**Science 1.1 AS 90940** Demonstrate understanding of aspects of mechanics



Writing Excellence answers to **Work and Power** questions

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| **Work and Power QUESTION** | |
| **Question:** A bike with a mass of 20 kg is lifted onto a shelf that is 1.5 metres high.  It takes 3 seconds to lift the bike.    Calculate the power required to lift the bike onto the shelf.  Before you calculate the power, you will need to:  • determine the weight force of the bike  • calculate the work done in lifting the bike.  A person pushed the same bike up a ramp that it was also at a height of 1.5m. It then took them a longer time to do this than lifting the bike. Explain whether the power needed to push the bike up the ramp is more or less than when it is lifted straight up to the same height. Refer to force and energy. | |
| **ANSWER** | |
| 1. calculate the **weight** (force) of the object (bike) with units  *F*w = *m* × *g* |  |
| 2. calculate the **work done** by the bike with units  *W = F x d* |  |
| 3. calculate the **power** required to lift the object (bike) with units  *P* = *W* / *t* |  |
| 4. link the same height above ground to same work required |  |
| 5. link the same work done to the same amount of energy gained |  |
| 6. explain the ***W = F x d*** *in words* comparing the differences in F and d in both situations – with both equalling the same work done. |  |
| 7. Compare the power required in both situations by explaining  *P* = *W* / *t in words* |  |

NOTE: The white column is how your answer would appear on your test paper so make sure you **write out complete sentences**. The grey area is just to help you structure your answer and would not appear in the question.