Energy Stores Practice

1 Link each situation with the right energy store.

A hot water bottle	Thermal energy
A moving trolley	Kinetic energy
Two charged balloons	Electrostatic energy
A book on a table	Gravitational potential energy

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2 Which energy store is the energy moved from and to which one(s) does it go to?

(a) An atom of Uranium breaking apart.

(b) A burning marshmallow.

(c) A cyclist pedalling to the top of the hill and continuing going.

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3 Complete the conservation of energy equation.
Total energy of the system _____ =

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4 When a pop-up toy is held down, it has an elastic potential energy of 3000 J. Once released it jumps to up to a height of 5 cm. At that point it is no longer moving.

(a) What energy store is filled at its highest point?

(b) How much energy is in this store?

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5 You want to climb Ben Nevis. At the top, you will have a gravitational potential energy of $807,000$ J. You want to bring chocolate bars with you as a snack. If a chocolate bar has $810,000$ J of chemical energy, how many chocolate bars will you need to to give you enough chemical energy to reach the top?

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6 A battery is used to power a drill. When the drill head spins it has a store of kinetic energy and a store of thermal energy. The battery has a total chemical store of 4000 J. How much energy is in

(a) the kinetic energy store of the drill if it takes $\frac{3}{4}$ of the battery's energy?

(b) the thermal energy store of the drill?

7 A toy hot air balloon floats 1 m off the ground. At this height, it has a gravitational potential energy of 10 J.

(a) How much energy is needed in its thermal store to get it to that height?

(b) If a fifth of its thermal energy is dissipated as heat to its surroundings, how much gravitational potential energy will it have when it floats?

(c) Will it float at the same height as before?

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8 A cyclist travels down a mountain at the same speed. They have a kinetic energy of $2,240$ J. The altitude of the cyclist and their gravitational potential energy is recorded in the table below.

Altitude $(\mathbf{m})$	800	700	600	500	400
Gravitational potential energy $(\mathbf{J})$	$560,000$	$490,000$	$420,000$	$350,000$	$280,000$

(a) By how much does the cyclist's gravitational potential energy store go down every 100 m?

	Top of the mountain	Halfway point
Gravitational potential energy $(\mathbf{J})$	$560,000$	$280,000$
Kinetic energy $(\mathbf{J})$	0	$2,240$

(b) The table above shows the energy in the cyclist's gravitational potential and kinetic energy at the top of the hill and halfway down the mountain. How much energy is not in one of these stores at the halfway point?

(c) Where does this energy go?

(d) Is this a useful store in this case?