

Cell Structure: Diffusion and Agar Block Size

Diffusion is the process in which molecules move from a region of higher concentration to a region of lower concentration. This is a passive process that will occur until the concentration of the molecules is equal or the molecules are evenly dispersed. The rate of diffusion is determined by temperature and the molecular size of the molecules involved.

This activity will visibly demonstrate the diffusion of base functional units into an agar block infused with a pH indicator. Phenolphthalein is a pH indicator. Between pH 0 and 3 the indicator is orange. Between pH 4 and 7 and pH 11-14 the indicator is colorless. Between pH 8 and 10 phenolphthalein turns pink.

Materials

Agar blocks made with phenolphthalein

Spoon or scoopula

NaOH solution

Razor or scalpel

Timer

Ruler

Beakers -3, 250 mL

1. From the supply table pick up 3 beakers. Label one beaker '1 cm', another beaker '2 cm' and the final beaker '3 cm'.
2. Add approximately 150 mL of NaOH to each beaker.
3. Pick up 12 agar blocks, 4 of each size (1 cm³, 2 cm³ and 3 cm³). The agar blocks within each size group should be all the same size.
4. Drop 4, 1 cm agar blocks into the beaker labeled 1 cm. Drop 4, 2 cm agar blocks into the beaker labeled 2 cm. Drop 4, 3 cm agar blocks into the beaker labeled 3 cm. Start the timer.
5. After 15 minutes use the spoon or scoopula to remove 1 agar block from each beaker.
6. Slice the block in half and measure in millimeters how far the pink color has penetrated. Record your results below.
7. Repeat steps 5 and 6 at 30, 45 and 60 minutes.

	Depth (mms) of Pink Color Penetration		
Time (mins)	1 cm Agar Block Samples	2 cm Agar Block Samples	3 cm Agar Block Samples
15			
30			
45			
60			

1. Why are the agar blocks turning pink?
2. Name the dye indicator.
3. What can you conclude about diffusion and agar block size? How do these results translate to the impact of diffusion on cells?