

**Down to Earth  
KS3**

## **Student Worksheet**

# **Impactor Speed**

**national  
museum  
wales  
amgueddfa  
cymru**



## Impactor Speed

The aim of this activity is to use vectors and Pythagoras' theorem to work out the speed at which the impactor hits the comet.

### Objectives

The students will:

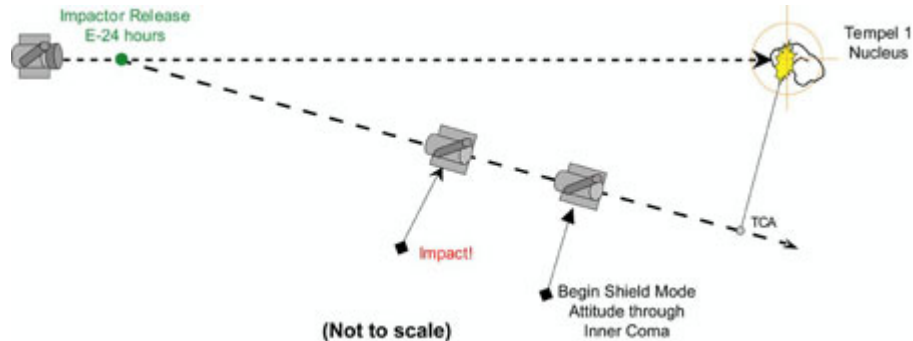
- Remember that velocity is a vector
- Calculate the relative velocity of the comet and impactor

### Resources required

Paper, pencils, example sheet.

### Activity

1. How fast will the impactor be moving when it hits Tempel 1?



The x, y, and z velocities (in kilometers per second) for the comet

$$\begin{aligned} x &= 27.09 \text{ km/s} \\ y &= -11.40 \text{ km/s} \\ z &= -5.46 \text{ km/s} \end{aligned}$$

and the impactor spacecraft

$$\begin{aligned} x &= 18.41 \text{ km/s} \\ y &= -12.67 \text{ km/s} \\ z &= -0.16 \text{ km/s} \end{aligned}$$

- a) From these, can you determine the velocity of the impactor spacecraft relative to the comet at the time of impact? (See Example Sheet for additional help)

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.....Use additional paper if necessary.

**See the follow on activity: Collision energy**