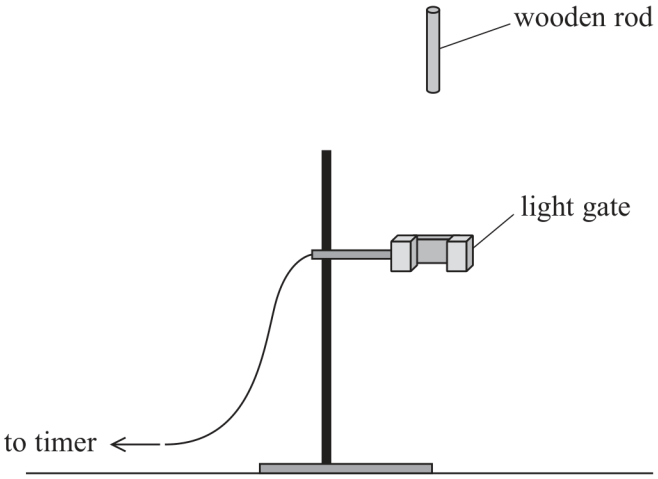
12 A student carries out an experiment to determine a value for g, the acceleration of free fall. A short wooden rod is released above a light gate. A timer connected to the light gate is used to measure the time taken for the wooden rod to pass through the light gate.

The experimental arrangement is shown.



The student uses the equation $v^2 = u^2 + 2as$, where $u = 0$, and a graphical method to determine a value for g.

(a) State the additional measurements the student should take.

(2)

(b) Describe how the velocity v of the wooden rod as it passes through the light gate can be determined accurately.

(2)

(c) Describe how the student can determine a value for g using a graphical method.

(3)

(Total for Question 12 = 7 marks)