

ENERGY Activity Sheet 1

Alton Towers
RESORT

Energy transfer

When energy is used it does not disappear, it is transferred into different forms of energy.

Law of Conservation of Energy

Energy cannot be created or destroyed.

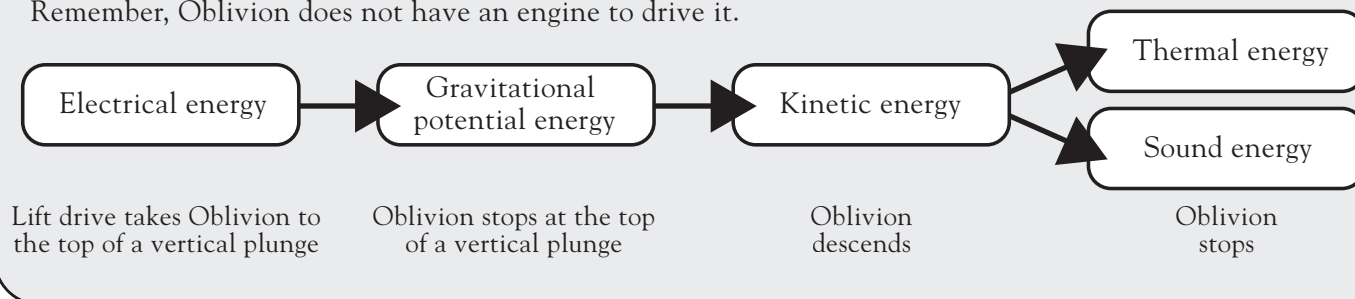
Energy at a theme park

The two most important forms of energy for theme park rides are:

- **Kinetic energy** – the energy an object has because it is moving.
- **Gravitational potential energy** – the energy that an object has because it is above the surface.

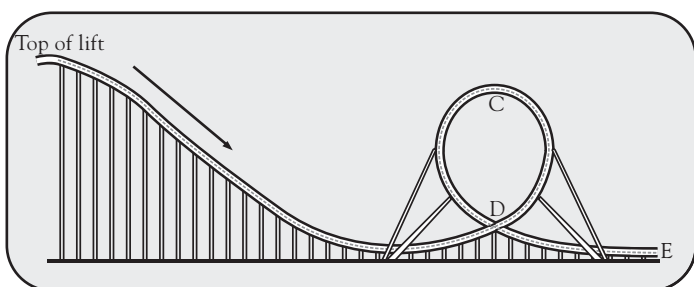
Transfer of energy on Oblivion

Remember, Oblivion does not have an engine to drive it.

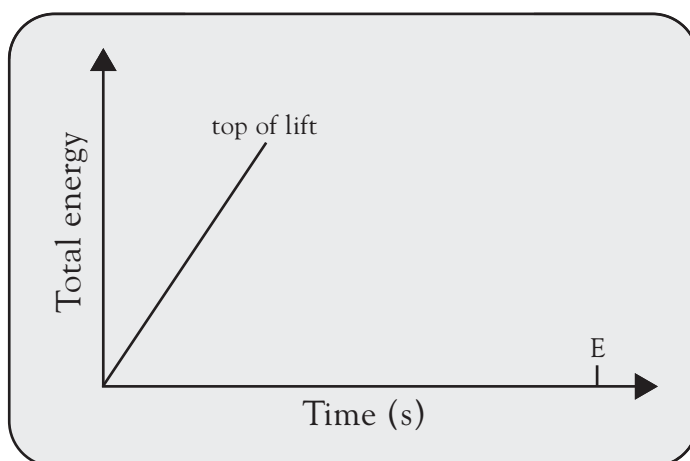


Activity 1

This is the path that Nemesis takes from the top of the lift to the loop.



- Label the point of maximum gravitational potential energy as A.
- Label the point of maximum kinetic energy as B.
- What is happening at point C?
- What is happening at point D?
- Show the transfer of energy as a flow diagram.
- Complete the graph to the right to show total energy against time from the top of the lift to point E.





Activity 1 Who is Right?

Sam, Jack and Katie looked at this diagram of the Blade. They made the following statements, but who is right?

The Blade



The Blade is gaining potential energy.



The Blade is losing potential energy.



