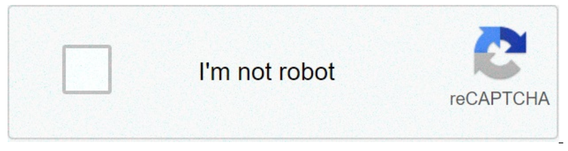

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Why is an inclined plane a simple machine

Why is an inclined plane called a simple machine.

Simple machines: objectives: Â Â Â Â Identifying the six simple machines. Explain how each simple machine works Â Â Â Â Â Calculate the mechanical advantage for each simple machine. Resources: Â Â Â Â Â Â Â Â Â «www.uark.edu/detts/aeedhp/agscience/simpmach.htm Notes: Simple machines: There are six simple machines: tilted wedge wedge with lever read and tilted axis: a tilted plane is a sloping surface Used to increase an object. Reduces the force needed to move an object by increasing the distance of the movement. The mA of a sloped plane is the length / height the mA is always> 1. "Why? The height will be shorter and shorter than the length. (Dots.physics.orst.edu/.../ incline_plane_orig.gif) wedges and screws: a wedge is simply a tilted plane moving. A wedge multiplies a force from a wider area to a smaller area. (Pensa di pressione) Longer and thinner A wedge is the least it is necessary to overcome the resistance. A screw is a tilted plane wrapped around a cylinder. The screw multiplies the Fe by acting through a longer distance. The closer the threads are the greater the mechanical advantage. Â (Em-ntserver.unl.edu/negahban/ Em223 / Note16 / IMG00006.gif) Lever: a lever is a bar that is free to move to a point of rotation when applying a FE. The pivot point is called the fulcrum. There are 3 classes of levers that the lever type depends on the position of the levers of the Fulcrum 1st class: the fulcrum is placed between the Fe and the 1st class levers multiply the Fe and change its direction. Â 2nd class: the FR is placed between FE and levers 2nd class multiply the Fe but not change its direction. Â Â Â Â «Leve Â Â Â Â« Fe is located between FR and Fulcrum Â The levers of the 3rd class multiply the distance but do not change its direction or increase its fe. Advantage Â Â Â mechanical lever: Â Â Â Â Â Â Â Â Â Â Â Â Â Â MA = FR / FE or the arm's length/strength stress length should be noted that the lever of 3rd class will always have a mechanical advantage This is less than 1. The pulleys: a pulley is a belt, chain or rope around a wheel. A pulley can change the direction or quantity of a Fe a pulley attached to a wall or a ceiling is a fixed pulley, a fixed pulley cannot multiply fe, can change only direction. The change of direction makes the lifting of the object easier. The ma = 1 â a mobile pulley is hanging on a rope so that it moves with the fe. A mobile pulley can multiply the fe. A mobile pulley cannot change the direction of the fe. The MA> 1 Advantage Â Â Â Â Â mechanical of a pulley: Â Â Â Â Â Â Â Â Â Â Â Â MM may be estimated by adding rope lengths under the upper pulley. Wheel and axis: it is a lever that rotates in aIt consists of 2 wheels of different sizes. The FE is equal to the radius if the wheel. wheel.FR is equal to the axis radius. Mechanical advantage of a lever: the MA = the wheel radius / ray of the compound axis machines: They are a combination of 2 or more simple machines. Cars, motorcycles, look,... almost everything we can think is made by simple machines. How many simple machines can you see? Background on simple machines: A machine is a device that works. Most machines consist of a number of elements, such as gears and ball bearings, which work together in a complex way. However, no matter how complex they are, all machines are somehow based on six types of simple machines. These six types of machines are the lever, wheel and axis, pulley, tilted plane, wedge and screw. Principles of simple machines: Machines simply transmit mechanical work from one part of a device to another. A machine produces strength and controls the direction and movement of force, but cannot create energy. The ability of a machine to work is measured by two factors. These are (1) mechanical advantage and (2) efficiency. Mechanical advantage. In machines that transmit only mechanical energy, the ratio of the force exerted by the machine to the force applied to the machine is known as a mechanical advantage. Under the mechanical advantage the distance that the load will be moved will only be a fraction of the distance through which the effort applies. While machines can provide a mechanical advantage greater than 1.0 (and even less than 1.0 if desired), no machine can never do more mechanical work than the mechanical work put in it. Efficiency. The efficiency of a machine is the relationship between the work it provides and the job put into it. Although friction can be decreased by oiling any sliding or rotating parts, all machines produce a little friction. A lever has high efficiency due to the fact that it has low internal resistance. The work he puts out is almost equal to the work he receives, because the energy used by friction is quite small. On the other hand, a pulley could be relatively inefficient due to a considerably greater amount of internal friction. Simple machines always have efficiencies of less than 1.0 due to internal friction. Energy conservation. Ignoring for a moment the energy losses due to friction, the work done on a simple machine is the same as the