**Derek’s 3 INCORRECT laws of motions**

In the video [The three incorrect laws of Motion](https://www.youtube.com/watch?v=Yf0BN0kq7OU), Derek explain the 3 laws of motion the way that he thinks most people think they are. Wrong ways of thinking about ideas are called misconceptions, so what Derek has outlined are really 3 misconceptions about Newton’s laws of motion.

Watch this video carefully and you will hear three laws of motion that sound similar to Newton’s laws, but each of them is incorrect. You should know the correct version of Newton’s laws.

TASK 1: (easy) Use your knowledge and the video to complete the table below.

|  |  |  |
| --- | --- | --- |
| Law | Newton’s **CORRECT** law | Derek’s **INCORRECT** law |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |

(6 marks)

TASK 2: (hard part) Can you explain why Derek’s version of each law is incorrect. The table below has clues in it to help guide your thinking. Complete the table by reading the clue, and in the next column explain why people like Derek may get the laws incorrect.

|  |  |  |
| --- | --- | --- |
| Law | ***Clue*** *to understanding why Derek’s law is incorrect* | **My explaination**  Why Derek’s law is not correct |
| **1** | Say a ball is rolling along a desk does actually appears to have no external force acting on it… and it comes to rest – so Derek looks like he is correct. But actually, there was an external force being applied to the ball which slowed it down and stopped it – these forces were friction forces and they often go unnoticed. |  |
| **2** | It true that when you pedal harder on a bike you accelerate to a higher speed and then move at that constant speed – you don’t keep accelerating and getting faster and faster (which is what Newton’s 2nd law says). This is because friction increase as you get faster and eventually friction balances out the extra force you applied, so you stop accelerating and move at a constant speed. Nobody notices the friction forces increase. |  |
| **3** | When something very heavy (high mass) is involved in a collision, it’s motion does not appear to change much – so it can look like it applies more force than the light object (low mass) in the collision. But the change of motion is caused by acceleration and not force directly. Acceleration, a = F/m, so if m is very large, the acceleration (change in motion) is very small. A light object has a small mass, so the same force divided by a small mass (F/m), gives a higher a – the higher accel means the lighter object changes its motion more obviously. |  |

(6 marks)