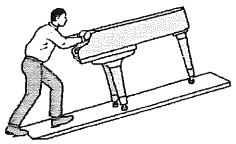
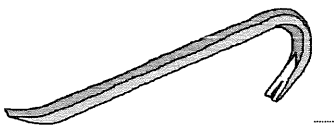
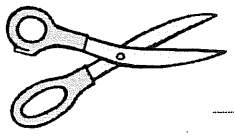
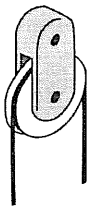
Simple machines

1. The following pictures show simple machines. Next to each one, write what type of machine it is.

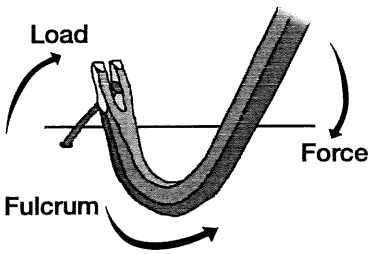
(a)  _____

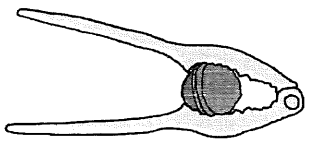
(b)  _____

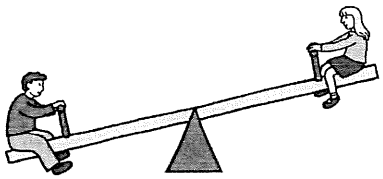
(c)  _____

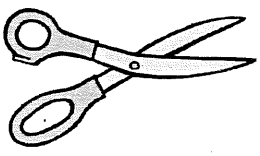
(d)  _____

2. Levers have three parts: the fulcrum, the load and the effort. On each of the following diagrams, label these three parts. The first one has been done for you as an example.

(a) 

(b) 

(c) 

(d) 

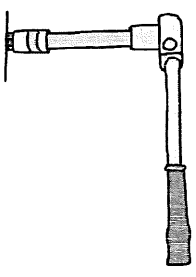
3. Use the words from the box to complete the passage below.

force	simple machines	increase

Levers, screws and inclined planes are all examples of (a)_____. They reduce the amount of (b)_____ required to lift the load. They work to (c)_____ the distance the load travels.

4. In your book, write an explanation of how simple machines help you lift heavier loads. To help you, use the passage you completed in question 3 and the joining words *by* and *which*.

5. Explain, in terms of force, effort and distance, why you use an extender on a socket wrench to make turning a nut easier.



_____

_____

_____

Answers

Simple machines (pp 5–7)

Basic

1. (a) Lever
   (b) Lever
   (c) Inclined plane
   (d) Pulley
   (e) Inclined plane
   (f) Lever
   (g) Inclined plane
   (h) Inclined plane
2. *Teacher to check answers.*
3. (a) simple machines
   (b) force
   (c) increase
4. *Possible answer:* Levers, screws and inclined planes are all examples of simple machines which reduce the amount of force required to lift the load by increasing the distance the load travels.

Proficient

1. (a) Inclined plane
   (b) Lever
   (c) Lever
   (d) Pulley
2. *Teacher to check answers.*
3. (a) simple machines
   (b) force
   (c) increase
4. *Possible answer:* Levers, screws and inclined planes are all examples of simple machines which reduce the amount of force required to lift the load by increasing the distance the load travels.
5. An extender is used on a socket wrench because it increases distance between the effort and the pivot. This means that the force applied is less.

Advanced

1. *Teacher to check answers.*
2. An extender is used on a socket wrench because it increases distance between the effort and the pivot. This means that the force applied is less.
3. A screw is an example of an inclined plane; a nail is not. Because the screw is an inclined plane, the gib board is in contact with the screw for a far longer distance than it would be with a nail so the amount of contact force is far greater and the gib board is held far more securely.
4. Test one: Teague and Keefe get on the seesaw, sitting on either side of the pivot but the same distance from it. Whoever goes up into the air is lighter so the heavier boy is on the ground.
   Test two: The heavier boy gets on the seesaw with AJ on the opposite end, and both boys again sit at the same distance from the pivot. Whoever is on the ground is therefore the heaviest boy of the three.
   Test three: The boy who was the lighter boy in test one gets on the seesaw with the lighter boy in test two; they sit at opposite ends but the same distance from the pivot and the boy who goes up is the lightest of the three boys.

Balanced and unbalanced forces (pp 8–10)

Basic

1. (a) push
   (b) pull *(or (a) and (b) can be in reverse order)*
   (c) direction
   (d) speed up
   (e) slow down *(or (d) and (e) can be in reverse order)*
2. *Teacher to check answers.*
3. By putting your foot on the ground, you create friction between your foot and the ground. This friction acts as a drag force in the opposite direction to the one you are travelling in, and so you and the skateboard slow down.

Proficient

1. *Teacher to check answers.*
2. By putting your foot on the ground, you create friction between your foot and the ground. This friction acts as a drag force in the opposite direction to the one you are travelling in, and so you and the skateboard slow down.
3. The person on the left is far heavier (has far greater mass) than the person on the right. We can infer this because the left-hand person is closer to the pivot (fulcrum) of the seesaw than the person on the right, yet the seesaw is balanced – it is not moving up or down.

Advanced

1. *Teacher to check answers.*
2. By putting your foot on the ground, you create friction between your foot and the ground. This friction acts as a drag force in the opposite direction to the one you are travelling in, and so you and the skateboard slow down.
3. The person on the left is far heavier (has far greater mass) than the person on the right. We can infer this because the left-hand person is closer to the pivot (fulcrum) of the seesaw than the person on the right, yet the seesaw is balanced – it is not moving up or down.
4. In strong winds, sailors often "reef the sails" to reduce the surface area of the sails out in the wind so that the sails don't rip and the boat speed is reduced to a safe level.

Energy transformations (pp 11–13)

Basic

1. Potential energy: Gravitational energy, Chemical energy, Elastic energy, Nuclear energy; Using energy: Thermal energy, Kinetic energy, Electrical energy, Light energy, Sound energy
2. (a) Nuclear energy
   (b) Kinetic energy
   (c) Elastic energy
   (d) Chemical energy
3. Candle being lit (e); Electric drill being used on wall (c); Electric garage door opening (b); A TV set being turned on (d); A chocolate bar being eaten (a); A barbecue being turned on (e)
4. (a) Heat energy
   (b) Elastic energy, Kinetic energy
   (c) Elastic potential energy
   (d) Chemical potential energy