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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.
 | EnquireStudents 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](https://thesuttonacademyorg.sharepoint.com/%3Aw%3A/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.
 | SolveStudents 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](https://thesuttonacademyorg.sharepoint.com/%3Aw%3A/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.
 | EnquireStudents 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](https://thesuttonacademyorg.sharepoint.com/%3Aw%3A/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.
 | AnalyseDraw 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](https://thesuttonacademyorg.sharepoint.com/%3Aw%3A/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.
 | EnquireStudents 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](https://thesuttonacademyorg.sharepoint.com/%3Aw%3A/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.
 | AnalyseDraw 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](https://thesuttonacademyorg.sharepoint.com/%3Aw%3A/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.
 | CommunicateConstruct 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. |  |