In this simulation, an object traverses the “hills and valleys” of a frictionless roller coaster in the realm of zero air resistance.  You will be asked to find measurements and make calculations concerning total mechanical energy and whether it is conserved.  Then you will then make some changes to the global air resistance for this simulation and answer the same questions as you did previously.

I took these calculations from the simulation

|  |  |  |  |
| --- | --- | --- | --- |
| Ball Position | PE | KE | TE or E |
| (-3.61,2.94) t=.10s | 0.59J | 0.01 | 0.60 |
| (-.77,.27)  t=.72s | 0.05J | 0.55 | 0.60 |
| (.43,1.15)  t=.88s | 0.23J | 0.37 | 0.60 |
| (1.93, 2.02)  t=1.12s | 0.40J | 0.20 | 0.60 |
| (2.80, 1.44)  t=1.30s | 0.29J | 0.31 | 0.60 |
| (3.74, 2.88)  t=2.00s | 0.58J | 0.02 | 0.60 |

Is the total energy (T.E.) conserved in every case (within experimental error)? [If not, where did the missing energy go?] How do I go about figuring this out???

The mass of the ball is changed from 0.01 kg to 1.0 kg

|  |  |  |  |
| --- | --- | --- | --- |
| Ball Position | PE | KE | TE or E |
| (-3.61,2.94) t=.10s | 58.89J | 1.41 | 60.30 |
| (-.77,.27)  t=.72s | 5.40J | 54.89 | 60.29 |
| (.43,1.15)  t=.88s | 23.06J | 37.24 | 60.30 |
| (1.93, 2.02)  t=1.12s | 40.47J | 19.83 | 60.30 |
| (2.80, 1.44)  t=1.30s | 28.89J | 31.41 | 60.30 |
| (3.74, 2.88)  t=2.00s | 57.68J | 2.47 | 60.15 |

Is the total energy (T.E.) conserved in every case (within experimental error)? [If not, where did the missing energy go?]

The air resistance on the ball changed from 0.0 to 0.05 kg/m\*s. The mass is 0.01kg

|  |  |  |  |
| --- | --- | --- | --- |
| Ball Position | PE | KE | TE or E |
| (-3.62,2.95)  t=.10s | 0.59J | 0.01 | 0.60 |
| (-1.57, 0.59)  t=.72s | 0.12J | 0.29 | 0.41 |
| (0.47, 0.33)  t=.88s | 0.07J | 0.24 | 0.31 |
| (0.36, 1.07)  t=1.12s | 0.21J | 0.03 | 0.25 |
| (0.48, 1.22)  t=1.30s | 0.24J | 1.93e^-003 | 0.25 |
| (-1.38, 0.53)  t=2.00s | 0.11J | 0.04 | 0.15 |

Is the total energy (T.E.) conserved in every case (within experimental error)? [If not where did the missing energy go?]