

Patricia Mannion
The E in STEM
Online Problem Solving Assignment

1. I worked through the following problems:
The Three Jugs
Wolf, Sheep and Cabbage
Entrapment
2. Entrapment was the easiest to solve because the visual cues with aligning the gray dots made it easier to see when the placement was just right.
3. As I moved the gray dots around the board, a solid line would form, indicating the alignment of the gray dots with the red dots. The first two gray dots were pretty easy to align because they had to line up along the “wall” of the grid, as that is where one of the red dots was placed. Then I just moved the third gray dot until I saw both solid lines appear, indicating it was aligned with all the other red dots.
4. I think this one is a well structured problem based on the article “ Principles for Teaching Problem Solving,” by Jamie Kirkley. In this case, there was one right answer, the goal was clear and there were visual cues along the way to confirm proper placement of the gray dots.
5. At first I used a little trial and error, which provided me with some declarative knowledge about the puzzle. This declarative knowledge consisted of how the puzzle worked, what the expectations were, and the correct placement indicators of the solid line and red dots turning green. Once that knowledge was established, I simply moved that third dot until the required indicators appeared and then I was finished.
6. The positive reinforcement of the indicators for correct placement reinforced the strategy.
7. & 8. I find it difficult to discern where declarative knowledge ends and procedural knowledge begins in this instance. The initial trial and error allowed me to learn just how the puzzle worked. Not how to solve the puzzle, but what the indicators were (more Pavlovian than logic?) and then I applied that to the procedure of moving the dot until the indicators appeared.
9. The Wolf, the Sheep and the Cabbage was the most difficult puzzle to solve.
10. I remember doing the Wolf, Sheep and Cabbage puzzle years ago and was more frustrated that I didn't remember exactly how to do it. I did remember there was an extra step that one of the items to be moved had to be moved more than once, but couldn't recall which. I believe it was my frustration with my lack of recall that clouded my ability to try and solve this problem logically as if I had never seen it. Kirkley also discusses attitude as part of the problem solving process and this is a perfect example!

Patricia Mannion
The E in STEM
Online Problem Solving Assignment

11. I think it was a moderately structured problem because while there was one solution, the problem solver had to model the different scenarios of what would happen to the two items left on the shore while the rower transports the third across the water. Evaluating the outcomes of the situations would be included in the modeling of the solutions.

12. I did one round of trial and error. I almost always approach puzzles like this in this manner just so I can see how the game actually works. Once I realized that the wolf and cabbage are the only two things that could be together, I knew I had to move the sheep twice.

13. Declarative knowledge required is that the wolf would eat the sheep and the sheep would eat the cabbage.

14. Procedural knowledge included envisioning the scenarios that the sheep had to be moved twice because it was both predator (of cabbage) and prey (of wolf). Processing that the duality of roles for the sheep meant that the sheep was the linchpin and thus the key to the solution.