Kinetic Energy
## STUDENT INTRODUCTION

▶ Kinetic energy is evident all round you at the Isle of Wight Steam Railway

▶ This follow-up activity enables you to engage with what you have learned about speed and energy at the Isle of Wight Steam Railway (using on-site resource numbers 101621 or 101622)

Prior Learning

Students need to have done the following to make use of this resource:

▶ Complete the on-site resource number 101621 or 101622
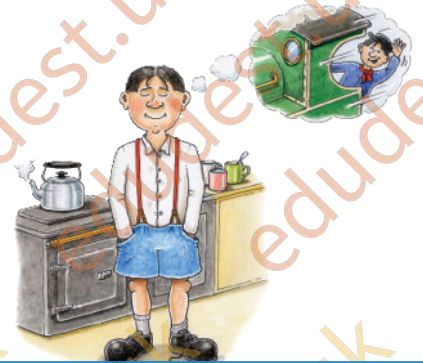
Kinetic Energy

Kinetic energy is the energy of motion. An object that has motion has kinetic energy. The amount of kinetic energy that an object has depends upon two variables:

a) the mass of the object

b) the speed of the object.

The following equation is used to represent the kinetic energy of an object:

Kinetic energy = ½ x **mass** x **(velocity)²**
(Joules, J)   **(kilograms, kg)**   **(metres per second, m/s)²**

You can now use this formula to work out various calculations about your train journey.

Task 1

"Look at page 3 to find out the mass of the engine that pulled your carriage on your visit...

For each carriage allow 25 tonnes..."

(1 tonne = 1000kg)

Calculate the mass of all the carriages in kilograms. Can you remember how many carriages there were during your visit? If not, use the average, which is 4.

Task 2

When on-site, you completed worksheet 101621 or 101622 and you calculated the speed of the train for different sections of your journey (for the purpose of this worksheet we shall call this the velocity).

Use this information to complete the table below, showing how much kinetic energy there is in the carriages for each section of the journey. You will need to change the speed from miles per hour (mph) to metres per second (m/s) using this formula:

Stage	Av. speed miles/hr (as calculated on your previous worksheet 101621/2)	Av. velocity^2 (metres/sec^2)	Mass of entire train (tonnes)	Mass of entire train (kg)	Kinetic energy (J)
1					
2					
3					
4					
5					
6					
7					
8					

Locomotive	Type	Mass (tonnes) (approx)	Built	Moved To IoW
Calbourne	0-4-4T	49	1891	1925
Freshwater	AIX 0-6-0T	28	1877	1913
Newport	AIX 0-6-0T	28	1878	1902
Invincible	0-4-0ST	28	1915	1971
Ajax	0-6-0T	40	1918	1972
Royal Engineer	0-6-0T	49	1953	1992
D2554	0-6-0DM	30	1955	1966
D2059 ("Edward")	0-6-0DM	31	1959	1988
235	0-4-0DM	22	1945	1992