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**Knowledge Rich Curriculum Plan**

BTEC – Unit 2 Learning Aim B



| **Lesson/Learning Sequence** | **Intended Knowledge:**  *Students will know that…* | **Prior Knowledge:**  *In order to know this, students need to already know that…* | **Working Scientifically** | **Tiered Vocabulary and Reading Activity** | **Assessment** | **Support** |
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| **Lesson 1:**  **Comparing types of thermometer** | * Temperature is a measure of how hot or cold something is and that heat is a form of energy measured in Joules. * There are different types of thermometer, electronic, probes and liquid filled, and how they are used to gain accurate readings. * Thermometers need to be calibrated and will know how to check this using ice and boiling water. * Thermometers and temperature probes are accurate at different temperatures. | * Thermometers are used to measure how hot or cold a substance is. * Parallax errors can occur when using liquid filled thermometers, and how to overcome this. * Temperature is measured in ˚C * Energy is measured in Joules (J) * The temperature of Ice is 0˚C and boiling water is 100˚C. | Enquire  Students will calibrate liquid filled thermometers using ice and boiling water. |  | Completion of assignment brief. | <https://thesuttonacademyorg.sharepoint.com/:w:/r/sites/Section_7d0f87b8-e1c5-4cea-9028-4350c3887635/Shared%20Documents/Unit%202/Cooling%20curve%20assignment%20example.docx?d=w2c189fdb318345c48e46374d899aabad&csf=1&web=1&e=gie2Ly> |
| **Lesson 2:**  **Introduction to cooling curves** | * Specific Latent Heat is the energy required to change the state of a substance without a change in temperature. * To calculate SLH use the equation E = mL, where E is the energy in Joules (J), m is mass in (kg) and L is latent heat in J/kg. * Tangents taken from a cooling curve shows the rate of cooling. * A change of state is shown as a straight horizontal line on a cooling cool graph. | * Solid particles are arranged in a fixed pattern with very strong intermolecular bonds. The particles can vibrate in their fixed position. * Liquid particles are arranged in a less fixed arrangement, particles still touching with strong intermolecular bonds. Particles can move past each other. * Gas particles have high kinetic energy and move with a random free motion. Very weak bonds between particles. * Changes of state are physical changes. * Tangents are a straight line produced from a curve on a graph. | Solve  Students will use E=mL to calculate latent heat.  Students will draw tangents on an example graph. |  | Completion of assignment brief. | <https://thesuttonacademyorg.sharepoint.com/:w:/r/sites/Section_7d0f87b8-e1c5-4cea-9028-4350c3887635/Shared%20Documents/Unit%202/Cooling%20curve%20assignment%20example.docx?d=w2c189fdb318345c48e46374d899aabad&csf=1&web=1&e=gie2Ly> |
| **Lesson 3:**  **Collection of cooling curve data** | * The process of collecting data – recording the temperature of cooling steric acid every 30-60 seconds. * Calibration of thermometers needs to be completed and results recorded each time they are used. | * Calibration of thermometers can be done using ice and boiling water. * Lab safety rules need to be followed at all times, and goggles worn. * Parallax errors can occur when using liquid filled thermometers, and how to overcome this. | Enquire  Students will carry out a cooling curve practical using steric acid.  Record results in a table for use in the next lesson. |  | Completion of assignment brief. | <https://thesuttonacademyorg.sharepoint.com/:w:/r/sites/Section_7d0f87b8-e1c5-4cea-9028-4350c3887635/Shared%20Documents/Unit%202/Cooling%20curve%20assignment%20example.docx?d=w2c189fdb318345c48e46374d899aabad&csf=1&web=1&e=gie2Ly> |
| **Lesson 4:**  **Plotting cooling curve graphs and analysis of the cooling curve shape.** | * Plotting previously recorded data can be displayed on a graph. * Cooling curves required a curved line of best fit. * The rate of cooling changed during the practical by using tangents to calculate values. * The cooling curve shows a change of state liquid – solid,, which is shown as a straight horizontal line on the graph. | * Appropriate scales are used on the axis of graphs. * Points on a graph need to be plotted precisely. * Lines of best fit can be curved. * Tangents are a straight line produced from a curve on a graph. | Analyse  Draw an accurate graph of a cooling curve using data from the previous lesson.  Interpret the shape of the graph and make conclusions on rate of cooling and changes of state. |  | Completion of assignment brief. | <https://thesuttonacademyorg.sharepoint.com/:w:/r/sites/Section_7d0f87b8-e1c5-4cea-9028-4350c3887635/Shared%20Documents/Unit%202/Cooling%20curve%20assignment%20example.docx?d=w2c189fdb318345c48e46374d899aabad&csf=1&web=1&e=gie2Ly> |
| **Lesson 5:**  **Collection of cooling curve using a data logger.** | * Data loggers are electronic devices which record data overtime from an external or built in sensor. * Data loggers are more reliable then human data collection. | * Calibration of thermometers can be done using ice and boiling water. * Lab safety rules need to be followed at all times, and goggles worn. | Enquire  Students will carry out a cooling curve practical using steric acid.  Record results in a table for use in the next lesson |  | Completion of assignment brief. | <https://thesuttonacademyorg.sharepoint.com/:w:/r/sites/Section_7d0f87b8-e1c5-4cea-9028-4350c3887635/Shared%20Documents/Unit%202/Cooling%20curve%20assignment%20example.docx?d=w2c189fdb318345c48e46374d899aabad&csf=1&web=1&e=gie2Ly> |
| **Lesson 6:**  **Plotting cooling curve graph and analysis of results** | * Plotting previously recorded data can be displayed on a graph. * Cooling curves required a curved line of best fit. * The rate of cooling changed during the practical by using tangents to calculate values. * The cooling curve shows a change of state liquid – solid,, which is shown as a straight horizontal line on the graph. | * Appropriate scales are used on the axis of graphs. * Points on a graph need to be plotted precisely. * Lines of best fit can be curved. * Tangents are a straight line produced from a curve on a graph. | Analyse  Draw an accurate graph of a cooling curve using data from the previous lesson.  Interpret the shape of the graph and make conclusions on rate of cooling and changes of state. |  | Completion of assignment brief. | <https://thesuttonacademyorg.sharepoint.com/:w:/r/sites/Section_7d0f87b8-e1c5-4cea-9028-4350c3887635/Shared%20Documents/Unit%202/Cooling%20curve%20assignment%20example.docx?d=w2c189fdb318345c48e46374d899aabad&csf=1&web=1&e=gie2Ly> |
| **Lesson 7:**  **Assignment Lesson** | * Completion of assignment booklet using the intended knowledge gained from previous lessons. | * Knowledge of cooling curves * Method of practical * Rates of cooling from tangents. | Communicate  Construct conclusions, critic method and suggest improvements. | Conclusion – a judgement or decision reached by reasoning.  Analyse – examine methodically and in detail.  Evaluate – judge the quality, importance and value of something.  Critique – a detailed analysis and assessment of something. | Completion of assignment brief. |  |