

ACCELERATION AND PAIRS OF FORCES

- A. In Figure 1, the student pushes the desk starting from rest. The student reaches a speed of 3 m/s in 2 s. In Figure 2, the students together push the desk from rest to a speed of 6 m/s in 2 s. In each case, find the acceleration of the desk and the force applied to it. Fill answers in the spaces provided.

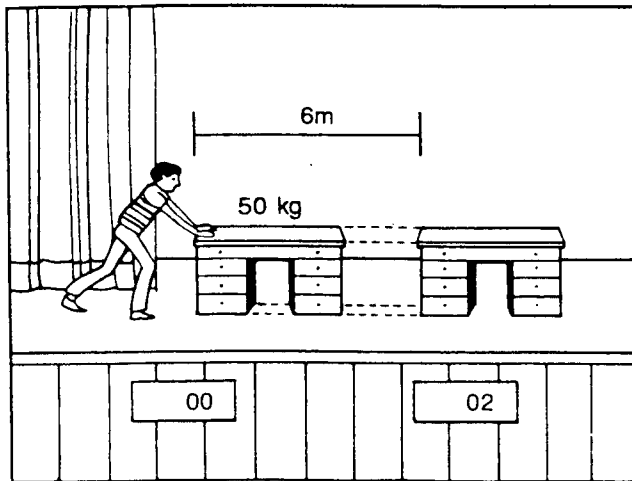


Figure 1.

$$\begin{aligned} \text{Acceleration} &= \frac{3 \text{ m/s} - 0 \text{ m/s}}{2 \text{ s}} \\ &= 1.5 \text{ m/s/s} \\ \text{Force} &= m \times a \\ &= 50 \text{ kg} \times 1.5 \text{ m/s/s} \\ &= 75 \text{ N} \end{aligned}$$

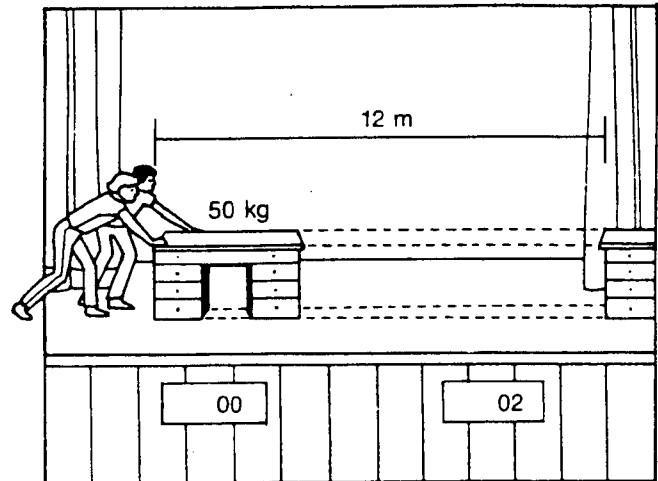


Figure 2.

$$\begin{aligned} \text{Acceleration} &= \frac{6 \text{ m/s} - 0 \text{ m/s}}{2 \text{ s}} \\ &= 3 \text{ m/s/s} \\ \text{Force} &= m \times a \\ &= 50 \text{ kg} \times 3 \text{ m/s/s} \\ &= 150 \text{ N} \end{aligned}$$

- B. Forces always act in pairs. Describe the pairs of forces in the pictures above. _____

The students apply a forward force on the desk. The desk applies a force in the opposite direction on the students.