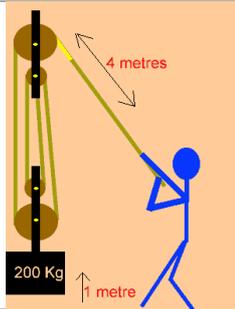


Pulleys & Sheaves

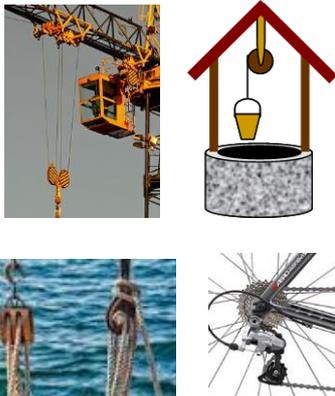


A pulley is a mechanism regularly used to change the direction of a force and/or to increase the effect of that force when moving loads, and to move a load from one place to another. Changing the force direction can help to use the gravity in user favor

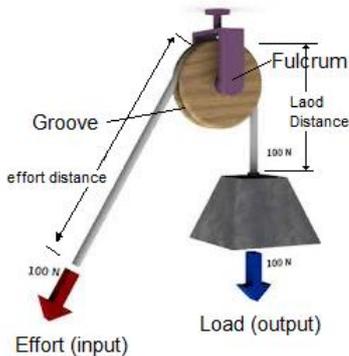


A sheave is one of the components of a pulley. It is, very often, a wheel with a groove along its surface through where a belt, a rope, or a cable passes through.

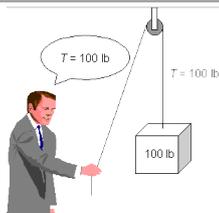
The belt, the rope, or the cable, is the other component of the pulley



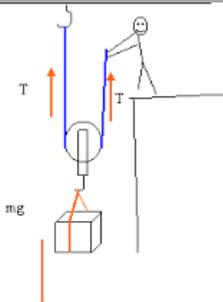
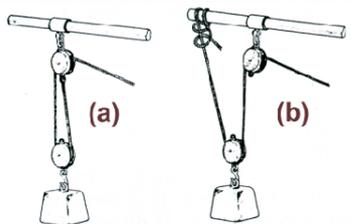
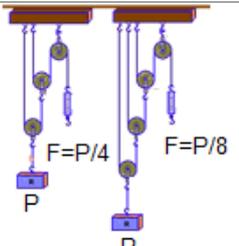
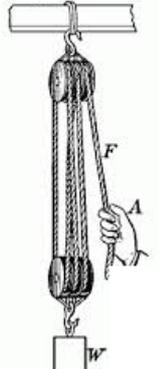
Pulleys have been used since ever in many everyday tasks, in cranes, in ships, in bikes, ...



The fulcrum is the axle of the pulley. The load is the pulley's input and the applied force or effort is the pulley output. The rope passes through the groove and serves to redirect the force direction and to transmit indirectly the applied force to the load



For an ideal fixed pulley the mechanical advantage is 1 this is, it redirects the force direction for moving the load and the applied effort is equal, in value, to the load

	<p>A free pulley redirects the force and the mechanical advantage is 2. However, it is not comfortable to use it!</p>
	<p>Combining a fixed pulley with a free one, the system offers an effort half the load value. The mechanical advantage is 2.</p>
	<p>Combining a fixed pulley with different free pulleys the system offers an effort as a fraction of the load value. The mechanical advantage is given by $P/2^n$ where n is the number of free pulleys</p>
	<p>Other complex pulley systems are often used and need more extended analysis for evaluating the mechanical advantage and for understanding other parameters as length of used rope, object rise, work, acceleration, velocity, ...</p>

Figures from internet resources