

Name:

Membrane Channel simulations.

Go to <http://phet.colorado.edu/en/simulation/membrane-channels>. Click on **Run Now!**

A new window should pop up. If you have trouble starting up the simulation, ask for help from the instructor.

Add 50 green particles to the top half of the membrane (this does not need to be exact so don't worry if you are off by 1 or 2).

1. Slow the animation down all of the way. Describe the motion of the green particles. Is it random or pre-determined? What happens when the particles hit each other?
2. What happens when the particles hit the membrane? What do you think this means about the size of the particles?
3. Click on the show concentrations box. How would you describe the concentration of the green particles on the top half of the membrane? (High or Low) How would you describe the concentration of green particles below the membrane? (High or Low)

Add 3 evenly spaced green gated channels to the membrane. Speed up the animation to full speed and open Channels button. Let the simulation run for one minute.

4. After one minute, compare the concentration on the top of the membrane to the concentration on the bottom of the membrane. Are the concentrations roughly the same or different?

Allow the simulation to run for another minute.

5. Have the concentrations changed significantly over the last minute?

Close the gated channels and allow. Add 20 green particles to the top of the membrane.

6. Compare the concentration on top of the membrane to the concentration on the bottom.

Keep the gates closed, and allow the simulation to run for one minute.

7. Did the concentration change over one minute?

8. How can gated channels affect the concentration of particles in and out of a cell?

Click on the reset all button. Add 50 green particles to the top of the membrane, and 50 blue particles on the bottom of the membrane. Add three equally spaced green and blue gated channels.

9. Open up the green gates, and allow the simulation to run for at least one minute. Describe any changes in the green concentration and the blue concentration.

10. Open up the blue gated channel and allow the simulation to run at least one minute. Have the green concentrations changed over time? Have the blue concentrations changed over time?

11. How can gated channels control the types of particles going in and out of a cell?