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**Knowledge Rich Curriculum Plan**

SCIENCE- Moving by Forces



| **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** |
| --- | --- | --- | --- | --- | --- | --- |
| ***01***  ***Forces: Speed*** | *Students will learn how to identify that an object has a higher speed because it travels further in a given time. Students will be able to identify that an object has a higher speed than another when they travel different distances in different times. Students will be able to calculate the average speed of an object by using the equation speed = distance/time.* | *Students will know how to identify forces and the ways in which they are acting. (push or pull).*  *Students will know that Newtons is the unit of force.*  *Students will know that a Newton meter can be used to measure force.*  *Students will know that examples of forces are friction, up thrust, air resistance, weight due to gravity, normal force, thrust, tension, water resistance, magnetism and electrostatic forces.*  *Students will know how to identify different forces acting on a variety of objects.* | *Enquire: Students will be able to identify variables* | *Speed- the rate at which something moves*  *Distance- the length of space between two points* | *Retrieval questions*  *Simple exam questions*  *Homework Quiz*  *End of topic test*  *Summative assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/topics/z83rkqt/articles/zhbtng8#:~:text=The%20formula%20for%20speed%20is,second%20(m%2Fs)*](https://www.bbc.co.uk/bitesize/topics/z83rkqt/articles/zhbtng8#:~:text=The%20formula%20for%20speed%20is,second%20(m%2Fs))*.* |
| ***02. Speed or acceleration*** | *Students will be able to explain why the average speed may be different to the instantaneous speed of an object. The average speed is the total distance and time of the object, whereas the instantaneous speed is the speed at a particular time. Students will learn that constant speed has zero acceleration and that anything over/under zero is a change in speed.* | *Students will be able to calculate the speed of an object using the equation. Students will know that objects will slow down due to the forces acting on an object.* |  | *Acceleration- the rate of change of velocity per unit time*  *Instantaneous- occurs immediately*  *Average- the number expressing the central or typical value of a set of data*  *Constant- occurring continuously over a period of time* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/topics/z83rkqt/articles/zhbtng8#:~:text=The%20formula%20for%20speed%20is,second%20(m%2Fs)*](https://www.bbc.co.uk/bitesize/topics/z83rkqt/articles/zhbtng8#:~:text=The%20formula%20for%20speed%20is,second%20(m%2Fs))*.* |
| ***03 Motion Graphs*** | *Students will be able to read values of distance or time off the axes of a distance-time graphs for a plotted point. The distance is on the y axis and the time is on the x axis. Students will be able to describe the changes to an object represented by a move from one point to another on a distance-time graph. Students will learn how to describe how the motion of an object is represented by straight lines on the distance-time graph. Students will know that distance-time graph shows the changing position of an object. Students will know that distance-time graph shows the changing speed of an object.* | *Students will need to know the difference between average and instantaneous speeds.* | *Enquire: Students will be able to identify the variables in the distance and time.* | *Axis-A fixed reference line*  *Gradient- change in y/change in x* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/z2wy6yc/revision/3*](https://www.bbc.co.uk/bitesize/guides/z2wy6yc/revision/3) |
| ***04 Changing Motion*** | *Students will know how to calculate the size and direction of the resultant force of two forces acting along the same straight line. Students will know how to describe how quickly the speed of an object can be changed if acted on by resultant forces of different size. Students will know how to describe how the speed of an object changes throughout the time that a resultant force is acting on it. Students will know how to explain how friction and other resistive forces can act to continually reduce the speed an un-propelled object. Students will know why friction and other resistive forces make it necessary to exert a constant force to keep an object moving at a steady speed.* | *Students will already know that forces act on objects which can cause an object to slow down or stop.* |  | *Resultant – the overall net result*  *Friction- the action of one surface rubbing against another*  *Propelled- to push something forward* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.youtube.com/watch?v=9kMNtZvYmqQ*](https://www.youtube.com/watch?v=9kMNtZvYmqQ) |
| ***05 Drag*** | *Students will know how to identify in which fluid an object has the biggest drag force. Students will know how to describe how streamlining reduced drag force. Streamlining an object involves elongating its rear surface. Students will know why drag force on an object increases with the objects speed as more air particles are striking the surface. Students will know how to describe the forces acting on an object when it is moving at a constant speed through a fluid. Students will know how using a parachute can make it safe to jump out of an aeroplane.* | *Students will know about contact and non-contact forces acting on an object.* |  | *Streamline- prevents very little resistance*  *Drag- a force acting opposite to the relative motion.* | *Retrieval questions*  *Simple exam questions*  *Homework quiz 2*  *End of topic test*  *Summative assessment 3* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/clips/z24pvcw*](https://www.bbc.co.uk/bitesize/clips/z24pvcw) |