



**Down to Earth  
KS3**

## Student Worksheet

# How long until the event is seen from Earth?

*national  
museum  
wales  
cymru*



## How long until the event is seen from Earth?

In this activity the students work out how long it takes light to travel from the comet to Earth, and how long after the collision we will see the event.

### Objectives

Students will:

- Remember the equation relating distance, time and velocity.
- Use the above equation to find out how long it takes light from comet Tempel 1 to reach the Earth.
- Understand why the impacting spacecraft needs to operate autonomously and not rely on commands sent from scientists on the Earth.

### Resources required

- Pens and paper.

### Introduction

When the comet Tempel 1 is struck by the impacting spacecraft it will a long way away from the Earth. This means that observers will have to wait for the light to travel from the comet to the Earth before we can see the event.

### Question:

1. How long after the impact happens will it be visible from Earth?

### Hints

- The comet (and therefore the impact) will be 0.895 Astronomical Units (AU) away from Earth.
- One AU is the average distance between the sun and the Earth, or roughly equal to 92,960,000 miles.
- One mile is equal to 1.6093 km.
- The speed of light in a vacuum is  $2.998 \times 10^8$  m/sec (299,800,000 m/s).

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

2. Why is answer to the above question one of the reasons why the impacting spacecraft have to be able to think for itself?

.....

.....

.....

.....

.....

.....

**For comparison, try these questions as well.**

As for the questions for comparison, use the distance you calculated and the given speeds to work out the travel times:

3. How long would it take to travel the distance between the comet at impact and Earth if you were: Flying in a jet at around 300 miles per hour (480 kilometers/hour)?

.....

.....

.....

.....

.....

.....

4. How long would it take to travel the distance between the comet at impact and Earth if you were: Driving in a car at 65 miles per hour (105 kilometers/hour)?

.....

.....

.....

.....

.....

.....

5. How long would it take to travel the distance between the comet at impact and Earth if you were: Riding a horse at around 8 miles per hour (13 kilometers/hour)?

.....

.....

.....

.....

.....

.....

6. How long would it take to travel the distance between the comet at impact and Earth if you were: Taking a casual walk at around 30 feet per minute (0.5 kilometers/hour)?

.....

.....

.....

.....

.....

.....