



Name:				
Class:				

## **ACTIVITY SHEET**

## 4.5 Fusion power and the Sun's source of energy

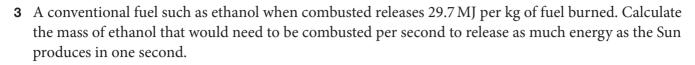
Well before Einstein suggested the equivalence between energy and mass, the source of the Sun's energy posed a problem to science.

It was known that Earth's distance from the Sun was about 150 million km, and that the Sun's radiant intensity on the surface of Earth is about  $1000 \, \mathrm{W \, m}^{-2}$ .

1 Calculate the surface area of a sphere with a radius equal to the distance between Earth and the Sun in  $m^2$ . (Use  $A = 4\pi r^2$ .)

**2** Hence calculate the power being emitted by the Sun by multiplying your answer to Question **1** by the value of solar radiation intensity on Earth's surface.





4 Now use the formula  $E = mc^2$  where  $c = 3.0 \times 10^8 \, \text{m s}^{-1}$  to find the amount of mass being converted into energy in the Sun each second.

5 Which of your answers to Questions 3 and 4 requires the least amount of mass to be used as fuel? Does this give an indication as to the source of energy inside the Sun? Explain your answer.