work done by the machine to carry out a sort of task. If even work works, then the machine is 100% efficient. Lever. A lever is a bar that rests on a pin. Force (strength) applied to one point is transmitted through the pin (fulcrum) to another point moving an object (load). The ideal mechanical advantage (IMA) - ignoring the internal friction - of a lever depends on the length of the leverwhich the force is applied divided by the length of the lever are that it lifts the load. The IM of a lever can be less than or greater than 1 depending on the class of the lever. There areclasses of levers, depending on the relative positions of the stress is applied, load and fulcrum. The first class levers have the centre between load and stress (LFE). If the two arms of the lever are of the same length, the stress must be equal to the load. To lift 10 pounds, an effort of 10 pounds must be used. If the stress arm is longer than the load arm, as with a load bar, the hand applying the stress travels further and the stress is less than the load. SOCIAL CONTEXT: Stained glass, pork bars and equal-arm scales are examples of a first-class lever; a pair of scissors is a first-class double lever. Second-class levers have the load located between the fulcrum and the stress (FLE). As in a flywheel, the wheel axle is the fulcrum, the handles represent the position where the stress is applied, and the load is placed between the hands and the axle. The hands applying the stress travel a greater distance and is less than the load. SOCIAL CONTEXT: In addition to a wheelbarrow, a bow barrow represents a second-class lever. A madman is a double leverage of this class. Third class levers have the stress between the load and the fulcrum (FEL). The hand applying the stress always travels at a shorter distance and must be greater than the load. SOCIAL CONTEXT: The forearm is a third class lever. The hand holding the weight is lifted by the muscles of the bicep of the upper arm which is attached to the forearm near the elbow. The elbow joint is the fulcrum. Composite levers combine two or more levers, usually to reduce stress. Applying the compound lever principle, a person could use the weight of a hand to balance a load weighing one tonne. Right of Equilibrium A lever is in equilibrium when the stress and load balance each other; that is, the sum of the torques (force times lever arm) is equal to zero. The stress multiplied by the length of the load arm is equal to the load multiplied by the length of the load arm. Wheel and axle. The wheel and axle is essentially a modified lever, but it can move a load as far as a lever can. The center of the axis serves as the fulcrum. The ideal mechanical advantage (IMA) of a wheel and axle is the ratio of the radius. If the stress is applied to the large radius, the mechanical advantage is R/r which will be more than one; if the stress is applied to the small radius, the mechanical advantage is still R/r but will be less than 1. Pulley. A pulley is a wheel over which a rope or belt is passed. It is also a shape of wheel and axle. Pulleys are often interconnected to achieve a significant mechanical advantage. The ideal mechanical advantage (IMA) of a pulley depends directly on the number of support strings, No. inclined plane. The inclined plane is a simple device that barely A car at all. The mechanical advantage increases while the slope of the inclination decreases. But the load must therefore be moved a greater distance. The ideal ideal mechanics (IMA) of an inclined plane is the length of the inclination divided by vertical increase, the so-called Run-to-Run relationship. The mechanical advantage increases as the slope of the slope decreases, but then the load must be moved a greater distance. Once again, working in equipment is equivalent to an entirely efficient system. The friction will be great if the objects have slipped along the surface of the inclined plane. The efficiency can be increased using the conjunction rollers with the inclined plane. Wedge. The wedge is a tilted plane adaptation. It can be used to increase a heavy load a short distance or to divide a log. The ideal mechanical advantage (IMA) of a wedge depends on the slim end angle. Smaller is the angle, minus the force required to move the wedge a certain distance through, for example, a log. At the same time, the quantity of split has decreased with smaller angles. Lives. The screw is actually an inclined plane wrapped in a spiral around a tree. A jackscrew combines the vine utility and lever. The lever is used to turn on the screw. The ideal mechanical advantage (IMA) of a screw is ideally the relationship between the circumference of the screw at the distance advancing during each revolution. The automatic screws, processing of their way through a dice, can be relatively efficient. The wooden screws tend to be anything but 100% efficient as considerable quantities of energy are lost to the friction and movement of matter. A Jackscrew, like those used to collect homes and other structures, combines the utility of the screw and the lever. The lever is used to turn on the screw. The mechanical advantage of a Jackscrew is quite high. tall.

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