Answers

K.d

Forces

Year 7 Science

Chapter 8

p173	1	Steering a car involves pulling on the steering wheel. A 'climb' in the plane involves a pull from the propellor and a pull from gravity on the plane. A horse gallops by pushing on the ground with its hooves. A 'dive' in the plane involves a pull from the propellor and a pull from gravity on the plane. Squeezing the balloon involves a push on the balloon from both sides. The rocket rises by quickly expanding gases pushing the rocket upwards. The rickshaw moves forward as the person pulls the rickshaw. The wheel turns as the mouse pushes the bottom of the wheel. The hot air balloon rises as the less dense air in the balloon pushes upwards. The bird flies as its wing pushes against the air.
	2	Kicking a ball, throwing a netball, hitting a ball with a cricket bat, writing with a biro, using a touch screen, pressing buttons, sitting on a chair, using a knife to cut a piece of toast, closing a door, a speaker producing sound.
	3	Gravity is a non-contact force involved in all examples on this page.
	4	All examples on this page involve friction.
p174	1	The SI unit of force is the Newton (N).
	2	The SI unit of length is the metre (m).
	3	The SI unit of mass is the kilogram (kg).
	4	Compression meters measure push.
	5	A meter is a device for measuring. A metre is the SI unit of length.
	6	Extension meters measure the size of the pull. Compression meters measure the size of the push.
p175	1	Gravity is the force of attraction between two objects.
	2	Gravity on the Moon less than gravity on Earth because the Moon has a smaller mass. There is thus less force of attraction between an object and the Moon than between the same object and the Earth.
	3	Gravity is a pull force.
	4	Gravity varies throughout the universe because the mass of objects in the universe vary considerably.
	5	Mass throughout the universe varies considerably from massive stars to miniscule asteroids and gases.
	5	The gravity on the Moon is 1/6 that of the Earth. I would be deduced that the mass of the Moon is 1/6 that of the Earth.
	6	An anti-gravity device would be based on a pushing force of repulsion between two objects instead of a pulling force of attraction between two objects.

p177	′ 1	Ice, wet slate, greased surface, round objects such as wheels, fluids such as water in a hose.
	2	Five examples of surfaces that have large friction: Carpet, sandpaper, resin for weightlifting, rough timber, bitumen roal surface, tyres.
	3	Friction is useful for walking, brakes on cars, nails in buildings.
	4	Friction is a problem in that it generates heat (gears), wears away surfaces (car tyres), slows moving objects (air resistance).
	5	Friction will slow motion. Air resistance may be reduced by adjusting the shape of the object such as rounded surfaces, and by changing the texture of the object's surface (such as polishing the surface).
	6	Friction will wear away surfaces. Friction between surfaces can be reduced by using a lubricant (grease and oil), or by using bearings. Lubricants and bearings have extensive use in cars.
	7	Use a fan to circulate air over the surface of the computer processors. Use circulated water to cool the computer processor similar to the radiator in a car. Use metal fins to conduct heat from the computer processor similar to the fins on motorcycle engines.
	8	Underinflated tyres cause increased friction and needs more engine power to overcome. Thus using more fuel.
n170) 1	North pole and the south pole
p1/)	2	Sketch of the magnetic field of a magnet.
	3	b) Like poles repel and unlike poles attract.
	4	a) repel b) attract c) attract d) repel
	5	The opposite poles of two magnets attract. The Earth's north pole
		is represented by a magnet with a south pole because the north end of a compass is attracted to the south end of a magnet
	6	The magnetic needle of the compass lines up with the Earth's magnetic field.
	7	10 everyday applications of an electromagnet: Electric motors which have hundreds of uses from fans
		to leaf blowers to electric shavers, electric generators, relays (electronic switches for large voltages),
		to levitate trains for high speed, electromagnets to separate magnetic material from other material, electromagnets to lift heavy magnetic material microwaye ovens clocks with special features electric
		door bell, loudspeakers, electromagnetic locks.
101	1	Foreas on an object are belonged when:
p181		 the object is not moving.
		• the object is not getting faster.
		 the object is not getting slower. the object is not changing direction
		 the object is not changing shape.
	2	The tug of war is a tie. The forces are balanced as shown by opposing forces of the same size.
	3	The chair is stationary. The force arrows are incorrect.
		The forces arrows should be the same size to indicate
		Weight of chair Ground pushing up
	4	5
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p194	1	Friction is useful for walking, brakes on cars, nails in buildings.
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	6	Underinflated tyres cause increased friction and needs more engine power to overcome. Thus using more fuel.
	7	Friction is in the opposite direction of motion.
n195	1	North pole and the south pole.
Prot	2	Sketch of the magnetic field of a magnet.
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	4	a) repel b) attract c) attract d) repel
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n195	1	Forces on an object are balanced when:
Prot		• the object is not moving.
		• the object is not getting faster.
		 the object is not getting slower. the object is not changing direction
		 the object is not changing shape.
	2	The tug of war is a tie. The forces are balanced as shown by opposing forces of the same size.
	3	a) Labelled forces.
		b) The force arrows are not correct because they are not equal as expected by a stationary cleaner.
		Gravity



p198	1 A ramp is sometimes called an inclined plane. The inclined means that one end is higher than the
	other. A plane means a flat surface. Pulling an object up an inclined plane gives a mechanical
	Load
	2 Mechanical advantage = $\frac{\text{Load}}{\text{Effort}}$
	3 An effort of 600 N is needed to pull and object of weight 900 N up an inclined plane. Calculate the
	mechanical advantage.
	$MA = \frac{Load}{RC} = \frac{900N}{CON} = 1.5$
	Effort 600N
	4 A slope of 1 in 14 is not as steep as a slope of 1 in 10.
	5 The wedge is one or two inclined planes that makes it easier to push things apart.
	6 The blockbuster, axe, knife, nail, scissors, chisel, and shovel are all examples of the wedge.
	7 The screw is essentially a circular inclined plane. Screws are used to lower, raise, or keep things in
	8 Wood screws, jar lids, car jacks, clamps, cork screws, taps, drills, propellors, fans, and nuts and bolts are all examples of the screw
	are an examples of the serew.
n198	Logd 600 N
P170	$MA = \frac{LOUU}{Effort} = \frac{000N}{600N} = 1$
	1 a) $load = 600 \text{ N}, effort = 600 \text{ N}.$ Elyon 000 N 2
	$MA = \frac{Load}{EC} = \frac{600N}{200N} = 2$ Effort
	b) $load = 600 \text{ N}, effort = 300 \text{ N}.$
	$MA = \frac{Load}{R} = \frac{600N}{R} = 3$
	c) load = 600 N, effort = 200 N. Effort $200N$
	3 A pulley can magnify the force and also change the direction of the force
	4 A wheel can be a force multiplier (600 N)
	A small force on the rim of the wheel
	will apply a larger force at the axle.
	Effort
	Fulcrum
	5 A wheel as a speed multiplier
	A movement of the inner wheel will make the larger
	wheel move faster.
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	Luau
	6 A pulley block attached to the load is held by four rones. The mechanical advantage of the pulley is 4
	7 A pair of gears can be used to increase speed
	A movement of the smaller gear will make the larger
	gear move faster.

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