

Simple machines used since ancient times

Every day we do many actions that require force. Most of them do not require a huge physical effort, but some involve an extra effort. Ancient people invented simple machines that helped them overcome these resistive forces. Some objects such as a pulley or a lever can multiply the force we apply. So, without simple machines, we would not be able to do lots of the things that we are able to do now, such as moving large pieces of furniture into high-rise apartments.

The wheel is a simple machine too. It was invented by the ancient Sumerians in 3500 BC and it is an easy way to move heavy loads. Moreover, the wheel is the basis of two other simple machines: the pulley and the lathe. A long time ago, there was an iron beam with a ring at the end in the front of buildings, where a pulley was fixed to take heavy objects up and down.

Water wells also use pulleys, as well as old lifts, which had a counterweight and a pulley connected to a motor.

Levers are used, for example, to open doors when there is a fire or to move objects easily with a fulcrum. Cranes also have been used since ancient times to transport heavy stone blocks required for construction. It is known that the first cranes were designed at the time of ancient Greece.

Another example of a simple machine is the inclined plane, used to transport materials easily. The inclined plane allows people in wheelchairs or people pulling a trolley to enter a building. The angle has to be well calculated, because if they are too inclined, users may find the ramp difficult to climb. It is believed that ramp systems were used in Egyptian pyramid construction to transport heavy stone blocks.

These examples show that good knowledge of physics can be very useful to carry out a wide range of daily activities that require force.

Reading comprehension and reflection

1. Translate the following words from the text into Catalan. Use a dictionary if you need to.
 - a) Overcome
 - b) Crane
 - c) Lever
 - d) Wheel
 - e) Lathe
 - f) Beam
 - g) Water wells
 - h) Counterweight
 - i) Fulcrum
 - j) Pulley

2. What are the simple machines mentioned in the text?

3. What tool would be best to use to lift a heavy load, like a fridge?

4. Provide an example of each of these:
 - a) Pulley
 - b) Inclined plane
 - c) Lever

5. Why do engineers care about simple machines? How do such devices help engineers improve society?

6. In small groups, design a machine that solves a problem, and that incorporates at least two simple machines.