

AQA Energy Dice Challenge

	1	2	3	4	5	6
1	True or false: tidal and geothermal are examples of non-renewable energy?	Give a disadvantage of wind energy.	What is the unit of power?	Define specific heat capacity.	Write down the equation that links kinetic energy, mass and speed.	A horse has a mass of 500 000g and runs at an average speed of 24m/s. Calculate the kinetic energy of the horse.
2	Give an advantage of solar energy.	Give an example of a chemical energy store.	Name two useful types of energy that are transferred by a hairdryer.	Write down the equation that links efficiency, total input energy transfer and useful output energy transfer.	A kettle supplies 140 000J of electrical energy to heat some water. 14 000J of energy is dissipated to the surroundings. Calculate the efficiency of the kettle.	Write a method to investigate how the thickness of an insulating material affects the rate of energy transfer.
3	What is the unit of mass?	A TV transfers electrical energy to light energy and heat energy and sound energy. Identify the useful and wasted output energy transfers.	Write down the equation that links distance, force and work done.	A lightbulb transfers 120J of electrical energy to 72J of heat energy and 48J of light energy. Calculate the efficiency of the lightbulb.	An athlete running at a constant velocity of 5m/s has 875J of kinetic energy. Calculate the mass of the athlete.	Explain what happens to braking distance if the speed of a car doubles. Refer to kinetic energy and work done in your answer.
4	Define power.	Write down the equation that links power, time and work done.	Describe the energy transfers that take place when a moving vehicle slows down.	A man lifts a weight of 350N through a vertical height of 0.8m. Calculate the work done on the weight.	A kettle contains 1500g of water which has a specific heat capacity of 4200J/kg°C. Calculate the energy required to increase the temperature of the water by 80°C.	18 720J of energy is used to heat a copper block from 20°C to 60°C. The specific heat capacity of copper is 390J/kg°C. Calculate the mass of the copper block.
5	Write down the equation that links gravitational field strength, gravitational potential energy, height and mass.	A motor transfers 192J of energy in 2 minutes. Calculate the power of the motor.	A diver has a mass of 60kg. He stands on a platform 10m above a swimming pool. Gravitational field strength on Earth is 10N/kg. Calculate the gravitational potential energy of the diver.	An archer's bow has a spring constant 200N/m. It is stretched 0.9m from its equilibrium position. Calculate the elastic potential energy stored in the bow.	When pedalling a bike, a student generates 600W of power. Calculate the time taken for the student to do 120kJ of work.	A cup contains 400ml of hot water. The water gives out 33.6kJ of energy to the surroundings as it cools. Calculate the temperature decrease of the water.
6	A student with a mass of 50kg walks from the ground floor to the top of the school building. They gain 6kJ of gravitational potential energy. Calculate the height of the building.	Describe the energy transfers that take place when electricity is generated in a coal-fired power station.	The power output of a wind turbine is directly proportional to the kinetic energy of the air passing the blades each second. Describe what would happen to the power output if the wind speed was halved.	At the lowest point in a bungee jump, 24 500J of energy is stored in the bungee cord and its extension is 35m. Calculate the spring constant of the bungee cord.	A wind turbine has a power output of 320kW. The mass of air passing the blades each second is 10 000kg. Assuming the process is 100% efficient, calculate the speed of the air passing the blades each second.	A hotplate with a power of 1500W is used to heat a pan of water with 100% efficiency. The time taken for the temperature of the water to increase from 20°C to 80°C was 7 minutes. Calculate the mass of water in the pan.