**Physics 20**

**Unit B: Dynamics**

**Knowledge Checklist (Do I know?)**

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| **Concept** | **Example/Explanation** | **Follow-up Questions I want to ask.** |
| 1. Balanced and Unbalanced Forces
 | Draw Free Body Diagrams for a variety of situationsExplain how Newton’s First and Second Laws apply to a variety of situations.  |  |
| 1. Action Reactions
 | Qualitatively and quantitatively, explain the interaction between two objects by understanding that the two forces are equal in magnitude but opposite in direction. |  |
| 1. Catalogue of Forces
 | Define each of the following forces and use them together with Newton’s Laws of Motion.* Net Force
* Force of Gravity
* Normal Force
* Force of Friction (Static & Kinetic)
* Applied Force
* Tension
 |  |
| 1. Universal Gravity
 | Identify Gravity as one of four fundamental forcesDescribe both qualitatively and quantitatively, Newton’s Law of Universal GravityDefine a field and apply it to describe gravitational effects |  |
| 1. Components of Force
 | Recognise that forces are vectors.Quantitatively determine the x- and y- components of a non-perpendicular force.Quantitatively add two vectors to determine a resultant magnitude and direction. |  |
| 1. Inclined Planes
 | Rotate the x- and y- axis to model the forces on an incline plane. |  |

**Skills Checklist (Can I Do?)**

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| **Concept** | **Example** | **Follow-up Questions I have** |
| 1. Apply Newton’s first law of motion to describe an object at rest or uniform motion.
 | Use the equations:* $F\_{net}=0$
* $F\_{net}=ΣF$

To describe the motion of objects at rest or moving at a constant velocity. |  |
| 1. Apply Newton’s second law of motion to explain describe accelerated motion.
 | Apply the equations:* $F\_{net}=ma$
* $F\_{net}=ΣF$

To situations involving the following Pulleys, Hanging Signs, Elevators, Cars, Boats or other objects that experience acceleration. |  |
| 1. Experiments
 | Formulate questions about observed relationships involving Forces, Acceleration, Displacement and Time.Analyze Mathematical Models to assess possible solutions (eg: when is acceleration due to gravity uniform and when is it non-uniform?) |  |
| 1. Add Vectors in 1 and 2 Dimensions
 | Apply at least one suitable technique to add vectors.Find the x- and y- components of a vector.Determine the resultant vector (including both magnitude and direction)Know the three ways to represent the direction of a vector. |  |