

Denise Post
Facilitator Josh Brown
E in STEM
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Online Problem Solving

1. Which problems did you work through?

I worked through 3 Jugs, The tower of Hanoi, Entrapment, and Wolf, Sheep, and Cabbage.

2. Which problem was the easiest to solve?

I found Wolf, Sheep and Cabbage to be the easiest.

3. Why was it easy to solve?

It required that parts be moved to separate locations and one had to consider the possibility of moving a piece back to the beginning in order to solve the problem. There was well structured and once you found the pattern it wasn't difficult to work through.

4. What type of problem was it (see Kirkley, 2003 article pg. 8)? Explain.

It was a "well structured" problems which always used the same step by step solution. In order to get all of the items to the opposite shore without having one eaten, there is only one solution.

5. What strategy did you use to solve the problem?

For the wolf, sheep and cabbage:

1. Bring sheep across the river
2. Bring the wolf across the river
3. Bring the sheep back to the starting bank
4. Bring the cabbage across the river
5. Bring the sheep back across the river.

6. How did you develop this strategy?

First, I read and re-read the rules to make sure I understood the problem.

Next, I imagined several scenarios (most of which included having an item being eaten once the man paddled to the opposite shore.

Then, I realized that the wolf won't eat the cabbage. So I needed a solution in which the wolf and the cabbage were the only two items ever left alone.

Finally, I realized that the items could go back across the water to the starting shore.

7. What declarative knowledge was needed to solve this problem?

The "know what" for this problem would include:

- The boat can only carry the man and 1 item/creature,
- The wolf will eat the sheep if left alone
- The sheep will eat the cabbage if left alone

8. What procedural knowledge was needed to solve this problem?

You needed to figure out that the boat could carry an item back across to the starting point.

9. Which problem was the most challenging for you to solve?

3 Glasses was the most challenging game to solve.

10. Why was it difficult to solve?

I think the difficulty came in the number of steps it takes to complete the challenge. I often ended up with all of the water back where it began and was often frustrated.

11. What type of problem was it (see Kirkley, 2003 article pg. 8)? Explain.

Even though it had many more steps, I believe this is also a well structured problem with a predictable single answer.

12. What strategy did you use to solve the problem?

To get 4 oz of water in a cup, I poured from each respectively:

3 to 1

1 to 2

3 to 1

1 to 5

2 to 3

1 to 2

3 to 1

13. How did you develop this strategy?

I started out by thinking about the total amount of water available and the total capacity of the cups. I then determined that I would have to isolate a single oz of water if I was to ever get 4 oz.

I then started trying different strategies and writing down the outcome for each.

By analyzing the results of the tests I was able to find the solution through trial and error.

14. What declarative knowledge was needed to solve this problem?

The "know what" for this problem would include:

How many oz of water there is total in the system

How many oz of water each cup can hold

15. What procedural knowledge was needed to solve this problem?

I needed to learn how to "pour" the water.