Combined Science - Biology - KS4

Cell Biology

Diffusion

(Downloadable student document)

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OAK NATIONAL ACADEMY

Method and equipment

Method:
Weigh 2 grams of sugar cubes and 2 grams of sugar granules. Prepare two beakers of water at 30 degrees Celsius. Add the sugar cubes and granules into the two beakers separately and start timing.
Stir during the timing process and stop timing when the sugar completely dissolves.
Repeat three times of the steps above.

Task 1: List out all the equipment you will need to perform the method above.

Task 2: Explain why the steps are repeated three times.

Results

	Time (s) taken to completely disappear			
	Trial 1	Trial 2	Trial 3	Mean
Sugar cubes	124	126	124	124.67
Sugar granules	24	25	23	24

The sugar granules took much shorter time than the sugar cubes to dissolve because there is a larger surface area in the sugar granules. There is more contact between the sugar particles and the water, therefore, the rate of diffusion was higher.

Independent practice

1. What is concentration?
2. Coffee granules are added to hot water. Which is the solute and which is the solvent?
3. State the four factors that can affect diffusion.
4. Why does increased temperature increase rate of diffusion?
5. Why does increased surface area increase rate of diffusion?
6. What does the concentration gradient show?
7. Suggest why all cell membranes are very thin?
8. Suggest why all cells have foldings for exchange of materials?

Independent practice

1. The mass of solute/particles per unit volume
2. The solute are the coffee granules while the solvent is the hot water.
3. Temperature, surface area, diffusion distance and the difference in concentration. (in any order)
4. Because particles can move faster with more energy.
5. Because there is more contact surface between particles.
6. It shows the difference in concentration of the same substance.
7. To shorten the diffusion distance.
8. To increase surface area.