Roller Coaster Energy Transfers

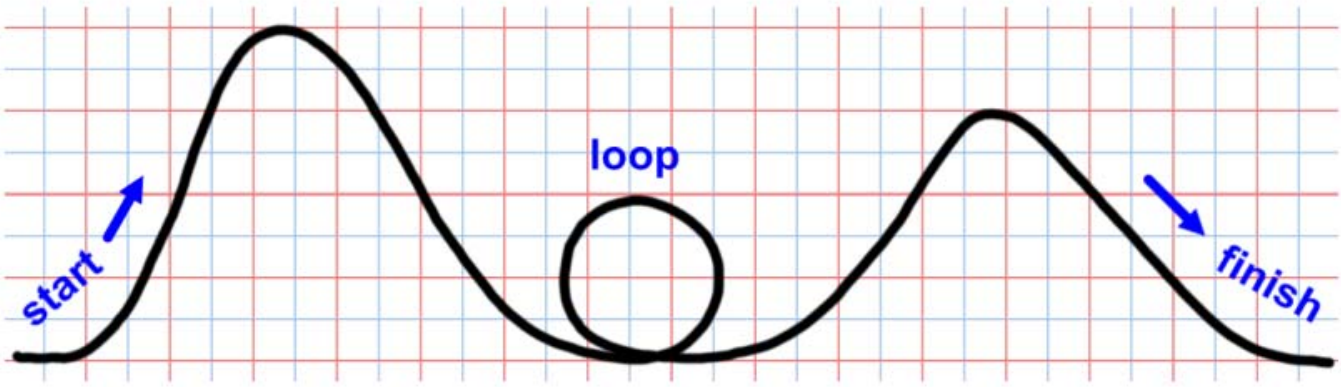
1. Write down the word equation, symbol equation and units for:

a) Gravitational potential energy

b) Kinetic energy

2. State the "Law of Conservation of Energy".

3. Label the diagram with the following letters. Use a pencil if you're not sure.



A Gravitational potential energy is highest here
B Kinetic energy is highest here
C Kinetic energy is transferred to gravitational potential energy here
D Gravitational potential energy is transferred to kinetic energy here
E Kinetic energy is transferred to heat energy here
F Roller coaster cars are accelerating here
G Motors transfer electrical energy to gravitational potential energy here

4. **Each of the red grid lines on the diagram represents 10m. A roller coaster car of mass 500kg is released from rest at the top of the first hump. g = 9.8 N/kg**

    a. **How much GPE has the car lost when it gets to the top of the second hump?**

    b. **What speed is the car travelling at when it goes over the top of the second hump? Assume all the GPE lost has been transferred to KE.**

5. **In reality the car does not travel at this speed over the second hump. Explain why.**