Kinetic Energy

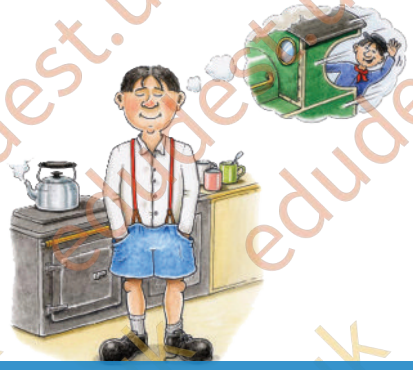
STUDENT INTRODUCTION

- Kinetic energy is 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 (using on-site resource numbers 101621 or 101622)

Prior Learning

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

- Complete the on-site resource number 101621 or 101622



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

"The mass of the engine is approximately 50 tonnes and each carriage has a mass of approximately 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:

mph x 0.447 = m/s

You may round your answers to whole decimals.

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)
e.g.	10	20	100	100,000	1,000,000
1					
2					
3					
4					
5					
6					
7					
8					