Source of error - lab report example

Science, Physics

Source of error

Identification of the Sources of Error in Newton’s Second Law. Newton’s second law of motion prompts that there is no state of balance between the action of objects and the existing force that surrounds them . It also argues that the speed of an object is reliant on two variables, the net force acting on an object and the mass of an object (Browne 58). Generally as the force acting on an object is elevated, the speed of the object increases, and as the mass is elevated, the speed of the object is decreased. Formally, the law argues that the acceleration of an object as a result of net force is absolutely correspondent to the intensity of the net force, in the similar direction of the net force and inversely correspondent to the mass of the object. It is expressed by the equation:

Fnet = m * a or a = Fnet / m

This paper investigates the sources of error in Physics experiments for collision chart in relation to Newton’s second law of motion.

A source of error is described as any factor that affects the final result of an experiment. However, careful evaluation of a source of error makes it possible for experimenters to improve on their techniques.

One source of error in Newton’s second law of motion is found in the incomplete definition, this is because gravitational force usually causes mass to speed up. In Newton’s definition, he excludes mentioning the effect of gravitational force as a co-effect to the variables. Therefore Newton’s law can also be expressed as;

mg= (M+m) a where mg; magnitude of weight, M; Mass and m; small mass (gravitational force).

Secondly, a source of error found in the law is the systematic failure to account for constancy in change as the net force changes. It is predicted that the speed of an object mass increases constantly when the net force acting on the object itself changes. For example in these calculations;

Force of gravity= mass*gravity (10N) and a= k*Fg where a: 0. 424*Fg and k (= slope of acceleration vs. net force)

Fg1= . 50kg*10N= 5N and

Fg1= 5: a= 0. 424*5=. 212

Fg1= 10: a= 0. 424*10= 424

From these calculations, when the force is elevated, the acceleration is high but still constant with other accelerations.

In addition, the third source of error in this law is found in the systematic or random environmental factors where Newton did not account for possible effects of environmental condition for instance temperature and how they affect the final results. For example when measuring the mass of a stone, we avoid highly ventilated rooms and use small strings on a pulley instead of large ones to minimize the percentage error.

Moreover, parallax and experimental apparatus errors is a common source of error in experiments, for instance when the observers eyes is not in proper alignment with the scale the mass recorded will be faulty. It is advisable to use the null difference method instead of measuring mass directly thus creating a sensitive measuring instrument.

Finally, a source of error in Newton’s law involves the rate of variation of a body which is directly proportional to the applied force and follows the direction where the force acts upon. This force as earlier said is not in

balance and it causes movement. Therefore force can be interpreted as mass times velocity (f= m*v). Hence Newton’s second law of motion identifies the relationship between applied force and speed initiated by it on a body.

Work cited

Browne, Michael E. (July 1999). “ Schaums outline of theory and problems of physics for engineering and science” (Series: Schaums Outline Series). McGraw-Hill Companies’ 58.