Student 1: Low Excellence

NZQA Intended for teacher use only

Note: This student evidence comes from student work related to the task Baby Bouncer. The following is a snippet of the complete report that was written by the student.

Discussion

1 For the masses that I used for the experiment, the greatest was 0.2kg. This is nowhere near the mass of a baby what the experiment was designed to model. My data fits the graph well and there is little variation, however I cannot be assured that this period will occur for the actual mass of a baby. This means that the final analysis possibly won't be valid in real life. This experiment was designed to model a baby on a baby bouncer but there are some flaws: the spring is not the same shape as the double elastic harness, and it is not built of the same material. There it is not known whether the spring would behave and oscillate the same way as a double elastic harness. However, without a real double elastic harness this can't be tested.

On a baby bouncer the mass (baby) bounces knees up with their feet inputting their own energy into the oscillation. The resultant force of this would vary. This meaning that the period of oscillation in a real life baby bouncer wouldn't be able to be replicated by my experiment. As in my experiment this was not taken into consideration. Also the fact the baby lifts off its feet demonstrates that the baby bouncer is not SHM. Where in my model the mass was oscillating with SHM, meaning in a real life model conclusions wouldn't be valid, and the equation $T= 2\pi\sqrt{\frac{m}{k}}$ is not applicable to my model/equation.

The relationship I determined was: $T^2 = 3.7 \pm 0.2m + 0.2 \pm 0.01$

The theoretical formula is: $T= 2\pi\sqrt{\frac{m}{k+5\%}}$ $k = 11\ Nm^{-1} \pm 5\%$

(Square to make it equivalent to mine)

$T^2= \frac{4\pi^2 m}{k+5\%}$

$T^2= 3.589m$ $T^2= 3.6m$ (2sf)

2 The gradient of this fits with my experimental relationship, as the gradient is within the gradient range. However, the y-intercept of C is not within my y-intercept range. This means there could possibly be a constant systematic error. This is probably due to the reaction time causing the measured time period to be longer than it should be.