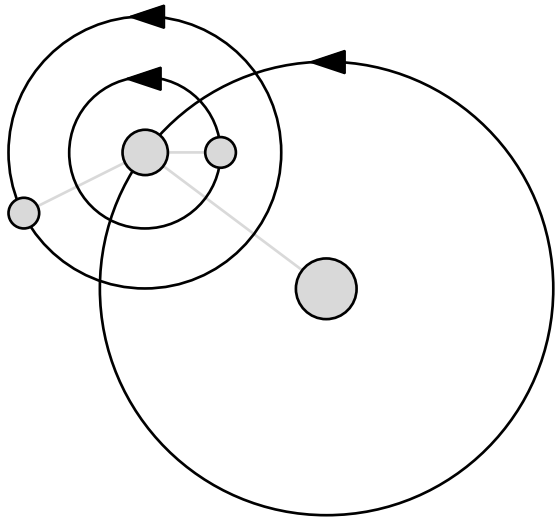
Liverpool Physics Olympics 1997



Martian Motion

Aim To simulate the motion of Mars around the Sun and the Martian moons Phobos and Deimos around Mars.

Materials 1 stopwatch 3 lengths of rope

Method In this simulation, each team member represents one of the heavenly bodies. The period of Mars' orbit around the Sun is 50 s. The periods (in seconds) of Phobos and Deimos are determined by Kepler's law:

$$\text{period}^2 = 64 \times \text{radius}^3$$

The radii of the orbits of Phobos and Deimos are 1 m and 1.842 m, respectively.

Conditions
- The team members start in a straight line (in the order Sun, Mars, Phobos and Deimos) and orbit in an anticlockwise sense.
- The ropes are to be used to maintain the correct relative distances.
- No timing devices other than the stopwatch provided may be used.

Time limit 15 minutes planning/practice followed by the judged motion.

Ranking The ranking order will be determined by the the accuracy of the team members' motion during a two-minute judging period.

Team ***Result***

Do not write below line

Mars		
Phobos		
Deimos		

Rank