Answer Key: T-Shirt Chromatography Activity

Post-Activity Questions

1. What was the solute in this experiment?
   Sharpie Marker

2. What was the solvent in this experiment?
   Rubbing alcohol (isopropanol)

3. What is meant by polarity of molecules?
   The uneven sharing of electrons due to a different in electronegativity and shape of molecule (like VSEPR shape) that creates a net dipole within the molecule.

4. Why is isopropanol polar? Why is it less polar than water?
   Isopropanol has a hydroxyl group attached to its carbon chain. This creates an uneven sharing of electrons and a net dipole that points towards the oxygen.

   Isopropanol is less polar than water because it only has one O-H bond, while water has two O-H bonds. Isopropanol has one strong dipole while water has two strong dipoles that do not cancel out.

5. Why is isopropanol used instead of water in this experiment? Explain in terms of solubility, IMFs, and the concept of “like dissolves like.”
   Isopropanol is less polar than water so it can attract and spread the nonpolar ink without completely dissolving it.

6. What acted as the stationary phase in this experiment?
   T-Shirt

7. What acted as the mobile phase that caused the ink to separate in this experiment?
   Rubbing alcohol (isopropanol)

8. Explain how the components of each ink separate. What can you infer about the molecules making up the color that travels the greatest distance? The least distance? Explain in terms of solubility, IMFs, and the concept of “like dissolves like.”
   Depending on the polarity of the color components, some spread out further than others. The colors that traveled the greatest distance are the most nonpolar because they are more attracted to the slightly polar alcohol than to the polar t-shirt. The colors that traveled the least distance are the least nonpolar because they are less attracted to the slightly polar alcohol and more to the polar t-shirt.

9. Predict what would have happened in this investigation if a very polar solvent had been used. Explain in terms of solubility, IMFs, and the concept of “like dissolves like.”
   If a very polar solvent like water had been used, the ink would not have spread at all. The ink is nonpolar and is not attracted to a polar solvent.