

## Ejecta and Plume Activity Report Sheet

### Part One

In this activity, you will be using scale images. There is a line on Card EP1 that has open circles at each end. Use your ruler to measure the length of the line in Card EP 1, making sure that you measure the same place on the open circle each time you measure.

Record your measurement right above the data table.

That length is equal to three kilometers in the actual comet Tempel 1.

The ellipses shown in Cards EP 2 to EP 8 outline the outer edges of the ejecta curtain of hot gas and dust and the plume from the impact of comet Tempel 1 and the Deep impact impactor spacecraft. These images were taken at intervals of 0.84 seconds.

The four open circles on each ellipse mark the ends of the long axis,  $a$ , and the short axis,  $b$ . Starting with Card EP2 measure the lengths of the long and the short axes of ellipses. Measure the same place on the open circles each time you measure.

Record your measurements in centimeters in the data table below.

Measurements from card EP1

Length of line in card EP1 = \_\_\_\_\_ cm.

Card No.	Length of long axis $a$ (cm)	Length of short axis $b$ (cm)
EP 2		
EP 3		
EP 4		
EP 5		
EP 6		
EP 7		
EP 8		

## Part Two

Use the length of the line you measured in Card EP 1 to convert each of your actual measurements in centimeters to scale measurement in kilometers. Record your results in the table below.

Card No.	Length of long axis a (km)	Length of short axis b (km)
EP 2		
EP 3		
EP 4		
EP 5		
EP 6		
EP 7		
EP 8		

### Part Three

Using the lengths of the two axes, a and b, as recorded in kilometers in the Part 2 data table, calculate the area of each of the ellipses. The formula for finding the area of an ellipse is  $\pi$  times a times b. Record your answers in the data table. Remember to include your units.

Card No.	Area = $\pi \frac{1}{2}a \times \frac{1}{2}b$
EP 2	
EP 3	
EP 4	
EP 5	
EP 6	
EP 7	
EP 8	

## Part Four

Calculate the rate of expansion of the ejecta plume, using the areas calculated in Part Three. Remember that the images were taken point eight four seconds apart. Record your answers in the data table below.

Card No.	Difference in area	Difference in time	Rate of change area change/ time change
EP2-EP3		0.84 sec	
EP3-EP4		0.84 sec	
EP4-EP5		0.84 sec	
EP5-EP6		0.84 sec	
EP6-EP7		0.84 sec	
EP7-EP8		0.84 sec	