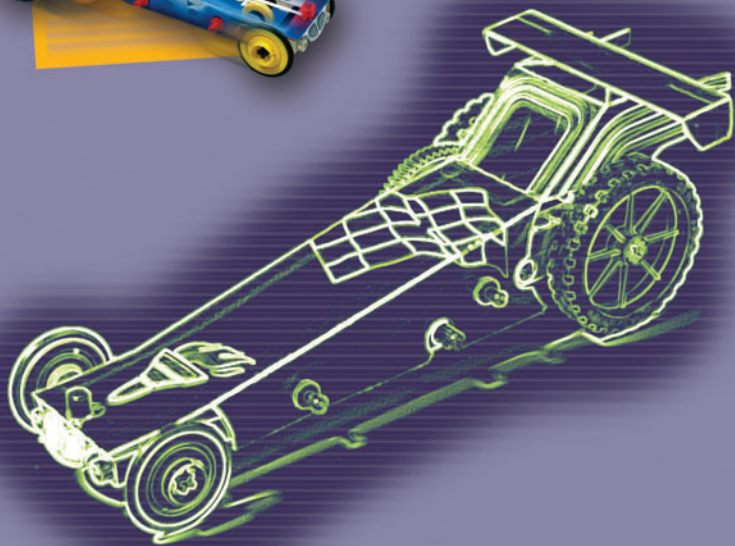


 Thames & Kosmos®



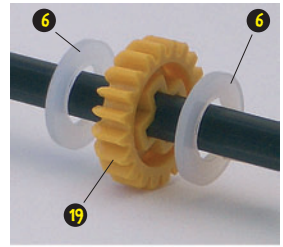
# PHYSICS

discovery

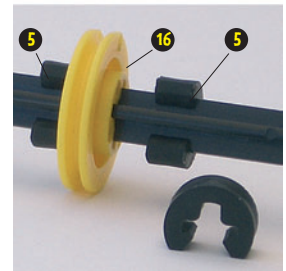
Experiment Manual

# Components

No.	Name	Quantity	Item No.
1	Anchor pin	15	702527
2	Joint pin	3	702424
3	Shaft plug	10	702525
4	Shaft pin	1	702526
5	Axle lock	5	702813
6	Washer	6	703242
7	Large frame	2	703239
8	Small frame	2	703232
9	Long rod	4	703235
10	Short rod	2	703233
11	Long axle	2	703234
12	Medium axle	6	703238
13	Short axle	3	703236
14	Large pulley wheel	2	702516
15	Medium pulley wheel	2	702518
16	Small pulley wheel	5	702519
17	Large gear wheel (60 teeth)	3	702506
18	Medium gear wheel (40 teeth)	2	702505
19	Small gear wheel (20 teeth)	4	702504
20	Base plate	1	703237
21	Crankshaft	1	702599
22	Connection bridge	2	703231
23	Shovel blade	8	703240
24	Rubber band (long)	1	703241
25	Wooden ball	8	703243
26	Cord (4 meters, white)	1	703244
27	Elastic cord	1	703245
28	Wheel with tire	2	703230
29	Tire ring for medium pulley wheel	2	703251
30	Tire ring for small pulley wheel	2	703250
31	Anchor pin lever	1	702590
32	Die-cut cardboard sheet	1	703365



To prevent gears or pulley wheels from rubbing against rods or frames, use the washers.



The axles locks are placed on the axles to secure against slipping. They can be attached after the wheels are mounted.



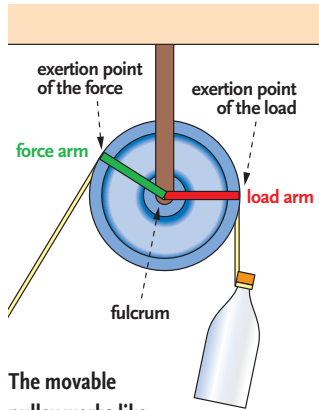
## Tips for Completing the Workshops

- Each workshop has a parts list that tells you how many of each part is needed, and the part numbers are in circles that look like this: ⑧
- In the assembly diagrams, the first time a part is used, it is also labeled with its part number.



# The Movable Pulley

With the movable pulley, force can be saved, but at the cost of increasing the distance. The suspended load is divided between two pieces of cord, so twice as much cord runs over the pulley, and half the force must cover double the distance. If a fixed and a movable pulley are put together to make a combination pulley, their respective advantages are combined as well: convenient pulling direction and gain in force.



The movable pulley works like a one-sided lever.

## Movable Pulley

You will need these parts for Workshop F:

- 1 large frame 7
- 1 medium axle 12
- 3 small pulley wheels 16
- 1 shaft plug 3
- 2 joint pins 2
- 2 washers 6
- 0.5 m cord 26
- force meter (see p. 9)
- 1 plastic bottle
- 1 heavy book

### Experiment 6

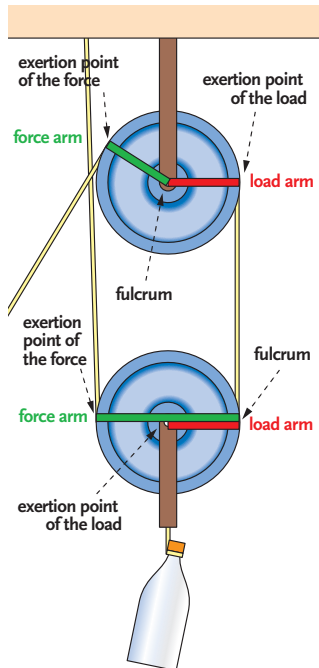
#### Saving force with a movable pulley and combination pulley

Tie the water-filled plastic bottle to the force meter with the cord again. What number does it read? If it reads 0.75 N you are correct, because the weight of the pulley itself hardly matters. Now, to lift the bottle straight up, you need only half the force you needed with the fixed pulley.



The more pulleys in a pulley-block, the less force needed to move the load.

# The Combination Pulley



Combination pulley: a combination of a fixed and a movable pulley.

## Combination Pulley

You will need these parts for Workshop G:

- 2 small frames 8
- 1 large frame 7
- 2 medium axles 12
- 4 small pulley wheels 16
- 1 shaft plug 3
- 2 joint pins 2
- 4 washers 6
- 0.5 m cord 26
- force meter (see p. 9)
- 1 plastic bottle
- 1 heavy book

# WORKSHOP F & G

