

BTEC Assignment Brief

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| Qualification | Pearson BTEC Level 3 National Certificate in Applied Science Pearson BTEC Level 3 National Extended Certificate in Applied Science Pearson BTEC Level 3 National Foundation Diploma in Applied Science Pearson BTEC Level 3 National Diploma in Applied Science Pearson BTEC Level 3 National Extended Diploma in Applied Science |
| Unit number and title | Unit 2: Practical Scientific Procedures and Techniques |
| Learning aim(s) (For NQF only) | B: Undertake calorimetry to study cooling curves. |
| Assignment title | Keeping up the standards |
| Assessor | |
| Issue date | |
| Hand in deadline | |

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| Vocational Scenario or Context | <p>You are a newly appointed technical assistant at a large chemical plant, <i>Chemcalequip</i>. As part of your induction period and to progress in your role, you have to demonstrate skills in a range of practical procedures and techniques. Part of your role is to ensure equipment is calibrated and equipment and chemicals are safety checked.</p> <p>You need to demonstrate your ability to use a calorimeter and associated equipment to obtain data to determine, analyse and evaluate the rate of cooling of substances. You will need to present evidence of your practical skills analysis and evaluation in a report.</p> |
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| Task 1 | <p>Produce a report to evaluate the accuracy of your practical work in calorimetry.</p> <p>Ensure you have checked the calibration of a digital and liquid thermometer before use. Draw conclusions about any thermometer that may not be properly calibrated.</p> <p>You will need to demonstrate that you can correctly</p> <ul style="list-style-type: none"> • select appropriate equipment and set it up. • Use the equipment safely to heat the solid substance(s) to above the melting point, measure temperature, at appropriate intervals as it cools and record the data in a table of your own design. • Use the data to construct cooling curves for two substances (stearic acid and paraffin wax.) <p>When planning your data collection, you may wish to</p> |
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| | <p>consider the following factors:</p> <ul style="list-style-type: none"> ○ amount of substance used (mass/volume) ○ how cooling will occur (in air, water) ○ surface area of the container(s) ○ type of thermometer ○ lid/no lid <p>Use the graphs you have constructed to accurately determine the rate of cooling near the start and demonstrate the ability to draw a tangent to the curve and find its gradient. Draw valid conclusions about the rate of cooling near the start, end and where the rate appears to have changed dramatically in between.</p> <p>Evaluate the accuracy of your practical work in relation to the analysis of the cooling curves and the equipment and methods you used. This should include</p> <ul style="list-style-type: none"> • a description of the patterns and trends seen • a comparison of your results to published data and class values. • an analysis of how the rate of cooling is related to intermolecular forces and the state of the substances. • an explanation of why it may be necessary to make changes to procedures in order to reduce levels of uncertainty. |
| Checklist of evidence required | <p>A report, evaluating the accuracy of the cooling curve experiment to include:</p> <p>A set of results from checking the calibration of thermometers.</p> <p>A table of time/temperature data and graphs of temperature against time for two substances cooling.</p> <p>Calculations and analysis of the rate of cooling at points on the graphs.</p> <p>An observation report of the investigation including calibration of thermometers completed by the tutor.</p> |
| Criteria covered by this task: | |
| Unit/Criteria reference | To achieve the criteria you must show that you are able to: |
| B.D2 | Evaluate the accuracy of practical work in calorimetry in relation to the analysis of the cooling curve. |
| B.M2 | Analyse the rate of cooling of substances from your data using cooling curves to draw valid conclusions. |
| B.P3 | Correctly obtain data using different equipment to construct cooling curves. |
| B.P4 | Correctly determine the rate of cooling of substances using cooling curves. |

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| Sources of information to support you with this Assignment | <p>http://www.chemteam.info/Thermochem/Determine-Specific-Heat.html</p> <p>http://www.virtlab.com/main.aspx</p> <p>http://www.chem.illinois.edu/CLCTutorials/104/Calorimetry/SeeIt.html</p> <p>https://www.youtube.com/watch?v=NZuU8BGj3uY</p> <p>https://www.youtube.com/watch?v=EAgbknIDKNo</p> <p>http://www.rsc.org/</p> <p>Above are some examples of websites. Further useful resources may be found at:</p> <p>http://qualifications.pearson.com/en/support/public-hed-resources.html#step1</p> |
| Other assessment materials attached to this Assignment Brief | <p><i>eg, work sheets, risk assessments, case study</i></p> |