Y5 Levers Pulleys Gears

KS2 Y5 Science · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

How does a lever help you lift a heavy rock?

Step 1 · Put a strong bar over a pivot

The pivot is the point the lever turns on

Step 2 · Put the load close to the pivot

The rock goes on the short end

Step 3 · Push down on the long end

A small push far from the pivot lifts a heavy load near it

Answer: A long lever with the pivot near the load lets a smaller force lift a heavier load.

Check: The trade-off: you push your end a long way down to lift the rock a little way up.

2. Now try one with the steps

Find the pivot, load and effort in a pair of scissors.

Step 1 · Pivot

Step 2 · Load

Step 3 · Effort

Answer:

3. Practice

Have a go at each one. There is space underneath to work it out.

1. What is the name of the point a lever turns around?

2. Name THREE simple mechanisms that let a smaller force have a bigger effect.

3. Give an example of a lever used in everyday life.

4. To lift a heavy load with a lever, should you push near the pivot or far from it?

5. What is a pulley?

6. What does a single fixed pulley change?

7. What are gears?

8. When two gears touch, do they turn the same way or opposite ways?

9. A 60 N rock is 1 step from the pivot. You push 3 steps from the pivot on the other side. How many newtons do you need?

10. A 100 N load hangs from a pulley system where 2 ropes hold it up. How many newtons must you pull?

11. With 4 ropes holding a load, how many metres of rope must you pull to lift it 1 m?

12. A 30-tooth gear turns a 10-tooth gear. When the big gear turns once, how many times does the small gear turn?

13. Why is a long spanner better than a short one for undoing a tight nut?

14. Archimedes said, 'Give me a place to stand and I will move the Earth.' What machine was he talking about?

4. Before you hand it in

Machines give you something for nothing.
Smaller force, bigger distance.

A single pulley halves the force.
You need two or more supporting ropes to reduce the force.

Gears that touch turn the same way.
A chain (as on a bike) makes linked gears turn the same way.

To make a lever easier, push close to the pivot.
Push from the pivot can.