**Physics 11 - Work, Power, Energy Worksheet**

1. Calculate the work done by a 47 N force pushing a pencil 0.26 m.
2. Calculate the work done by a 47 N force pushing a 0.025 kg pencil 0.25 m against a force of 23 N.
3. How far can a mother push a 20.0 kg baby carriage, using a force of 62 N, if she can only do 2920 J of work?
4. What is the gravitational potential energy of a 61.2 kg person standing on the roof of a 10-storey building relative to (a) the tenth floor, (b) the sixth floor, (c) the first floor. (Each storey is 2.50 m high.)
5. A 10 000 kg airplane lands, descending a vertical distance of 10 km while travelling 100 km measured along the ground. What is the plane's loss of potential energy?
6. A coconut falls out of a tree 12.0 m above the ground and hits a bystander 3.00 m tall on the top of the head. It bounces back up 1.50 m before falling to the ground. If the mass of the coconut is 2.00 kg, calculate the potential energy of the coconut relative to the ground at each of the following sites:

(a) while it is still in the tree,

(b) when it hits the bystander on the head,

(c) when it bounces up to its maximum height,

(d) when it lands on the ground,

(e) when it rolls into a groundhog hole, and falls 2.50 m to the bottom of the hole.

1. Calculate the kinetic energy of a 45 g golf ball travelling at: (a) 20 m/s, (b) 40 m/s, (c) 60 m/s.
2. When the speed of an object doubles, does its kinetic energy double? Explain your answer.
3. How fast must a 1000 kg car be moving to have a kinetic energy of: (a) 2.0 x 103 J, (b) 2.0 x 105 J, (c) 1.0 kW.h?
4. A 50 kg bicyclist on a 10 kg bicycle speeds up from 5.0 m/s to 10 m/s.

(a) What was the total kinetic energy before accelerating?

(b) What was the total kinetic energy after accelerating?

(c) How much work was done to increase the kinetic energy of the bicyclist?

(d) Is it more work to speed up from 0 to 5.0 m/s than from 5.0 to 10.0 m/s?

1. At the moment when a shotputter releases a 5.00 kg shot, the shot is 3.00 m above the ground and travelling at 15.0 m/s. It reaches a maximum height of 8.00 m above the ground and then falls to the ground. If air resistance is negligible,

(a) What was the potential energy of the shot as it left the hand relative to the

ground?

(b) What was the kinetic energy of the shot as it left the hand?

(c) What was the total energy of the shot as it left the hand?

(d) What was the total energy of the shot as it reached its maximum height?

(e) What was the potential energy of the shot at its maximum height?

(f) What was the kinetic energy of the shot at its maximum height?

(g) What was the kinetic energy of the shot just as it struck the ground?

1. A power mower does 9.00 x 105 J of work in 0.500 h. What power does it develop?
2. How much work can a 22 kW car engine do in 60 s if it is 100% efficient?