Project Based Learning (PBL 1)

Please choose one of the following problems:

1. You were on a cruise ship with your friends sailing in the Caribbean Sea, when a huge storm hit, and the ship sank. You managed to get a seat on a rescue boat with two of your friends and landed on an unknown uninhabited island.

   On the island you found a water source, some coconut palm trees as well as a grove of avocado trees. You knew you had food and water; you could wait for the rescuers to come. Days passed by and no one came, you started getting tired of being on the island and, furthermore, you could really use some soap, so you started thinking about how you could make some.

   a) Propose a method you could make soap on the island
   b) Design an experiment
   c) Run your experiment to see if it works
   d) Write a recommendation for the future shipwreck victims

2. You had to rebuild the two front balconies in your house. The contractor you hired did both balconies and he used treated pine wood planks for the floor of the 1st floor balcony, and he used painted aluminum panel for the ceiling of the entrance balcony on the ground floor. He ensured you that the painted aluminum panel would last for at least 20 years, however after a couple of months you started seeing what looked like corrosion spots on the aluminum ceiling.
   You have complained to the contractor, and he said he had nothing to do with it, but he could install the new aluminum ceiling at your expense.

   What is happening to the aluminum ceiling and how can you convince your contractor that he should be paying for the new ceiling. What else the contractor will have to do?

   a) Make a hypothesis of what can be happening and explain why you think your hypothesis makes sense
   b) Design an experiment to prove your hypothesis
   c) Run your experiment

d) Based on the results of your experiment, write a letter to the contractor to justify your claim that he must pay for the new ceiling and make modifications to ensure that the situation does not repeat itself.

3. You went on a 7-day backcountry hike. You brought a supply of water for one day and a bottle of water purifier powder. Once your water supply ran out, you wanted to use the powder you brought with you and discovered that you accidentally took a small bottle of table salt instead. What can you do?
   a) Propose a solution
   b) Design an experiment
   c) Run the experiment
   d) Write a report and a general procedure that can be used by other hikers in the future

4. Aspirin overdose

   Story: A patient dies unexpectedly, and an overdose of aspirin is suspected. The patient followed the directions (2 tablets every 4 hours), but instead of getting new aspirin tables with a specified dose from the pharmacy as prescribed, used aspirin tables with unknown amounts of aspirin (label is unreadable)

   a) Propose a method to determine how much aspirin is in the tablet
   b) Design an experiment
   c) Run the experiment
   d) Write a report based on your results explaining whether taking 2 of these tablets every 4 hours could have resulted in a lethal overdose