9le More machines

1 Any uses of pulleys, such as on cranes, in lifts, some weights machines in gyms, raising blinds (although these usually do not change the force required, only its direction).

2 Any uses of ramps, such as loading lorries or ships; emergency escape chutes from aeroplanes (which reduce the downward force on exiting passengers, so they do not hit the ground as fast); zig-zag roads up hillsides; wheelchair ramps into buildings (although this is also connected with the need for wheels to move easily on the ramp).

3 **a** 1000 N × 2 m = 2000 J

b 500 N × 4 m = 2000 J

4 **a** The force has to move further (accept 'because of conservation of energy').

b There will be some friction between the block and the ground as the block is pushed up the ramp. This means that the force needed will be a little more than 500 N, so the total energy transferred (work done) will be more than 2000 J.

c Students' own responses.