CAMBRIDGE
International Examinations

Activity 13
An example lesson plan

AS Biology Topic 4 Cell membranes and transport

<table>
<tr><td>Teacher:</td><td>Date:</td><td>Lesson: External Environment</td></tr>
<tr><td>Subject: Biology</td><td>Group: Delegates</td><td>Class size: 30</td></tr>
<tr><td>Nature of the Group, e.g. overall targets; learners with additional/ special needs/G&T etc.
Please reference teaching assistants in the learning activities or add a note here.</td><td colspan="2">Context, e.g. topic;

Previous (e.g. iGCSE knowledge of diffusion and membranes)
Previous lesson knowledge of fluid mosaic membrane structure</td></tr>
<tr><td colspan="3">LEARNING OBJECTIVES AND (where possible) LINK TO LEVELS/GRADES
What learners will know/understand/be able to do differently from when the lesson started</td></tr>
<tr><td colspan="3">Broad Learning Objective to be shared with learners:
• Consolidate work on 4.1 Fluid mosaic membranes
• 4.2(a)(part) Describe and explain the process of diffusion.
• 4.2(b)(part) Investigate simple diffusion using non-living materials, such as glucose solutions, Visking tubing
• Improve practical skills.
Displayed on a poster throughout the lesson</td></tr>
<tr><td colspan="3">By the end of the lesson, <u>all</u> learners will (minimum expected of all learners in the group)
• know the components of fluid mosaic membranes
• be able to define diffusion
• be able to follow straightforward instructions to carry out a practical
• be able to handle visking tubing and carry out biochemical tests
• be able to describe the results of the practical</td></tr>
<tr><td colspan="3">By the end of the lesson, <u>most</u> learners will
• be able to draw a diagram of a section of membrane
• be able describe the main features of diffusion
• be able to answer AO1 questions on fluid mosaic membrane structure and diffusion
• know the biochemical tests for starch and reducing sugars
• be able to explain the results of the practical
• know the type of substances that can cross the membrane by simple diffusion</td></tr>
<tr><td colspan="3">By the end of the lesson, <u>some</u> learners will (most able/those wishing to push themselves)
• be able to answer AO2 questions on fluid mosaic membrane structure and diffusion
• be able to relate the results and explanations of the practical to applications within organisms
• suggest other related practical ideas</td></tr>
<tr><td colspan="2">Starter / introduction
Learners carry out Cell Membranes Starter to consolidate work on Topic 4.1 from previous lessons and lead to the idea of moving substances across the membrane, Topic 4.2

Then brainstorm learner knowledge of the definition and features of diffusion</td><td>Assessment
Self-assessment by checking answers (initial and formative)</td></tr>
</table>

Main lesson Discuss / question and answer to remind learners of which type of substances can cross the membrane by simple diffusion. Give verbal instructions or an instruction sheet to get learners to set up an experiment using Visking tubing and biochemical solutions. This needs time before results are taken so learners can move on to the next step. Learners use textbook or information sheets to draw diagrams and make bullet point notes to define diffusion and state the main features of passive diffusion. Choice of one out of two past paper questions from Paper 2, one fairly basic and one more challenging. Also provide two multiple choice questions from Paper 1 to consider (some learners will have time and ability for both questions). Learners use the mark schemes to check their answers and to see the answers of the other question if necessary. Then learners carry out biochemical tests to obtain results for their experiment. Class discussion of results and explanations.	Self-assessment by checking answers (formative)
Plenary Learners carry out a short gap-filling exercise to include the definition of diffusion, features and a description of practical work involving Visking tubing (this can be a new situation e.g. sucrose and starch solutions). This can be differentiated e.g. no help; words provided in list at end; gap has a choice of two words. Brief class discussion, including reference to aims displayed on poster. Explain to learners / learners volunteer the skills used in the lesson.	Teacher check (summative)
Homework Write-up practical (Assessment = teacher check, summative). Assignment sheet on working out surface area to volume ratios – will save time in the next lesson. Make sure sheet has an example for learners who need to improve in this area.	
Notes e.g. literacy, numeracy aspects of the lesson Check that learners have relevant manipulative skills for the practical. Extension activity for some learners: information sheet (with or without questions), or recommended website to learn about renal (kidney) dialysis.	

