



Name: _____

Work, Energy and Power

- Billy raises a dumbbell of mass 20kg, to a height of 2m, in 2s.
 - What is the work done?
 - What is the power?
- A car ($m = 1500\text{kg}$) starts at rest and accelerates to 20 m/s in 3s. Calculate
 - the kinetic energy it has gained
 - the work done
 - the power of the engine.
 - The car now travels at a constant speed of 20 m/s, maintaining the power from above. What is the force of friction it is overcoming?
 - What is the coefficient of friction?
- A car ($m = 2000\text{kg}$) accelerates from 5 m/s to 20m/s in 2 seconds. Calculate
 - The gain in KE
 - The power required achieving this.
- William moves a 100kg barrel up a ramp to a height of 1.5m.
 - If the ramp is 3m long what force must he apply.
 - If he can only exert 300W of power, how long will it take him.
- Stephanie, having done weight training, can lift the same barrel (in Q4) in 2s. What is her power?
- A truck (3000kg) climbs a hill that has an incline of 20° . The truck has a power of 10kW. It takes 20s to get to the top of the hill.
 - the work done
 - the vertical height of the hill
 - the length of the inclined road
- An F-16 has a mass of 16000 kg. It goes into a climb and raises its height by 2km. If it does this in one minute, what is its power?
- The human heart is a powerful and reliable pump. Each 24-hour day, it takes in and discharges over 7500 liters of blood. If the work done by the heart is equal to the work required to lift this amount of blood a height equal to the average American female (1.63 m), and if the density of blood is the same as that of water (1mL of water has a mass of 1g)
 - How much work does the heart do in a day?
 - What is the power output in watts?
- There are two formulas related to power we have discussed. $P = E/t$ and $P = Fv$. Draw two graphs that show these relationships.

