SubjectNest · What crosses a cell boundary?

Year 11 Queensland General Biology · Term 1 · Weeks 3–4

Educational scope and use

These materials are a bounded 350-minute conceptual teaching slice about membrane structure, transport, cell size and diffusion evidence. They follow a separate introductory cell/organelle slice. They do not complete Topic 1, Unit 1, a whole Biology course, a practical investigation or a school assessment instrument. School teachers choose sequence, access, laboratory work, safety and formal assessment. Other states and territories have their own senior pathways. There has been no classroom pilot, independent human scientific review, validated accessibility study or measured learning outcome.

All cell files, pouch values, repeat sets and numerical conditions are original supplied teaching models. They are not real biological, clinical or learner investigation records. Geometric layer fractions do not measure molecular flux or a diffusion coefficient; average Δdepth/Δtime = (d_end − d_start)/(t_end − t_start), with d_start = 0 mm and t_start = 0 min describes only the stated interval. Predictions depend on explicitly supplied permeability, gradient, temperature and pressure conditions. Charged-ion direction requires electrical information. Paper analysis and planning do not establish actual or genuine virtual investigation conduct.

The activities need paper only. No cultures, specimens, chemicals, ingestion, biological fluids, medical histories, diagnosis, treatment, hydration advice or risky home experiments are required. Any future actual practical needs a qualified teacher and the school's approved safety, disposal and access arrangements. No fabricated translation, First Nations voice or cultural material is supplied.

Original educational material

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Scientific cross-checks

Scientific concepts were cross-checked against the National Human Genome Research Institute's plasma-membrane page (https://www.genome.gov/genetics-glossary/Plasma-Membrane-Cell-Membrane), bounded indexed search excerpts from Alberts and colleagues' *Molecular Biology of the Cell*, fourth edition (NCBI Bookshelf NBK26815 and NBK26871), and the primary-study abstract by Finean and Hutchinson, DOI 10.1016/0009-3084(88)90115-6 (https://pubmed.ncbi.nlm.nih.gov/3338100/). Full Bookshelf opens yielded browser challenges; full chapters and the full research paper were not read. These sources supplied factual checks only. No external image, exercise, passage, narration or audio is incorporated. Their source terms remain separate and no rights clearance for third-party expression is asserted.

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