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**Knowledge Rich Curriculum Plan**

SCIENCE- Heating and Cooling



| **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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| **01**  **Particle model recap** | *Solids have a regular structure; the particles vibrate and there are strong intermolecular forces.*  *Liquids have an irregular structure; the particles are touching but can move.*  *Gasses have an irregular structure; the particles are spread out and move very fast due to having the highest energy.* | *Students will know how to construct particle diagrams for Solids, liquids and gases* | Communicate: Students will be able to explain differences in particle movement, space and structure for solids, liquids and gases. | *Compression: Can be squashed*  *Fluidity: can move as a gas or liquid*  *Sublimation: change of state from solid to gas* | Retrieval questions  Simple exam questions  Homework quiz 1  End of topic test  Summative assessment 3 | Knowledge organiser (provided on Teams and in class)  <https://www.bbc.co.uk/bitesize/topics/z9r4jxs> |
| **02**  **Temperate: Mixing hot and cold** | *Students to make qualitive and quantitative predictions about the resulting temperature when hot and cold are mixed together. Students will be able to describe how very hot water changes as it cools.* | *Predict the temperatures of different materials that are all in thermal equilibrium with the room.*  *Predict the temperature reached by mixing samples of water that are all at the same temperature.* | *Analyse: Students will be able to analyse patterns.* | *Temperature – A measure of how hot or cold something is (Degrees Celsius)*  *Temperature – a measure of the average speed at which the particles in a substance or material are moving.* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 1*  *End of topic test*  *Summative assessment 3* | Knowledge organiser (provided on Teams and in class)  <https://www.youtube.com/watch?v=Y8sKYv_L2j0> |
| **03**  **Conservation of energy** | *Students will be able to explain how energy dissipates as a hot object cools down.*  *Students will be able to apply the law of conservation of energy to explain what happens to energy in different situations.* | *Make qualitative predictions about the resulting temperature when hot and cold water are mixed*  *Apply the law of conservation of energy to explain what happens to energy in novel situations.* | *Enquire: Students will be able to hypothesise what happens to energy in different situations via the law of conservation of energy.* | *Conservation – prevention of wasteful use of a resource.*  *Transferred- moved from one place to another.*  *Joule – The unit of energy*  *Dissipated- Any energy that is not transferred to useful energy stores is said to be wasted because it is lost to the surroundings.* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 1*  *End of topic test*  *Summative assessment 3* | [*https://www.bbc.co.uk/bitesize/guides/z8hsrwx/revision/4*](https://www.bbc.co.uk/bitesize/guides/z8hsrwx/revision/4) |
| **04 Conductors and insulators** | *Students will be able to describe the speed at which temperature increases along a thermal conductor compared to a thermal insulator. Students will be able to identify materials that are good thermal conductors or good thermal insulators. Students will be able to use the idea of vibrating particles to explain heating by thermal conduction. Students will be able to explain how insulators can be used to slow down heating and cooling.* | *Explain why it is common for thermal insulators to feel warm and thermal conductors cold* | *Communicate: Students will be able to construct an explanation about how a conductor transfers heat and how an insulator slows down heating and cooling* | *Conductor – A material or device that conducts or transmits heat, electricity, or sound.*  *Insulator - a substance which does not readily allow the passage of heat or sound.*  *Thermal – Relating to heat* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | [*https://www.bbc.co.uk/bitesize/topics/zcj6yrd/articles/zb6mt39*](https://www.bbc.co.uk/bitesize/topics/zcj6yrd/articles/zb6mt39) |
| **05 Thermal store of energy** | *Students will be able to identify which two objects or substances has the most energy in its thermal store dependent on the temperature, then dependent on the mass. Students will be able to explain the difference between energy and temperature. Students be able to explain why it is common for thermal insulators to feel warm and thermal conductors to feel cold.* | *State materials that are god conductors and good insulators.*  *Explain conduction via the idea of vibrating particles through a conductor and how insulators slow down heating and cooling.* | *Comparing 2 processes* | *Thermal Energy: Energy stored within the particles of a substance* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | [*https://www.bbc.co.uk/bitesize/topics/zc3g87h/articles/zg2sn9q*](https://www.bbc.co.uk/bitesize/topics/zc3g87h/articles/zg2sn9q) |
| **06 Specific heat capacity** | *Students will be able to describe how the specific heat capacity of a material affects the amount of energy in its thermal store. Students will be able to use the equation E= mc∆T to calculate the energy needed to increase the temperature of a material.* | *Students will know that objects thermal energy store is dependent on its temperature and mass.* | *Analyse: Students will be able to analyse data in order to calculate the energy needed to increase the temperature of a material.* | *Specific Heat Capacity: The energy needed to raise the temperature of 1 kg of a substance by 1 oC*  *Capacity: the amount that something can contain/ produce.* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | [*https://www.bbc.co.uk/bitesize/guides/z2gjtv4/revision/5#:~:text=The%20specific%20heat%20capacity%20of%20a%20material%20is%20the%20energy,degree%20Celsius%20(%C2%B0C)*](https://www.bbc.co.uk/bitesize/guides/z2gjtv4/revision/5#:~:text=The%20specific%20heat%20capacity%20of%20a%20material%20is%20the%20energy,degree%20Celsius%20(%C2%B0C))*.* |