Fairground Rides Worksheet

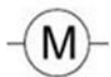**Name:**……………………………………………………………………………………......

Label these electrical parts: _____ _____ _____	
Draw your circuit using these circuit symbols and using lines to represent the wires. Label the components.	
Is metal an insulator or a conductor?	
Is plastic an insulator or a conductor?	
What could happen if you short circuit your battery?	
What will happen if you leave the circuit switched on for a long time?	

Why does the pulley need to be a tight fit on the rotating shaft?	
Which of your items are acting as bearings?	
Which item is acting as a drive belt to turn the shaft?	
Does a fairground ride with a larger pulley rotate faster or more slowly than one with a smaller pulley?	
Which forces are acting to slow your fairground ride down?	
Which tools did you use to make your fairground ride?	

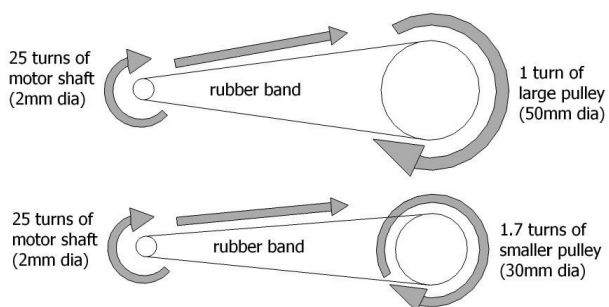| **Extension questions**	
Calculate the speed of your passengers as follows: Time 10 rotations Calculates number of revolutions per minute (rpm) Estimate diameter of circle travelled by passengers Calculate distance travelled in one revolution Calculate distance travelled in one minute Calculate distance travelled in one hour Convert to miles per hour	
If you were designing a real rotating fairground ride, suggest some safety aspects you would consider.	
Explain why the size of the pulley affects how fast your fairground ride rotates. 25 turns of motor shaft (2mm dia) — rubber band — 1 turn of large pulley (50mm dia) 25 turns of motor shaft (2mm dia) — rubber band — 1.7 turns of smaller pulley (30mm dia)	

Suggested Answers

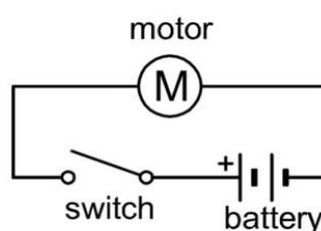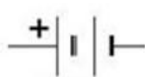|	
Label these electrical parts: Motor · Switch · Cell or battery	

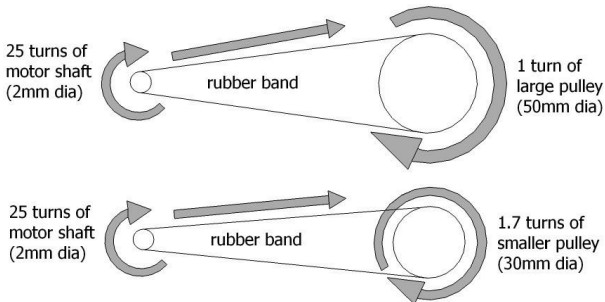| Draw your circuit using these circuit symbols and using lines to represent the wires. Label the components.	
Is metal an insulator or a conductor?	Metal is a conductor.
Is plastic an insulator or a conductor?	Plastic is an insulator.
What could happen if you short circuit your battery?	The battery could get hot and possibly burn my fingers.
What will happen if you leave the circuit switched on for a long time?	I will drain the battery.
Why does the pulley need to be a tight fit on the rotating shaft?	It needs to be a tight fit so that when the pulley is driven the rod turns. Otherwise, it will slip.
Which of your items are acting as bearings?	The wooden wheels with the 6 mm holes are acting as bearings. (If the shaft is rotating in the central holes in the base, these are also acting as bearings.)
Which item acts as a drive belt to turn the shaft?	The rubber band is acting as a drive belt to turn the shaft.

Does a fairground ride with a larger pulley rotate faster or more slowly than one with a smaller pulley?	A fairground ride with a larger pulley rotates more slowly.
Which forces are acting to slow your fairground ride down?	Friction (e.g. between the shaft and bearings) and air resistance (which is also a form of friction) are acting to slow the ride down.
Which tools did you use to make your fairground ride?	Examples: hacksaw, vice, sandpaper, glue gun, scissors, pencil, ruler, protractor, pair of compasses.

Extension questions

Calculate the speed of your passengers as follows: Time 10 rotations Calculates number of revolutions per minute (rpm) Estimate diameter of circle travelled by passengers Calculate distance travelled in one revolution Calculate distance travelled in one minute Calculate distance travelled in one hour Convert to miles per hour	Example: Time T for 10 rotations = 8 seconds Rotational speed in rpm = T x 60 / 10 = 48 rpm Diameter of circle = 38 cm = 0.38 m Distance travelled per revolution = π x 0.38 = 1.2 m Distance per minute = 1.2 x 48 = 58 m Distance per hour = 58 x 60 = 3500 m = 3.5 kmph Miles per hour = 3.5 x 5 / 8 = 2.2 mph
If you were designing a real rotating fairground ride, suggest some safety aspects you would consider.	Possible answers: Making the structure strong enough so that it doesn't break, preventing passengers from falling out or climbing out while the ride is moving, making sure the ride is balanced, emergency stops, electrical safety, inspection and maintenance...
Explain why the size of the pulley affects how fast your fairground ride rotates. 25 turns of motor shaft (2mm dia) — rubber band — 1 turn of large pulley (50mm dia) 25 turns of motor shaft (2mm dia) — rubber band — 1.7 turns of smaller pulley (30mm dia)	If the motor turns 25 times, this should rotate the large pulley once. If the motor turns 25 times, this should rotate the smaller pulley 1.7 times. Therefore, the fairground ride with the smaller pulley should rotate faster.