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Modeling Plan  
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### **Putt Putt Pathways**

**Purpose:** To demonstrate that most cation-selective ion channels only allow certain ions to pass through them based on their permeability, as well as showing the three dimensional structure of an ion channel in relation to the cell.

**Materials:** ping pong balls, spray paint (two colors), cardboard, duct tape, candy, chicken wire, white board or easel, dry erase markers, newspaper, glue/water mixture

**Procedure:** We will begin by showing and explaining what a cell is using the white board and the markers. We will then move on to the 3 dimensional model that was made out of the chicken wire and paper mache. It will have random “channels” (holes) all over it. Two such holes will be flush with the floor. The kids will have cardboard golf clubs and will proceed to putt ping pong balls into the holes. The balls will be different colors (and maybe different sizes), thus being linked to a specific ion (sodium and potassium). Each ball will only be permitted to enter into its designated “channel” (the hole with the matching color).

**Issues:** The flux of ions is not completely random and by chance. In all reality, you must take into account the electrical properties, as well as, the diffusional driving forces that are taking place within the cell and its environment. The ions are not designated specific colors and we may not be able to show the fact that ions not only go into the cell, but also have forces pushing them out of the cell.