

Kinetic, potential and Mechanical Energy- Enriched notes

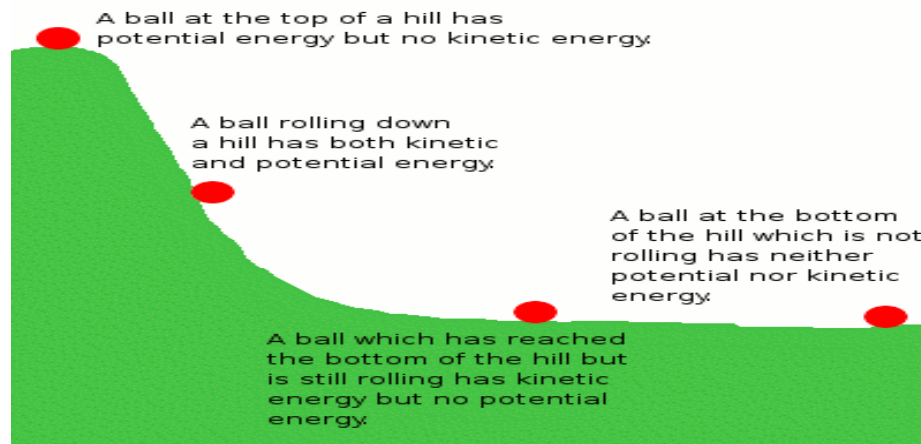
| | Kinetic | Potential | Mechanical |
|------------|---------|-----------|------------|
| Formula | | | |
| Units used | | | |

Conversions

| Km/h to m/s | g to kg | cm to m |
|-------------|---------|---------|
| | | |

Constant : gravitational pull:

Relationship between mechanical, kinetic and potential energy



| Height (m) | Time (s) | Velocity (m/s) | PE _g (J) | KE (J) |
|------------|----------|----------------|---------------------|--------|
| 2.00 | 0 | 0 | 70.6 | 0 |
| 1.67 | 0.261 | -2.56 | 58.9 | 11.8 |
| 1.33 | 0.369 | -3.62 | 47.1 | 23.5 |
| 1.00 | 0.452 | -4.43 | 35.3 | 35.3 |
| 0.67 | 0.521 | -5.11 | 23.5 | 47.1 |
| 0.33 | 0.583 | -5.72 | 11.8 | 58.9 |
| 0 | 0.639 | -6.26 | 0 | 70.6 |

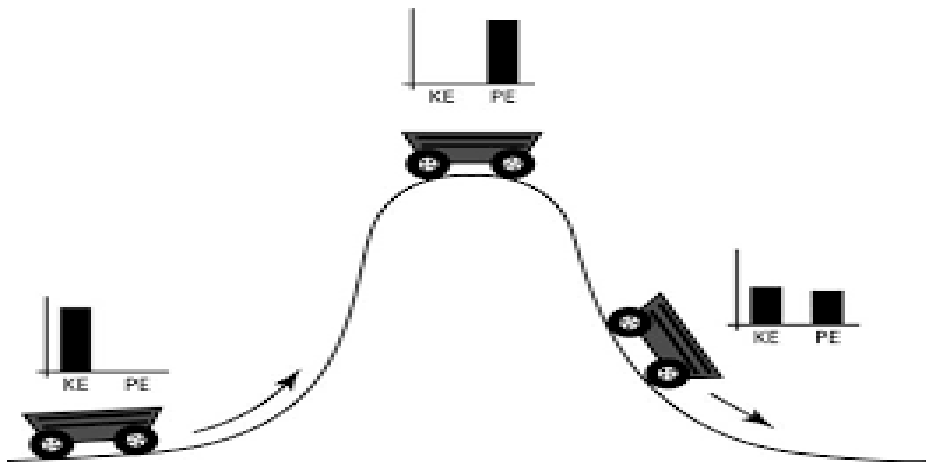
Introduction to Conservation of Mechanical Energy with Demonstrations

*

Full potential is also =

Full kinetic is also =

Mechanical is also =



Sample kinetic energy questions

1. A marble weighing 4.0 kg, travels at a speed of 1.9 m/s. What is its kinetic energy?

2. What is the mass of a truck if its kinetic energy is 5500 J and travels at a speed of 65 km/h.

3. A car having 75 000 J of kinetic energy and a mass of 330 kg, travels at what speed?

Example potential energy questions

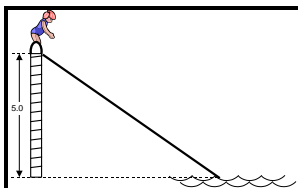
1. A bar weighing 550 g is raised 3.0 m off the ground. What is its potential energy?
2. What is the mass of a girl if she was raised 2.00 m off the ground and has a potential energy of 555 J?
3. A rock weighs 700 g and has a potential energy of 1 500 J. What height is it found at?

Example mechanical energy questions

1. A car weighing 5 500 kg, travels at a speed of 55 km/h up a 15 m hill. What is its mechanical energy?

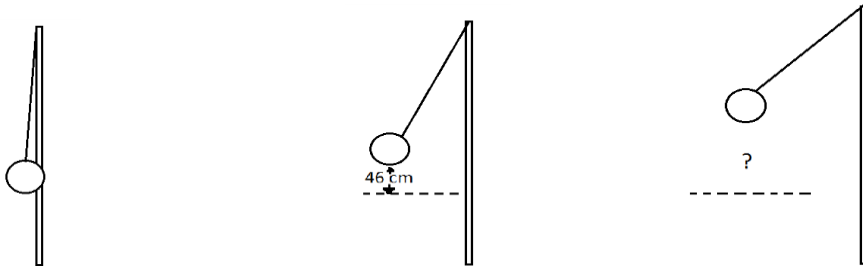
Past Exam Questions

1. A camp has a waterslide that is 5.0 meters high. Debra, a 55 kg camper, is sliding down the waterslide from rest. See Figure 5 below.



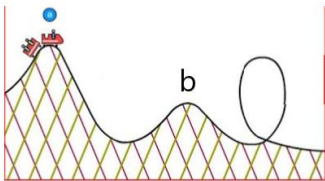
- a) How fast will Debra be travelling when she reaches the water? Neglect resistance forces (air and friction)
- b) Explain, using scientific terminology, why doubling the velocity of an object increases the kinetic energy by a factor of four.

2. You are playing tether ball in the playground. When the height of the 5 kg ball rose to 46 cm above the initial position, its velocity was 5.0 m/s.



What is the maximum height, above the initial position, that the tether ball will reach?

3. The roller coaster is at rest at point A, it weighs 660 kg and is 35.0 m high. The height at point B is 13.0m.



How high above the ground is the roller coaster travelling at a speed of 55.0 km/h.