

Canoe Trip

How many trips will it take to cross the river with a large Native American family? Only 3 can fit at one time in the canoe with their food and supplies.

Exemplars

Canoe Trip

Suggested Grade Span

Pre-K-2

Task

How many trips will it take to cross the river with a large Native American family? Only 3 can fit at one time in the canoe with their food and supplies.

Alternate Versions of Task

More Accessible Version:

How many trips will it take a Native American family of 8 to cross a river using 1 canoe? Only 3 people and their supplies can fit in the canoe at one time.

More Challenging Version:

Only 3 people and their supplies can fit in the canoe at one time. How many trips will it take a Native American family of 8 to cross a river using 1 canoe? How many trips will it take a Native American family of 9 to cross a river using 1 canoe? How many trips will it take a Native American family of 10 to cross a river using 1 canoe? How many trips will it take a Native American family of 11 to cross a river using 1 canoe? How many trips will it take a Native American family of 12 to cross a river using 1 canoe?

Write a rule for determining the total number of trips it would take for any number of people.

Context

We have been studying different Native American cultures in our interdisciplinary theme for six weeks. We have talked a lot about the importance of the extended family, food gathering and transportation needs of each group. We concluded our Native American Studies focusing on the Northeastern Woodlands tribes. The children also investigated the importance of the rivers and lakes in the Champlain Valley Basin. This was a difficult task for my first graders, but I was very pleased and excited with the effort and strategies shown in their drawings along with their awareness of our Native American theme. Allow each student to determine the number of people in the family.

What This Task Accomplishes

This task has the children working with the concept of large family groupings, patterns in

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crossing the river, combinations of people and tallying skills.

What the Student Will Do

In solving this problem the students were encouraged to use manipulative materials to represent all the members of their Native American family, the canoe and trips the family needed to take. Some children chose to start right in on their drawing. Some children used Unifix cubes for the family members and the trips while others used numbers or tally marks to record the trips.

There was a discussion about whether the children would keep track of the trips over and back or consider it one trip. We also talked about how many would paddle the canoe back each time. It was up to each child to decide how they wanted to use this information.

The students were encouraged to use their own writing skills at their own ability level and I moved around the room asking the students to explain how they came to their solution.

Time Required for Task

90 minutes

We worked on this problem on two consecutive days for 45 minutes each time.

Interdisciplinary Links

This problem was integrated into our social studies theme on Native Americans in the fall. Along with this we constructed different types of boats from Popsicle® sticks, clay, foil and paper in science discovery stations. We used mathematical skills to predict and count plastic rabbits and bears to determine how many our different boats would hold before sinking.

Teaching Tips

We discussed many times during our theme about the Native American family structure and the value of the canoe in construction and traveling. The class did some role playing with part of the class being the extended family, river and a pretend canoe, moving certain numbers of the family back and forth across the room to their longhouse. The students were asked to first decide how many were going to be in the large family. We then discussed how to represent their family with objects in the classroom, draw their canoe and find a strategy to count the trips made across the river.

Suggested Materials

- Manipulatives
- Drawing materials
- Popsicle® sticks

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Possible Solutions

This problem was very open-ended because each child chose a different number of family members. The trips were different depending on whether the child counted a round trip as one or each crossing as two.

More Accessible Version Solution:

Round Trip 1:

Three across, one back to drive the canoe for a total of two on the other side.

Round Trip 2:

Three across, one back to drive the canoe for a total of four on the other side.

Round Trip 3:

Three across, one back to drive the canoe for a total of six on the other side.

Trip four is a one-way trip bringing the last two people across.

More Challenging Version Solution:

Round Trip 1:

Three across, one back to drive the canoe for a total of two on the other side.

Round Trip 2:

Three across, one back to drive the canoe for a total of four on the other side.

Round Trip 3:

Three across, one back to drive the canoe for a total of six on the other side.

Round Trip 4:

Three across, one back to drive the canoe for a total of eight on the other side.

Round Trip 5:

Three across, one back to drive the canoe for a total of 10 on the other side.

Round Trip 6:

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Three across, one back to drive the canoe for a total of 12 on the other side.

Round Trip 7:

Three across, one back to drive the canoe for a total of 14 on the other side.

# of Trips	# of People
1	2
2	4
3	6
4	8
5	10
6	12
7	14

The rule is the number of people \div 2. If the number of people is an odd number, then round down. If there is only 1 person, then only 1 trip is required.

Task Specific Assessment Notes

Novice

This student does not have an appropriate solution. There is no apparent strategy that the student used. The student kept changing the number of family members going over the river. There was no use of manipulatives or recording strategies observed to help solve the problem. No clear use of mathematical notation.

Apprentice

You can appreciate the nice diagram, and the student did start to organize a strategy, but it did not lead to a full solution. There is some appropriate use of math notation and thinking skills. Even if the student counted the coming and going of the canoe as a single trip, the solution is not accurate.

Practitioner

This solution shows a clearer understanding of the task on the trip made across the river. This drawing is not as detailed, but manipulatives were used and the procedures and effective use of mathematical notation lead to an accurate solution. The student provided a clear explanation.

Expert

This solution shows a clear understanding and strategy that leads to an accurate solution. The student also attempted to write a story independently to communicate the mathematical ideas. Unifix cubes were stacked to tally the trips and the student explained why certain members of the trip went first and last.

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