The Blade is losing kinetic energy and gaining potential energy.



Activity 2 Energy explained

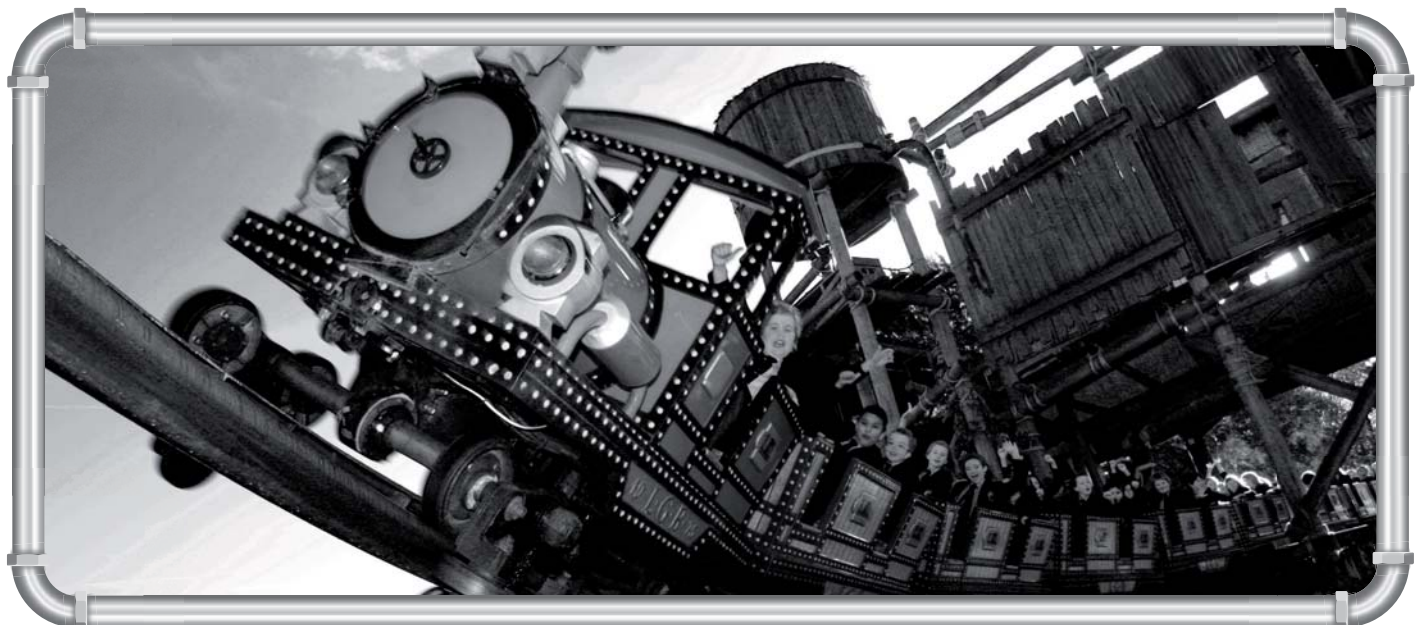
Your teacher will give you a set of cards. Each card contains a word that you will need to describe. You must try and describe the word to a partner without using any of the 'banned' words.

For example, on this card you need to describe 'free-fall' without saying 'gravity', 'drop', 'plunge' or 'vertical'. Try making up some cards of your own.

FREE-FALL

Banned Words:

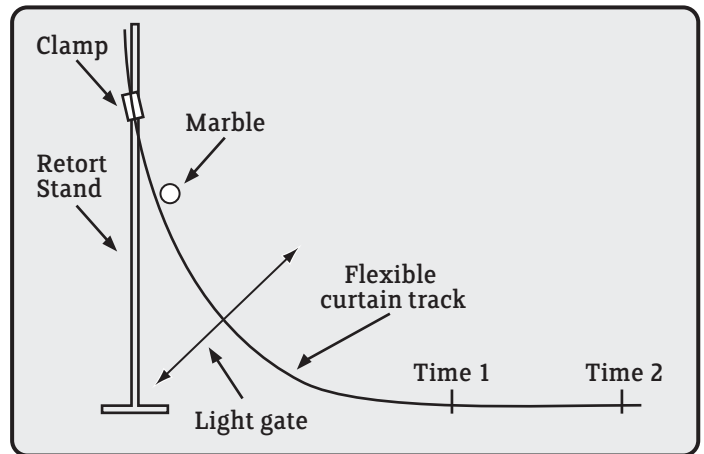
Gravity
Drop
Plunge
Vertical





Activity 1 Potential energy experiment

When you roll a marble down a track, its potential energy is converted to kinetic energy. Find out what happens when you roll a marble down a track at different angles and from different heights. Record your findings in the table below.



