

Cell Structure: Diffusion

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 evenly dispersed. The rate of diffusion is determined by temperature and the 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
NaOH solution
Timer
Beakers -2, 250 mL

Spoon or scoopula
Razor or scalpel
Ruler

1. From the supply table pick up 2 beakers. Label one beaker 'RT' and the other 5⁰ C. Write your group members' initials on the beakers.
2. Add approximately 150 mL of NaOH to each beaker.
3. Pick up 8 agar blocks. The agar blocks should be all the same size. Agar blocks are 1 cm x 1 cm x 1cm.
4. Drop 4 agar blocks into each beaker. Place the 5⁰ C beaker in the laboratory refrigerator. Leave the beaker labeled RT (room temperature) on the benchtop. Start the timer.
5. After 15 minutes use a spoon 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)	5 ⁰ C Agar Block Samples	RT Agar Block Samples
15		
30		
45		
60		

1. Why are the agar blocks turning pink?
2. Name the dye indicator.

- Under which condition did diffusion occur more rapidly? How do explain this result?
- Graph your data below. Show the penetrance of hydroxyl ion (as indicated by the change in color) with time and temperature.