SCIENCE AT O'BRIEN GROUP ARENA

Grade 10

$$Speed = \frac{Distance}{Time\ Travelled}$$

In the sport of competitive speed skating, it is important for competitors to be able to calculate their racing speed for various reasons.

1. For the 2014 Sochi Winter Olympics, the qualifying time for the 500m Men's short track was 42 seconds. Calculate the average speed required to achieve this time. Give your answer in metres per second and to one decimal place.

2. The 2014 Russian 5000m relay team received gold medals finishing their race in 6.75 minutes. There are four skaters in the relay team.
   a. What is the average speed the team needs to reach to achieve this time? Give your answer in metres per second to two decimal places.

   b. If skater 1 has an average speed of 8 metres per second, skater 2 has an average speed of 11 metres per second and skater 3 has an average speed of 14 metres per second, what average speed does skater 4 need to reach to complete the race in 6.75 minutes?

3. Jorien Ter Mors from the Netherlands won gold in the Sochi 1500m Women's Finals, racing in 1minute and 53 Seconds.

    a. Calculate Jorien's average velocity in seconds per metre. Round your answer to two decimal places

    b. After 4 seconds into the race, Jorien had reached a speed of 8.34 m/s. Calculate her average rate of acceleration.

    c. If Jorian weighed 53kg at the time of her race, calculate the force exerted to reach this rate of acceleration.

4. If a competitor in the same race weighed 60kg, calculate the amount of extra force required to reach the same rate of acceleration, in comparison to Jorien.