

Learner-Centered Assessment Writing Assignment

Department of Higher Education, The Penn State University

HIED 806: Teaching and Learning

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Performance and Summative Assessment

Performance and summative assessment methods should be used to assess students' mastery of A-Level Biology learning outcome 2.2.6 "describe the breakage of a glycosidic bond in polysaccharides and disaccharides by hydrolysis, with reference to the non-reducing sugar test" (Cambridge Assessment International Education, 2019, p. 15). A laboratory experiment where students must perform Benedict's test on reducing and non-reducing sugars will be used as a performance assessment while a formal lab report will be used as a summative assessment.

Benedict's Test - Hydrolysis of a Reducing Sugar

This lab requires students to treat several unknown compounds with Benedict's solution, heat the samples, and observe a color change. If the compound turns brick-red, the test is positive and students should conclude that there are reducing sugars present in the unknown compound. If, on the other hand, there is no color change, students must add acid to the sample to break the glycosidic bonds in non-reducing sugars, heat the mixture, add a base to neutralize the sample then repeat the initial test with Benedict's solution. At this point, students should observe a color change indicating that the acid broke the glycosidic bonds in a non-reducing sugar allowing the secondary addition of Benedict's solution to yield a positive test for reducing sugars.

Evaluation

Students will be evaluated by the lab instructor to determine if the steps were performed promptly, safety was observed, and the experiments yielded a color change as a result. The students will also be responsible for identifying the unknown samples as containing either reducing sugars, non-reducing sugars, or a mixture of both. An understanding of Learning Objective 2.2.6 is the only way that students will know how to identify the unknown solutions they are provided. Students are given a clear, step-by-step procedure to guide them through the

activity. Students must also complete questions throughout the lab that are designed to encourage documentation of relevant data while applying theory to each procedural step. Students are welcome to ask their instructor questions during the activity, and the instructor should closely observe students providing feedback and assessment through personal communication.

Finally, a lab report must be submitted within two days of the experiment that will serve as a summative assessment. The performance assessment and summative assessment are evaluated by the rubric in the appendix (UCSC, n.d.).

References

- Cambridge Assessment International Education. (2019). Syllabus: Cambridge International AS & A Level Biology 9700. <https://www.cambridgeinternational.org/Images/554607-2022-2024-syllabus.pdf>.
- Fink, L. (2005). *Integrated Course Design*. University of Oklahoma. <https://cpb-us-e1.wpmucdn.com/sites.ucsc.edu/dist/9/291/files/2020/03/Exp-1-%E2%80%93-Carbohydrates-1.pdf>.
- UCSC. (n.d.). Experiment 1 – Carbohydrates. <https://cpb-us-e1.wpmucdn.com/sites.ucsc.edu/dist/9/291/files/2020/03/Exp-1-%E2%80%93-Carbohydrates-1.pdf>.

Appendix

RUBRIC & STUDENT CHECKLIST (DO NOT TURN IN)

SECTION	INSTRUCTOR COMMENTS	POINTS ASSIGNED
IN-LAB QUIZ		/ 5
LAB REPORT		
<p style="text-align: center;">ABSTRACT</p> <p>One paragraph, four-six sentences: Purpose, method, main result(s), and conclusion.</p>		/ 10
<p style="text-align: center;">INTRODUCTION</p> <p>Original responses to pre-lab questions with TA initials</p>		/ 30
<p style="text-align: center;">RESULTS</p> <p>The main results are stated, as outlined in the in-lab questions, using complete sentences.</p>		/ 30
<p style="text-align: center;">EXPERIMENTAL SECTION</p> <p>The experimental details (including final amount used and obtained) are <i>briefly</i> described in a few sentences.</p>	NONE	0 / 0
<p style="text-align: center;">NOTEBOOK PAGES</p> <p>Proper format: reaction scheme, chemical info table, procedure, waste and clean-up procedure.</p>		/ 15
<p style="text-align: center;">NEATNESS, ORGANIZATION, & LAB TECHNIQUE</p> <p>Proper order and format (see syllabus for full descriptions of each section). Safety rules followed, equipment used properly.</p>		/ 10
LAB REPORT TOTAL		/ 100