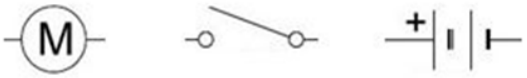
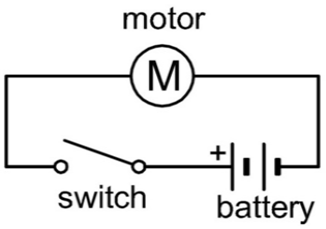
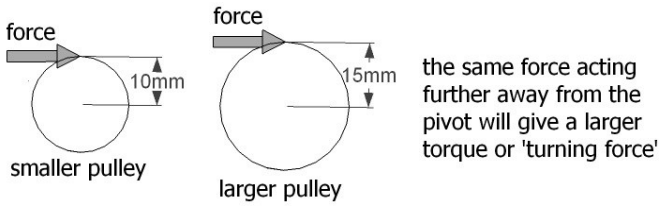
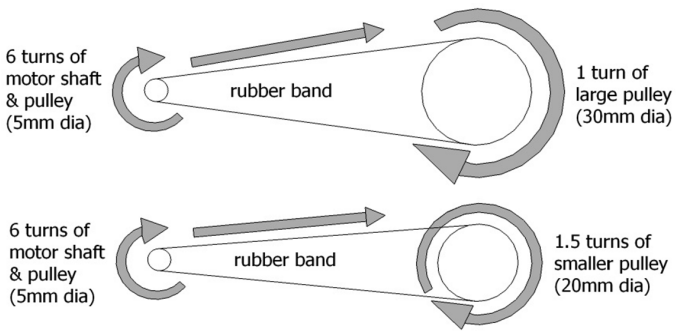
Suggested answers to Motorised Vehicle Worksheet

Name these electrical parts:   	Motor, switch and battery
Draw your circuit using these circuit symbols, and using lines to represent the wires. Label the components. 	
Is metal an insulator or a conductor?	A conductor
Is plastic an insulator or a conductor?	An insulator
What could happen if you short circuit your battery?	You could heat up or melt your battery holder and possibly burn your fingers.
What will happen if you leave the circuit switched on for a long time?	You will drain the battery.
If you measure the time T taken to travel a known distance D, how do you calculate the average speed?	Average speed = distance D / time T
Which of your items are acting as bearings?	The straws
Why does the pulley need to be a tight fit on the axle?	It needs to be a tight fit so that when the pulley is driven the axle turns. Otherwise it will slip.

Motorised Vehicle Worksheet continued

Why do the wheels need to be a tight fit on the axles?	The wheels need to be a tight fit so that when the axle turns the wheels also turn.
If your vehicle goes backwards what can you change to make it go forwards?	You can swap over the crocodiles attached to the two motor terminals.
Which goes faster, a vehicle with a larger driven pulley or one with a driven smaller pulley?	A vehicle with a smaller driven pulley goes faster (unless it is trying to go so fast that the wheels slip on the ground or the motor stalls and won't go round.)
Which goes up steeper slopes, a vehicle with a larger pulley or one with a smaller pulley?	A vehicle with a larger pulley goes up steeper slopes (as long as the wheels grip the slope).
Extension questions	
Why do cars have rubber tyres?	It helps them grip the road better, by increasing the friction between the wheels and the road. This is particularly important when braking, going round corners, accelerating and going up hill.
If you were cycling up a steep hill would you choose a gear which gives you low speed and high torque ('turning force') or high speed and low torque?	Low speed and high torque.
Explain why the size of the pulley affects the hill climbing ability of your vehicle. 	With a larger driven pulley the speed is lower but the torque ('turning force') is higher, which enables you to get up the hill.
Explain why the size of the pulley affects the speed of your vehicle. 	If the motor shaft and the rubber band were going at the same speed, the smaller pulley would have to turn faster than the large pulley; otherwise the rubber band would slip on the pulley. If the smaller pulley turns faster then the driven axle (and hence the wheels) turns faster, so the vehicle goes faster.

