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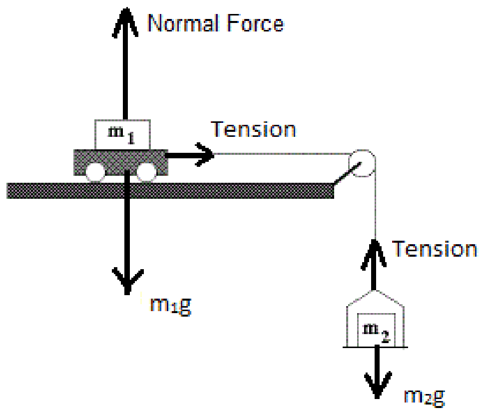
5* AS Physics

Unbalanced Force Lab Conclusion

In this lab we used a toy car, a pulley, and eight washers to discover the relationship between force and acceleration. After measuring the mass of eight washers, the toy car, and the hook on our pulley, we found that our total system mass was about .510 kg. From our data that we collected during our lab, we could see that with each increase in force, the acceleration of the toy car also increased. In fact, with each washer taken off of the toy car and added onto the hook on the pulley (increasing the force of the pulley by 0.04N), we found that the acceleration increased by about 0.488 m/s/s. When we graphed our data points, we could see that the relationship between the data points was linear, meaning that the relationship between acceleration and unbalanced force are directly proportional. If we increased the force by 0.04N each time, as we did in the lab, then we know that the acceleration will also increase by roughly 0.488 m/s/s each time. As we did more research, we discovered that this phenomenon could be explained by Newton's second law of motion. Newton's second law of motion pertains to the behavior of objects for which all existing forces are not balanced. The second law states that the acceleration of an object is dependent upon two variables--the net force acting upon the object and the mass of the object. The acceleration of an object depends directly upon the net force acting upon the object, and inversely upon the mass of the object. As the force acting upon an object is increased, the acceleration of the object is increased. As the mass of an object is increased, the acceleration of the object is decreased. From Newton's second law, we can concluded that unbalanced force and acceleration have a direct, or linear, relationship, and that we can also find the formula for calculating either force, acceleration, or mass: Unbalanced Force=Mass x Acceleration. Based on our findings here, we can conduct further experiments, such as setting up the pulley at a different height so the string would be pulled at an angle or using a car with the same mass as the weight on the pulley. By conducting these experiments, we can discover more about force, and its relationship with mass and acceleration.



$$F = m \times a$$

Force (N) Mass (kg) Acceleration (m/s^2)