



The Sutton Academy

# Knowledge Rich Curriculum Plan

Course/Unit



Lesson/Learning Sequence	Intended Knowledge: <i>Students will know that...</i>	Tiered Vocabulary	Prior Knowledge: <i>In order to know this students, need to already know that...</i>	Assessment
<p><b>To learn how to find an unknown force when a system is in equilibrium.</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know that a particle or rigid body is in static equilibrium if it is at rest and the resultant force acting on the particle is zero.</i></li> <li>• <i>Students will know that to solve problems in statics you should:</i> <ul style="list-style-type: none"> <li>- <i>Draw a diagram showing clearly the forces acting on the plane</i></li> <li>- <i>Resolve the forces into horizontal and vertical components or, if the particle is on an inclined plane, into components parallel and perpendicular to the plane.</i></li> <li>- <i>Set the sum of the components in each direction equal to zero.</i></li> <li>- <i>Solve the resulting equations to find the unknown force(s).</i></li> </ul> </li> <li>• <i>Students will know how to resolve forces in static forces.</i></li> <li>• <i>Students will know how to that you can use a vector diagram to solve equilibrium problems involving three forces, because the particle is In equilibrium, the three forces will form a closed triangle.</i></li> <li>• <i>Students will know that the angle between forces on the force diagram is <math>\theta</math>, the angle between those forces on the triangles of forces is <math>180 - \theta</math>. The length of each side of the triangle us the magnitude of the force.</i></li> <li>• <i>Students will know how to find angles and missing forces</i></li> </ul>		<p>Students will need to know that <math>f=ma</math></p> <p>Students will know how to use the sine rule</p> <p>Students will know how to use the cosine rule.</p>	
<p><b>To learn how to model objects in static equilibrium to solve problems.</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know how to use forces in static equilibrium and to solve problems involving weight, tension and pulleys.</i></li> <li>• <i>Students will know how to model real life situations to find missing angles and forces in static equilibrium.</i></li> </ul>		<p>Students will need to know that a particle or rigid body is in static equilibrium if it is at rest and the resultant force acting on the particle is zero.</p> <p>Students will need to know that to solve problems in statics you should:</p> <ul style="list-style-type: none"> <li>- <i>Draw a diagram showing clearly the forces acting on the plane</i></li> <li>- <i>Resolve e the forces into horizontal and vertical components or, if the particle is on an inclined plane, into components parallel and perpendicular to the plane.</i></li> <li>- <i>Set the sum of the components in each direction equal to zero.</i></li> <li>- <i>Solve the resulting equations to find the unknown force(s).</i></li> </ul> <ul style="list-style-type: none"> <li>• <i>Students will need to know how to resolve forces in static forces.</i></li> </ul>	
<p><b>To learn how to solve problems involving motion on rough or smooth inclined planes.</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know that when a body is static equilibrium under action of a number of forces, including friction, you need consider whether the body is on the point of moving or not.</i></li> <li>• <i>Students will know that the force of friction will be less than <math>\mu R</math>, as a smaller force is sufficient to prevent motion and to maintain static equilibrium.</i></li> <li>• <i>Students will know the maximum value of the frictional force <math>F_{MAX} = \mu R</math> is reached when the body you are considering is on the point of moving. The body is then said to be in limiting equilibrium.</i></li> </ul>		<p>Students will need to know how to resolve forces on a plane.</p> <p>Students will need to know how to resolve forces including friction.</p> <p>Students will need to know that <math>F=ma</math>.</p> <p>Students will need to know how to model objects in static equilibrium.</p>	

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	<ul style="list-style-type: none"> <li>• <i>Students will know that in general, the force of friction <math>F</math> is such that <math>F \leq \mu R</math>, and the direction of the frictional force is opposite to the direction in which the body would move if the frictional force were absent.</i></li> <li>• <i>Students will need to know how to find forces to a body inclined on a plane.</i></li> <li>• <i>Students will know how to model real life situations involving inclined planes to find missing forces.</i></li> </ul>			
<b>To learn how to model static rigid bodies.</b>	<ul style="list-style-type: none"> <li>• <i>Students will know that if you need to consider rotational forces acting on an object you can model it as a rigid body.</i></li> <li>• <i>Students will know that for a rigid body in static equilibrium</i> <ul style="list-style-type: none"> <li>- <i>The body is stationary</i></li> <li>- <i>The resultant force in any direction is zero.</i></li> <li>- <i>The resultant moment is zero.</i></li> </ul> </li> <li>• <i>Students will know that sometimes you need to consider the moments acting on the body and the resultant force acting on the body and the resultant force acting on the body separately.</i></li> <li>• <i>Students will know how to find magnitude of a reaction rigid body in static motion.</i></li> <li>• <i>Students will know how to find the coefficient of friction.</i></li> <li>• <i>Students will know how to find missing angles.</i></li> </ul>		Students need to know how to model with moments. Students need to know how to resolve forces. Students need to know how to model forces.	
<b>To learn how to solve problems with dynamics and inclined planes.</b>	<ul style="list-style-type: none"> <li>• <i>Students will know that when a particle is moving along a rough plane, the force of friction is equal to <math>\mu R</math> and acts so as to oppose the direction of motion.</i></li> <li>• <i>Students will know how to resolve forces on a incline plane to find acceleration.</i></li> <li>• <i>Students will know how to apply the suvat equations to a particle moving on a rough inclined plane.</i></li> </ul>		Students need to know how to model with moments. Students need to know how to resolve forces. Students need to know how to model forces. Students will need to know how to apply the suvat equations.	
<b>To learn how to solve problems involving connected particles that require the resolution of forces.</b>	<ul style="list-style-type: none"> <li>• <i>Students will know how to solve problems about connected particles on inclined and rough surfaces.</i></li> <li>• <i>Students will know that unless connected particles are moving in the same direction they must be considered separately.</i></li> <li>• <i>Students will know how to find the acceleration on a system on connected particles on inclined and rough surfaces.</i></li> <li>• <i>Students will know how to find tension on connected particles on inclined and rough surfaces.</i></li> <li>• <i>Students will know how to find forces on connected particles on inclined and rough surfaces.</i></li> </ul>		Students will need to know how to solve problems involving connected particles. Students need to know how to resolve forces. Students need to know how to model forces. Students will need to know how to apply the suvat equations.	