5. If the seesaw is to be in balance, the net clockwise torque must be equal to the net counterclockwise torque. Because the two children sit on opposite sides of the fulcrum, one will produce a clockwise torque and the other will produce a counterclockwise torque, so we can equate the torques produced by the two children. The distance the heavier child is from the fulcrum is not known, so we will label it as x.

$$[(30 \text{ kg})\ (9.8 \text{ m} / \text{s}^2)]\ x \quad = \ [(20 \text{ kg})\ (9.8 \text{ m} / \text{s}^2)\ (2.5 \text{ m})]$$

Note that we multiplied the masses by the acceleration of gravity to obtain the weights of the children, because torque is calculated using force. However, in this case, the acceleration of gravity appears on both sides of the equation, so it conveniently cancels out leaving

$$(30 \text{ kg})\ x \ = \ (20 \text{ kg})\ (2.5 \text{ m})$$

Dividing both sides of the equation by 20 kg gives

$$x \ = \ (20 \text{ kg} / 30 \text{ kg})\ (2.5 \text{ m}) \ = \ 1.67 \text{ m}$$