TEACHER NOTES
Moments Program

Program Problem Answers

	Left Hand Side	Right Hand Side
1	5 x 50 =	5 x 50
2	1 x 10 =	1 x 10
3	2 x 30 =	2 x 30 OR 2 x 30 = 3 x 20
4	5 x 40 =	5 x 40 OR 5 x 40 = 4x 50
5	80 + 80 =	4 x 40

Quiz Answers

No.	Answer	Notes
1	4(D)	*Clockwise moments = anti-clockwise moments (definition)*
2	1(A)	*Must be BOTH to produce equilibrium (discuss)*
3	2(B)	*Taking moments about the pivot/fulcrum, W x d = F x b*
4	1(A)	*ADD moments in the same direction*
5	3(C)	*W x 2 = 1 x 600, W = 300 N*
6	2(B)	*Force at B INCREASES as weight moves from left to right*
7	3(C)	*300 x 3 = F x 1, F = 900 N*
8	4(D)	*Work Done = Force x Distance Moved (Definition)*
9	1(A)	*This lever produces a large force though a small distance*
10	2(B)	*SAME, you do not get something for nothing… (discuss)*

Notes

The quiz works well if you go round the class asking students individually. If they all find a question difficult, they can vote.

Discussion

Where in every day life do we meet devices that use moments?

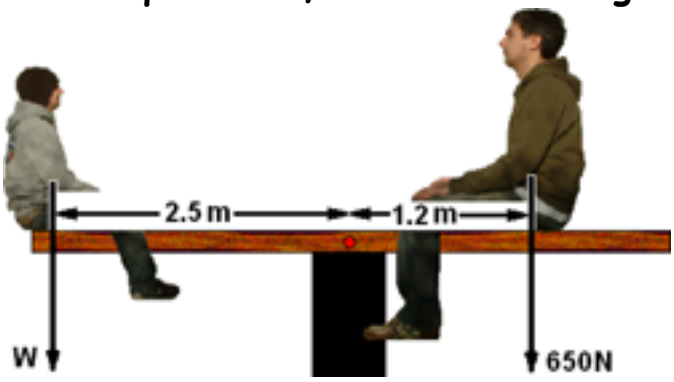
See-saw and lever as in the program. Various tools use moments such as scissors, spanner, wheelbarrow and pliers. In the human body the arm is a good example, cranes use a counter-balance weight and balancing scales use a pivot.

Moments Worksheet/Homework/Test

1. State the Principle of Moments

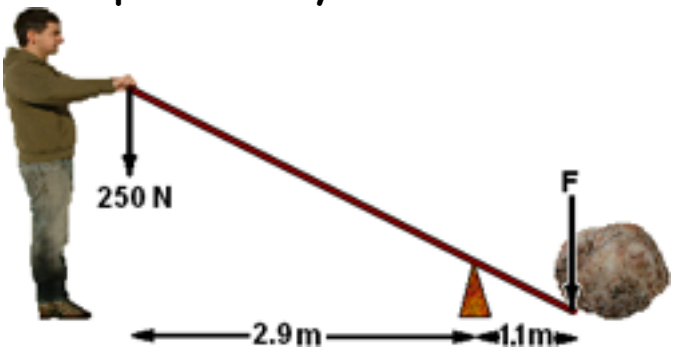
For equilibrium, the sum of the clockwise moments must equal the sum of the anti-clockwise moments.
(Also there must be no resultant forces).

2. If the see-saw is in equilibrium, what is the weight of the child?



W x 2.5 = 1.2 x 650, this gives W = 312 N

3. What is the force F produced by the lever?



250 x 2.9 = 1.1 x F, this gives F = 659.1 N

Experiment to Investigate the Principle of Moments

Method

This experiment is based around using a metre rule with a 2 mm hole drilled through its centre. The apparatus should be set up is as in the program. Plasticene/BlueTack can be used to balance the ruler if necessary before weights are applied. A loop of cotton thread works well as a means of attaching weights to the ruler. The weights and distances are varied (the bigger the range the better) and a graph of the clockwise moments against the anti-clockwise moments should produce a linear graph going through the origin with a gradient of one provided the same scales are used.
Alternatively values from the program could be plotted.