Conclusion:

After my lab partners and I performed this experiment, I can say that my hypothesis was in fact correct. The starch did not permeate the plastic bag membrane, as is apparent by the fact that

there was no color change in the surrounding iodine solution, because polysaccharides, such as starch, change color to a dark purple or black when in contact with iodine. The inside of the bag, however, was permeated by the iodine. The color change of the starch solution inside of the bag -- a change to a deep purple, almost black color -- shows that iodine was able to permeate the membrane and react with the starch in the solution. While the starch solution was originally milky white, it turned a dark purple/black color.

One large question is why the starch did not permeate the membrane. I believe this has to do with the size difference between iodine and starch. Starch is a polysaccharide, a complex carbohydrate, and is a source of energy for plants. Polysaccharides are not just molecules, they are macromolecules. It would be very hard for a molecule of starch to fit through the molecular gaps of a sandwich bag and diffuse in the iodine solution. Iodine, on the other hand, is an element. It is composed of a single atom. And even if a molecule or another element was added to the iodine, the iodine would still be small compared to a macromolecule of starch. If even a monomer of starch is larger than iodine is, then a large chain of these monomers would be extremely large compared to iodine. I know that the starch solution doesn't just naturally change to purple/black, because of the control. The control contained only water outside of the bag, instead of an iodine and water mixture. After 24 hours, the conditions of the control remained the same. Most importantly, the starch solution remained a milky white. Since the control contained no iodine, while our experimental group did, the independent variable was the iodine. Since the starch solution's color changed as a result of the iodine being placed in the water, the color of the starch solution after 24 hours must be the dependent variable, since it is being changed as a result of the independent variable.

One thing I was wondering about with this experiment was the permeability of the sandwich bag. I was wondering if the bag was also water-permeable. To my knowledge, plastic is not a lipid, thus it seems likely that It could be. Since we were using mixtures, where the water and other elements/molecules were not actually chemically bonded with one another, there would be little or no way to tell this from the experiment. Perhaps one way to tell would be to fill the plastic bag with water, seal the bag, and place it in a container with an indicator for water inside of it. It seems possible that the bag is permeable to water, since plastic is not a lipid, but a synthetic polymer. This experiment might be a bit unreliable, due to properties of water. What if the water condenses? This could throw of the results of the experiment, unless it could be controlled for in some way.

Through this experiment, I learned more about how objects can be selectively permeable, as well as learning more about how cell transport, more specifically passive transport, works. Because the iodine was able to permeate our simulated membrane, the starch in the starch solution changed colors. This gives me a good idea of what happens on a cellular level. Not only did this give me a good idea of cell transport, it also showed me how diffusion works. There was a low concentration of iodine in the plastic bag, and a high concentration outside, so the iodine diffused into the bag as a result.