 20 acres/cow; Desert SW = 64 acres/cow 8.) \$R 166.67; \$45 9.) \$R 165,000; \$ 55,000 10.) \$83.33

**Technology
Integration:**

Accommodations:

EXTENDED ACTIVITIES: Use extended activities to involve students in learning more about a different country and one of its major industries. Have students share research results with the class at a later date. Have a class

discussion using the compare/contrast ideas on the activities suggested.

Review Questions:

Related Careers:

Ranch owner: Degree in agriculture recommended

Pantaneiro: on the job training; previous experience preferred
Tour/guest guide: rich experience and knowledge in wildlife, geology, hydrology, and history of the area highly recommended. Self-taught or College experience preferred.

Embrapa employee: College degree in appropriate field, i.e. wildlife, soil science, animal science, etc.

Career Education:

Hints and Tips:

Lesson Evaluation: