Camping

One week from today we will be at Button Bay State Park in Vergennes, Vermont! Before we go, we need to decide on lean-to arrangements. Attached to this page you will find a map of Button Bay State Park and class lists for all 3 classes going on the trip. There will also be a total of 20 adults on the trip.

Your job is to figure out what the sleeping arrangements should be (in general, no names please). We have reserved all the lean-tos and each one can have a maximum of 8 people in it. Prove what you think would be the best arrangement. How many people should be in each lean-to?

Is there more than one way to solve this? What things do you need to think about before you start solving the problem? How did you solve this? Make sure you explain your results using as much math language as possible and include some form of representation as well.

Good luck, and remember... show all your work!

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Suggested Grade Span

3-5

Task

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Alternate Versions of Task

More Accessible Version:

One week from today we will be at Button Bay State Park in Vergennes, Vermont. Before we go, we need to decide on lean-to arrangements. There will be 68 students and a total of 20 adults on the trip. Lean-tos can have a maximum of 8 people in them. If this is the case, how many lean-tos do we need to reserve?

More Challenging Version:

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For breakfast, each person will be given a fried egg, 2 strips of bacon and 2 pieces of toast. If there are a total of 68 people going on the trip, how many dozens of eggs, loaves of bread and pounds of bacon do we need to bring?

Note: There are approximately 16 slices of bread in a loaf and 20 slices of bacon in pound.

Good luck, and remember... show all your work!

Context

This problem is relevant to the students' lives. The students on the "I" Team (the Intermediate team) went on this camping trip as a team building experience. The numbers, maps and class lists used were real. This problem was very challenging for some students. Some students used calculators without proper knowledge of how to use them or what the answers meant. The fact that this problem was real and meaningful, helped the students to understand that there was at least one solution that they needed to find! Most students understood that there were many possible answers. This task was done in the middle of September with third and fourth graders.

What This Task Accomplishes

We often tell children that there are many answers to a problem. We try to encourage children to make assumptions and decisions before they begin to solve a problem. This task encourages children to think about combining children from different classes, the number of boys and girls in each class, and the number of chaperones. There were a lot of opportunities for children to make decisions. It made sense to the kids because it was real to them.

This problem supplied children with the data they needed in order to find a solution, but they needed to use the class lists and map of the state park to proceed.

Note: Although technology is very important for students to utilize, I find that young children often think calculators are magic. I enjoyed watching children abandon the use of a calculator because, "the answer did not make sense."

What the Student Will Do

Most students will draw the number of people going on the trip and divide them into groups of eight for the lean-tos. Many students will leave the remainder (five people) for the last lean-to instead of making the numbers in each lean-to more equitable. Many students may not deal with the fact that some of the 68 people needing to sleep in the lean-tos are adults, some are boys and some are girls.

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Time Required for Task

Two or three, 45-minute periods

Interdisciplinary Links

This was a part of a team/community building unit we did in social studies. The children also planned the menus and activities. Field trips and other concrete experiences make great topics for problem solving.

Teaching Tips

Encourage children to draw diagrams and use manipulatives. A discussion on organizing data and labeling may be helpful.

Suggested Materials

- Graph paper
- Manipulatives (to represent people and lean-tos)
- Scissors
- Glue sticks
- Markers
- Straight edges
- Button Bay State Park Map (see page 6)

Possible Solutions

Answers will vary. There are 48 students and 20 adults going on the trip. There are 26 boys and 22 girls. The students are in three classrooms; some students took the community building aspect of this unit and used it to make sure that the lean-tos had a mix of classes in them. Hopefully children will take the number of boys and girls into consideration and keep them in separate lean-tos (this had been discussed with the kids when discussing the trip). Children should make some distinction about the number of adults and the number of children in each lean-to.

More Accessible Version Solution:

68 + 20 = 88 ÷ 8 = 11 lean-tos

More Challenging Version Solution:

68 ÷ 12 = 6 dozen of eggs needed, with 4 eggs left over

68 x 2 = 136 slices of bread needed ÷ 16 = 8.5 so 9 loaves are needed with a half a loaf left over

68 x 2 = 136 strips of bacon. 136 ÷ 20 = 7 pounds of bacon with 4 slices left over

Camping

Task Specific Assessment Notes

Novice
No solution. There is no explanation and numbers used are not correct. There is no math representation and very little math language/notation.

Apprentice
The student did not complete the problem. There is evidence of mathematical reasoning as s/he distinguishes between the numbers of boys, girls and adults. S/he makes several attempts to carry out the procedures necessary to divide the people into lean-to groups, but does not succeed.

Practitioner
The student's response shows that s/he has a broad understanding of the problem and the major concepts. His/her reasoning is effective and s/he proceeds appropriately. His/her work is efficient and clear. However, this student does not address the number of boys and girls, the number of chaperones or the idea that this is a team building trip incorporating three classes. S/he also has no representation present.

Expert
This student shows a deep understanding of the problem. S/he takes into account the number of girls and boys from each classroom and the number of chaperones. S/he made the number of students in each lean-to as equitable as possible. This student explains how s/he got his/her answers and uses appropriate representation with a key.

Class #1	Class #2	Class #3
Bill	Ella	Karen
Sally	Christie	Debbie
Marcia	Tim	Colleen
Ernie	Jon	Josh
Matt	Greg	Wil
Jeff	Jackie	Katherine
Katelin	Anna	Gus
Sophia	Liza	Rusty
Alexander	Sam	Charlie
Carol	Lucas	Mason
Claire	Mark	Michael
Martin	Beth	Tyler
Todd	David	Isabelle
James	Dan	Lisa
Molly	Laurie	Kelly
	Peter	Max
		Susan

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THESE ARE LEAN-TOS.

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