	Speed of marble	Height of drop	Mass of marble
Angle 1			
Angle 2			
Angle 3			

A Set up the track so that it is the same shape as the bottom half of the letter 'C'. You will be rolling the marble from the top of the track.

i Measure the height that you drop the marble from.

ii Record the marble's speed on the straight section of the track using a light gate, or by timing it and working out the speed using distance ($t_2 - t_1$).

B Set up the track so that it is at a different angle, but the marble is dropped from the same height. Record the marble's speed on the straight section of the track using a light gate, or by timing it and working out the speed using distance ($t_2 - t_1$).

i Does the speed of the marble on the straight section of the track vary when you change the angle of the track?

ii Is the marble's speed affected if you vary the height of its starting point on the track?

iii What happens if you use marbles of different masses?

ENERGY Activity Sheet 4



Activity 1

Oblivion's mass fully loaded is 12,000kg. The fully-loaded ride is poised 60 metres above the ground at the top of a vertical plunge. As it hurtles down the track it loses over 7,000,000J of potential energy.

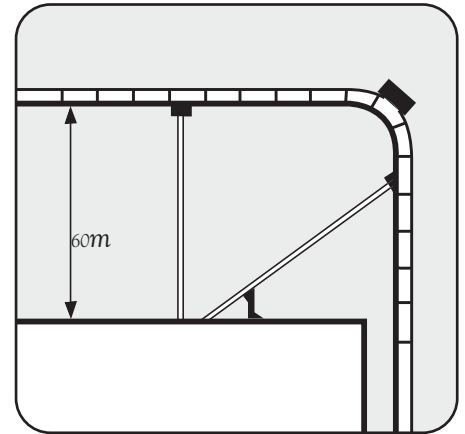
A Tick the box next to the correct statement about the kinetic energy of Oblivion.

While Oblivion was poised at the top of the hill it had over 7,000,000J of kinetic energy.

While Oblivion descends on its downwards plunge its potential energy is transformed into kinetic energy.

While Oblivion descends its kinetic energy remains constant.

While Oblivion is descending it loses kinetic energy.

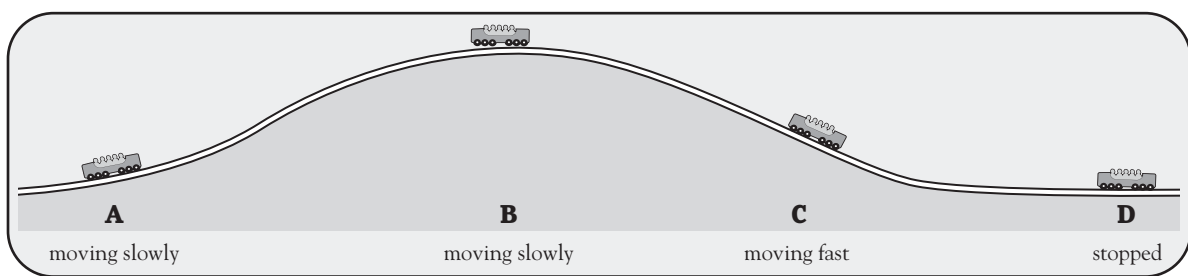


B How much kinetic energy does Oblivion have at the lowest point on its track?

C When Oblivion reaches the end of its exit track it stops and loses all its kinetic energy. What happens to this energy?

Activity 2

The diagram below shows riders on The Flume as it approaches and descends the final drop.



• Where does The Flume have the most kinetic energy? Tick the correct box.

A	B	C	D
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

• Where does The Flume have the most potential energy? Tick the correct box.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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• Where does The Flume have the least potential energy? Tick the correct box.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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• The Flume used some energy to come over the drop. Where was this energy transferred to by the time it reached position D?
