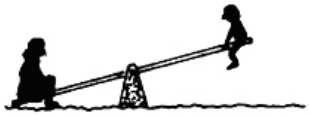
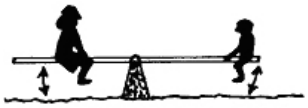
Balancing see-saws

This task is about levers and forces.

Adults and small children can have a successful see-saw if they sit in the right place.

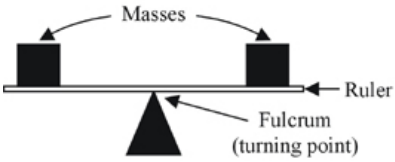


"OH DEAR"



"YES, IT WORKS"

Tui and Sonny decided to model the see-saw using a ruler and 50 g masses.



They put different number of masses on each side and moved them until the ruler was balanced. Then they recorded the mass and its distance from the turning point (fulcrum) for each side.
Here are their results:

Left-hand side		**Right-hand side**	
mass (g)	distance from fulcrum (cm)	mass (g)	distance from fulcrum (cm)
50	8	100	4
100	6	150	4
150	5	50	15
200	4	100	8

a) Tui said, "I can see a rule for this. Multiply mass × distance for the left-hand side; it equals mass × distance for the right-hand side." Use evidence from the table to show that Tui is right.

b) If 400 g is placed 10 cm from the fulcrum, how far from the fulcrum must 100 g be placed for the ruler to be balanced? (Show your working.)

c) Tui's mother weighs 60 kg. She sits 0.4 m from the fulcrum. Tui's young sister weighs 12 kg. Where must his sister sit for them to have a successful see-saw? (Show your working.)