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Class: _____

Student worksheet

7.9 Energy is always conserved

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Conservation of energy

1 What is the law of conservation of energy?

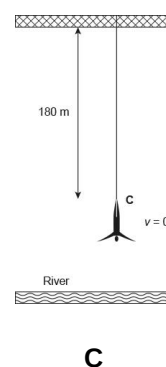
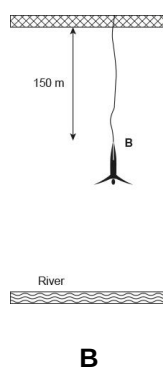
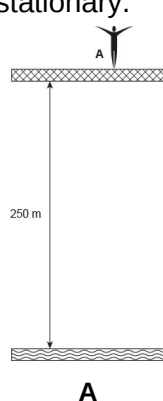
2 Which two types of energy are harnessed by a pendulum?

A student of mass 60.0 kg went bungee jumping during her holidays. The bridge from which she jumped was 250 m above a river. She was attached to a bungee cord that had an unstretched length of 150 m. You can assume that the student and the bungee cord are part of an ideal energy-conversion system. This means that no energy is 'lost' to the environment as heat or sound.

Figure A shows the student just before she jumps off the bridge.

Figure B shows the student a short time later when she has fallen a distance equal to the unstretched length of the bungee cord.

And Figure C shows the student when the bungee cord has reached its maximum length and the student is momentarily stationary.



3 At which point is the bungee jumper likely to experience the most kinetic energy?

4 At which point is the bungee jumper likely to experience the most elastic energy?



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- 5 What was the student's gravitational potential energy at point A as shown in Figure 1? Provide your answer in joules. (Remember: $GPE = \text{mass} \times \text{gravity} \times \text{height}$)

- 6 How much elastic potential energy is stored in the bungee cord when the student has fallen 180 m and reached point C as shown in Figure 3? Give your answer in joules.

Extend your understanding

A pendulum, as shown in Figure 4, is known to have an efficiency of 95% on each swing.

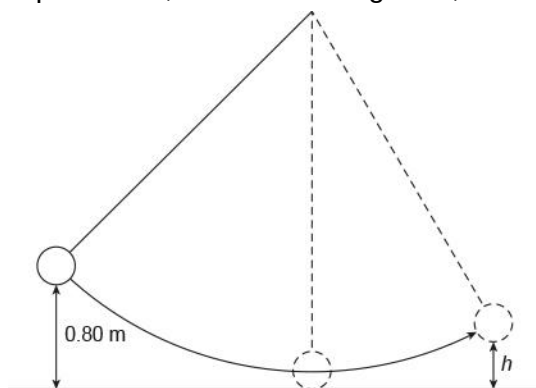


Figure 4

- 7 To what height, h , would the pendulum bob rise after a single swing if it was being released from a height of 0.80 m as shown? Give your answer in metres.



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- 8 How far below its release height of 0.80 m would the pendulum bob be after its return swing? Give your answer in metres.
