

## **Everyone Needs Shelter An Estimation Activity**

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### **OVERVIEW**

Students will use math skills to estimate the number of hides necessary to construct tipis, and the number of tipis needed to accommodate the average band of Colorado Indians.

### **STANDARDS**

- Reading and Writing Standard 4: Students apply thinking skills to their reading, writing, speaking, listening, and viewing.
- Reading and Writing Standard 5: Students read to locate, select and make use of relevant information from a variety of media, references, and technology sources.
- History Standard 2: Students know how to use the processes and resources of historical inquiry.
- Math Standard 1: Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
- Math Standard 5: Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.
- Math Standard 6: Students like concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

### **OBJECTIVES**

Students will be able to:

- Use existing numerical information to estimate missing data.
- Use primary source materials to help determine and explain the impact of the horse on the Colorado Indian with regard to shelter.

- Make use of historical information on the use of tipis and wickiups to make decisions.

### **INQUIRY QUESTIONS** (Discuss after student has collected data)

- Why would tipis constructed in pre-horse days be smaller than those constructed after the Colorado Indians had use of horses?
- Why would more elk hides have been needed to construct a tipi than buffalo hides?
- Why did the Arapahoe and Cheyenne use more buffalo hides to construct their tipis and the Utes use more elk hides?

### **MATERIALS**

- Doing History/Keeping the Past CD-ROM disk or website.
- Colorado Indian/Food, Clothing, and Shelter/Shelter/All pictures.
- Colorado Indian/Families, Children, and Infants/families /#3.
- Colorado Indian/Community Live/Village Life/#3,4.
- Other resources selected by the teacher.
- Graph Paper (1/2 in. or 1 cm squares)

### **PROCEDURE**

1. After making sure the student is familiar with the website or CD, have the student fill in the Data Collection Sheet using the Doing History/Keeping the Past site, the excerpt from *Indians of the Great Plains*, and other resources.
2. After collection as much information as possible, have students estimate answers to fill the remaining blank cells.
3. As a class, compare and discuss estimates. (In the discussion introduce/review the concept of ratios and help students use it informally to estimate answers.)
4. Discuss inquiry questions.
5. While viewing Picture #2 (Shelter), discuss and estimate the number of people in the village. What is the smallest number you would expect might be living there? What is the largest number? (Use data collected to make the estimates.)
6. Using masking tipi, outline the circumference of a tipi with a diameter of 10 feet on the floor of your classroom. Discuss how many people might live in a tipi of that size and how they might share the space. (Use picture #3

in Colorado Indians/Families, Children, and Infants/Infants)

7. Divide students into groups of 3-4 students. Based on information collected, have students make a floor plan of a tipi to scale. (Students may select any size tipi suggested by the data collected.)
8. Have students estimate the area of their tipi by counting squares. How much space would each person in the tipi have?

## EXTENSION

- Discuss the prefix tri. What other words use the prefix? Since the text states the Utes used four poles, what might the Utes have called their structure? (Words using other prefixes that denote number can be introduced/discussed at this time.)
- Compare the square footage of our homes vs. the square footage of a tipi. Why are our homes so much larger than those of the Colorado Indians? What factors cause the numbers to be so different? Are there people in the United States who live in smaller spaces that we do? What are some reasons that they might live there? Discuss.
- Have students make a scale drawing of their bedroom. Then have them compare their space with that of an individual in a tipi.
- Have each group construct a tipi to the scale of their tipi floor plan. Combine the individual tipis into a village using information gathered on the environment in which the Colorado Indians lived. Estimate the number of people who might live in the village. Have students research the plants and animals that live in the environment of the Colorado Indians.

## ASSESSMENT

- Observe the student's use of primary source documents and the other resource materials to answer inquiry questions.
- Observe student product and student ability to estimate missing data, find area of scale model, and draw conclusions.

### Additional Information

"In pre-horse days, the tipi was usually made of six or eight bison hides and measured no more than ten feet (3m) in diameter. After the introduction of the horse, the average tipi was made of about fourteen hides and measured about fifteen feet (4 1/2m) in diameter."

From *Indians of the Great Plains: Traditions, History, Legends, and Life* by Lisa Sita. (Gareth Stevens Publishing, Milwaukee, 2000, p.51.)