Problem 1. Diffusion of PCB Through a Capping Sediment Layer
   Solve the modified form of Fick’s Second Law of Diffusion for the flux of PCB at the water-capping sediment interface. Verify equation (11) from the Thoma et. al. article.

Problem 2. The Molar Flux in Facilitated Diffusion
   Lithium, sodium, or potassium chloride is diffusing from a 0.1 M aqueous solution (for each salt) across a 32 micrometer organic membrane into pure water. The membrane is largely made of chlorinated hydrocarbon, but it also contains as a mobile carrier $6.8 \times 10^{-3}$ M of the macrocyclic carrier dibenzo-18-crown-6. This carrier selectively complexes alkali metal salts. For lithium chloride, the association constant is 260 liters/mole; for sodium chloride, it is $1.3 \times 10^{4}$ liters/mole; for potassium chloride, it is $4.7 \times 10^{6}$ liters/mole. The partition coefficients of the various salts are $4.5 \times 10^{-4}$, $3.4 \times 10^{-4}$, and $3.8 \times 10^{-4}$, respectively. Assume that all salts and complexes have diffusion coefficients of $2 \times 10^{-5}$ cm$^2$/sec. Find the total flux for each of these alkali metals. What percentage of the total flux is due to ordinary solubility - diffusion versus facilitated diffusion?