

Modelling in mechanics 8B

- 1 a** Modelling the ball as a particle means we can ignore the rotational effect of any external forces that are acting on it and the effects of air resistance, and assume all the mass acts at a single point.
- b** Assuming air resistance is negligible means we can ignore the frictional effects of the air on the football.
- 2 a** Modelling the puck as a particle means we can ignore the rotational effect of any external forces that are acting on it and the effects of air resistance, and assume all the mass acts at a single point.
- b** Modelling the ice as smooth means we can ignore any friction between the puck and the ice.
- 3** Modelling an object as a particle means that the effect of air resistance is ignored but, for a parachute, this force is significant.
- 4 a** Modelling the fishing rod as a light rod means we can assume it has no mass or thickness and is rigid and unbending.
- b** While the mass of the rod may be negligible in comparison with the reel or any fish it is designed to catch (justifying the 'light' assumption), and narrow compared to its length (allowing it to be treated as a one-dimensional object) rigidity is not a desirable property of fishing rods, so it is not appropriate to consider it as a rod.
- 5 a** Model the golf ball as a particle, and ignore the effects of air resistance.
- b** Model the child and sledge as a single particle, consider the hill to be smooth, and ignore the effects of air resistance.
- c** Model the objects as particles, the string as light and inextensible, and the pulley as smooth.
- d** Model the suitcase and handle as a single particle, consider the path to be smooth, and ignore friction between the wheels and their holdings.