Mechanisms

Complete the following lever problems.

1. John, Peter and Jane weigh 80, 70, and 50 kg respectively. John sits 3 meters, Peter sits 5 meters, and Jane sits 6 meters from the fulcrum on the same side. How far must their 200 kg father sits from the fulcrum in order to balance them?

2. Sam weighs 100 kg and sat 8 meters from the fulcrum of a teeter totter. His older brother James weighs 150 kg. How far from the fulcrum must he sit so that he and his brother balance?

3. 100 Newtons rests on the end of a 10 meter lever, 2 meter from the fulcrum. How much weight must be applied to the other end of the lever so that the weights balance?

4. Bob weighs 70 kg and Susan weighs 50 kg. They sit on opposite ends of a 12 meter teeter totter which had its balance point in the center. Chrissy, who weighs 40 kg, sits on the same side as Susan and 5 meters from the fulcrum. How far would Steve, who weighs 35 kg, have to sit on the side with Bob to balance the teeter totter?

5. Samuel, who weighs 65 kg, sits 4 meters away from the fulcrum of a see-saw. His friend Steve, who weighs 85 kg, sits twice as far away on the same side of the see-saw. How far would Billy, who weighs 200 kg, have to sit on the opposite side of the see-saw in order to balance it?

6. Katie wants to move a 400 kg rock with a 5.9m crowbar. She puts the fulcrum 9 meters from the rock. How much force must she use to move the rock?

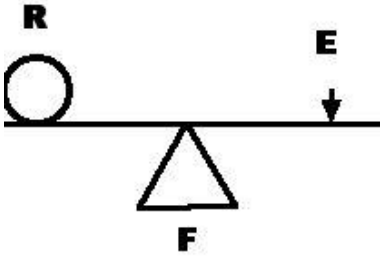
7. A weight of 60 g rests on the end of an 8 m lever and is 3 m from the fulcrum. What weight must be placed on the other end of the lever to balance the 60 g weight?

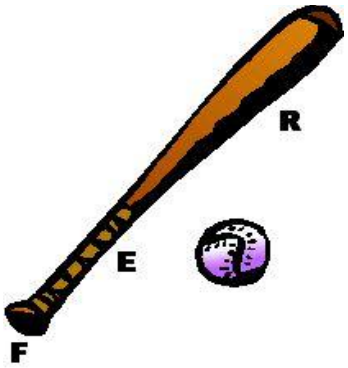
8. Four girls decide to use the same teeter-totter. Two of them weighing 75kg and 50kg, respectively, sat on opposite ends of the 12 m board which had the fulcrum in the center. The third girl weighing 60 kg got on the same side as the one weighing 50kg and sat 5m from the fulcrum. Where must the fourth girl sit so the teeter-totter is balanced if she weighs 400 kg?

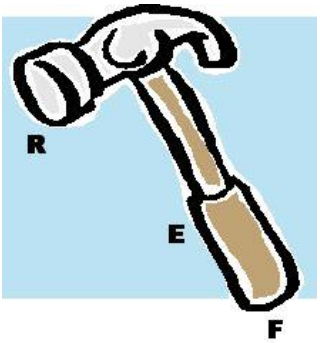
9. A window in Patty O'Cover's house is stuck. She takes an 18 cm screwdriver to pry it open. If the screwdriver rests on the fulcrum 3 cm from the window and Patty O'Cover has to exert a force of 10 kg on the other end to pry open the window, how much force was the window exerting?

Classify the type of Lever as 1st, 2nd, or 3rd.

1. _____ **2.** _____ **3.**_____







4. _____ **5.**_____ **6.**_____