



components

materials

battery

switch

motor

plastic pulley

wooden pulley

wheels

dowel

axle

triangle axle supports

hacksaw

vice

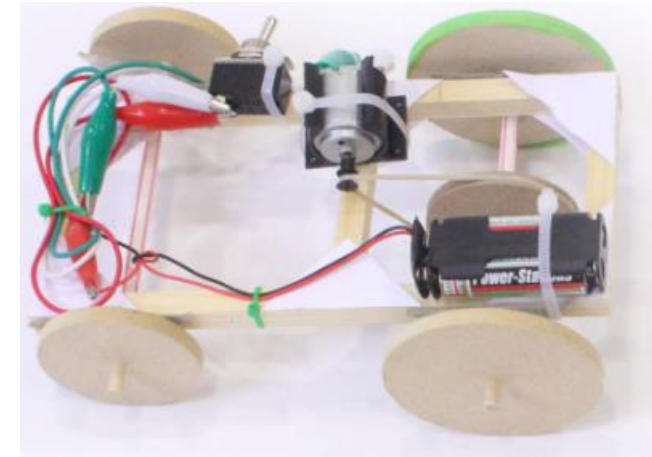
reinforce

corners

wheels

bearings

Important information



Prior learning

Last half term, we revisited our learning about Electricity and experimented with different components in a simple series circuit.

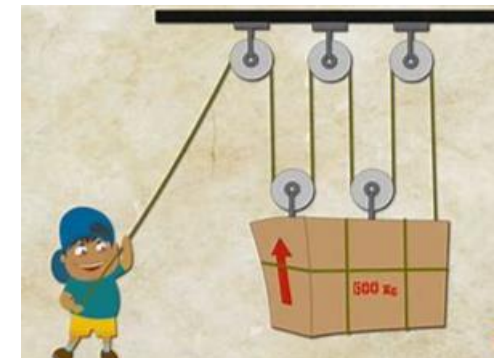
This half term, we have learnt about different aspects of Forces including pulleys.

When we build our cars, these sessions will combine both of these areas of learning along with key skills in DT.

What is a pulley?

Pulleys are simple machines that have been used to help humans construct large buildings and structures for thousands of years. Pulleys are an example of how engineering and physics work together to make a job easier. Kids can learn more about engineering and physics by playing with pulleys.

A basic pulley system comprises of a wheel on a fixed axle with a groove along the edge to guide a rope, cable or - in our case- an elastic band.



Summer 2 - DT – Motorised cars

Year Five and Six

By the end of this unit, you will have created a car that incorporates electrical components and a pulley system to help it move.

Step	Lesson Objective/Question	What you will learn	Learning Review
1	I can make a simple circuit and ensure all the components are working	You will create a circuit comprising of a number of key components. You will test it to ensure all the components work and can make changes if they do not.	What components did you use and did the circuit work?
2	I can create a frame for my car that is reinforced and includes axle supports	You will create a frame for your car using hacksaws, sandpaper and a glue gun. Using cardboard triangles, you will reinforce the structure and then add another four triangles as axle support. You will try to keep the triangles symmetrical	Briefly explain how you created your frame, axles and added the wheels to your car.
3		You will cut two lengths of dowel to make the axles and smooth the ends. Then you will push a wheel onto the end of one of the axles; it should be a tight fit. You will use straws to create the bearings and will slide them over the axle. These will go into the axle holders. You will check the axle rotates easily in the straw	
4		You will carefully attach the straw to the axle holder to stop it sliding about when in use (without getting glue on the axle). You will complete a series of tasks to ensure the wheels are secure and can easily rotate	
5	I can add a motorised pulley system to my design	You will place a wooden pulley to the centre of the second axle and fit a rubber band over the pulley. You will slide the axle assembly into the two axles holders.	What advice would you give someone if they were trying to fit a pulley system to their hand-built car?
6		You will make adjustments to the axle, check the frame and spin the wheels, to check the wheel and axle assembly rotates freely whilst the straws remain stationary. You will secure the wheels carefully using the glue gun.	
7		You press the small pulley onto the motor shaft and clip the motor into the motor mount. After that, you will fit the rubber band onto the small pulley and position the motor so that the rubber band is just tight but not stretched. You will need to create tension (i.e. stretch) for the rubber band.	
8		You will reinforce the car with card triangles and create a flat surface for the motor to mount onto. Ensuring your motor chassis is the right way up (i.e. so that the wheels are on the bottom), you will stick your motor assembly to the top of your crosspiece so that the two pulley centres are exactly in line, and then cable tie it firmly in place. Fit the rubber band onto the pulley.	
9	I can attach an electrical circuit to my car's chassis	You will work out where to attach your battery and switch, making sure nothing will interfere with the rotating parts. After that, you will tidy up your wires, making sure the crocodile clips don't touch, and cable tie these as well. You should trim off the ends of the cable ties.	Did you need to do anything to make sure the electrics didn't interfere with the rotating parts? What?
10	I can experiment with my motorised car	Here are some things you may try in this session: • Try out your motorised vehicle on different surfaces • Cut sections of balloon and fit them as tyres for slippery surfaces • You can time your vehicle over a known distance • You can also use a ramp to find out how steep a slope it can climb • Try different wheel sizes and compare the performance of the vehicle • If you want your vehicle to go in the opposite direction, you can swap over the crocodile clips on the back of the motor	Which experiment had the most interesting results for you. Explain why.