

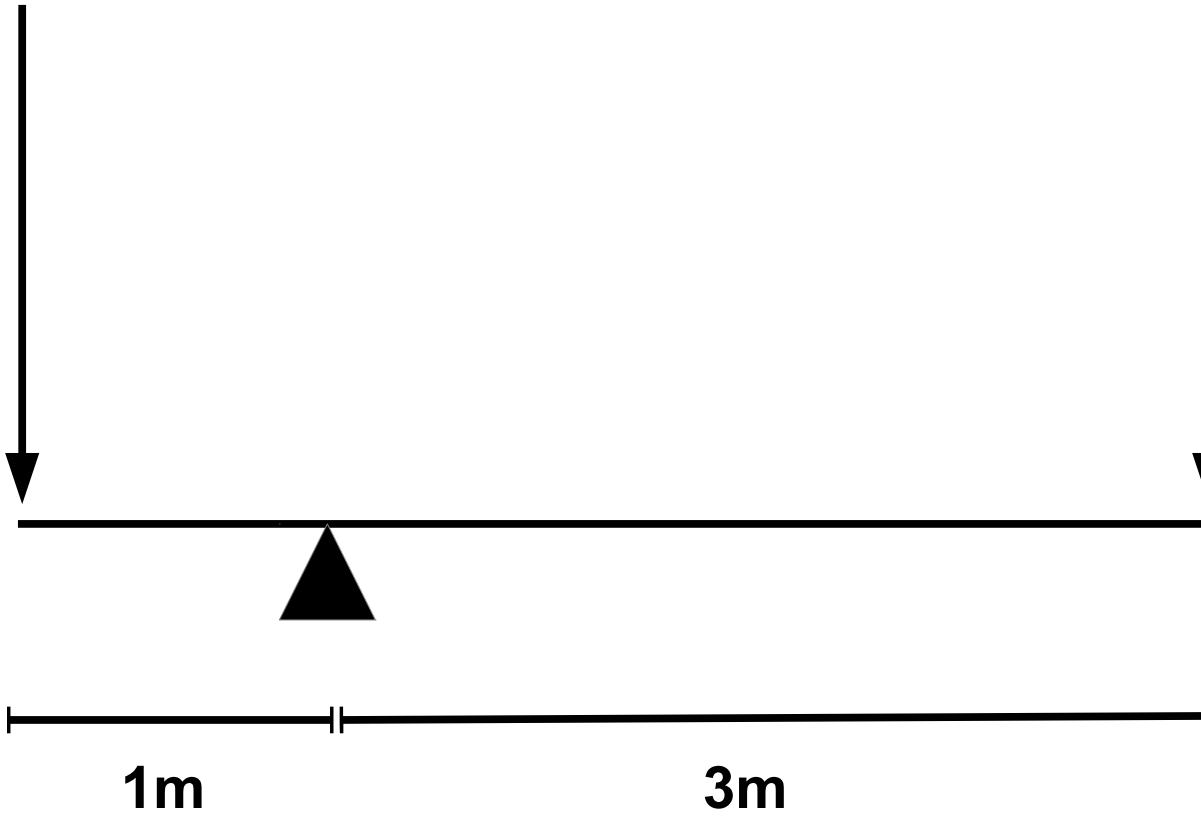
1st class lever example

Resistance

Effort

15N

5N



1st class lever example

Resistance

$$\text{Force} = -15\text{N}$$

$$\text{Moment arm} = -1\text{m}$$

$$\text{Moment} = -15\text{N} * -1\text{m} = 15\text{Nm}$$

Effort

$$\text{Force} = -5\text{N}$$

$$\text{Moment arm} = 3\text{m}$$

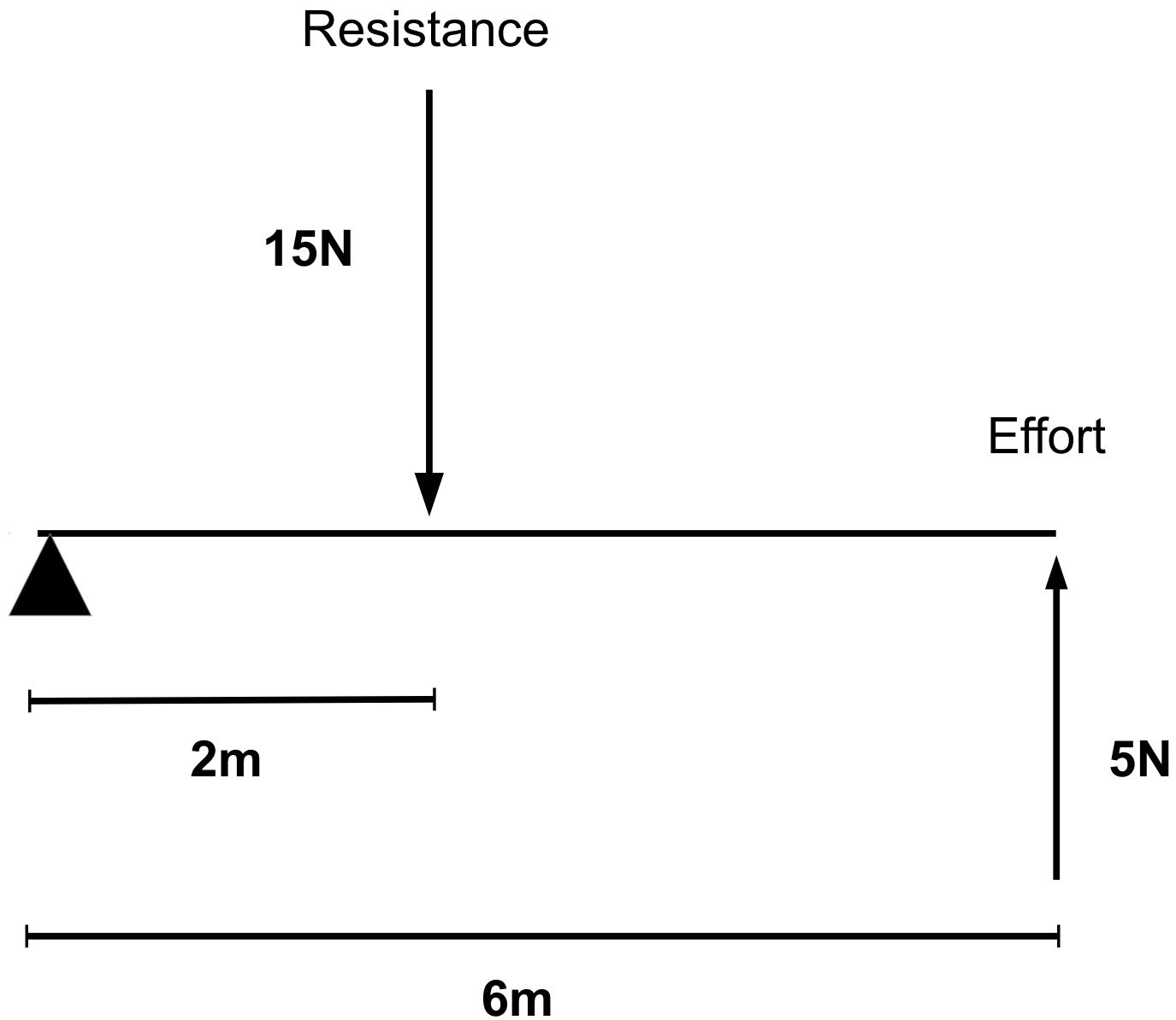
$$\text{Moment} = -5\text{N} * 3\text{m} = -15\text{Nm}$$

Moment due to Resistance + Moment due to Effort = 0

$$\mathbf{15\text{Nm} \quad + \quad -15\text{Nm} \quad = \mathbf{0\text{Nm}}$$

This lever is in equilibrium

2nd class lever example



2nd class lever example

Resistance

$$\text{Force} = -15\text{N}$$

$$\text{Moment arm} = 2\text{m}$$

$$\text{Moment} = -15\text{N} * 2\text{m} = -30\text{Nm}$$

Effort

$$\text{Force} = 5\text{N}$$

$$\text{Moment arm} = 6\text{m}$$

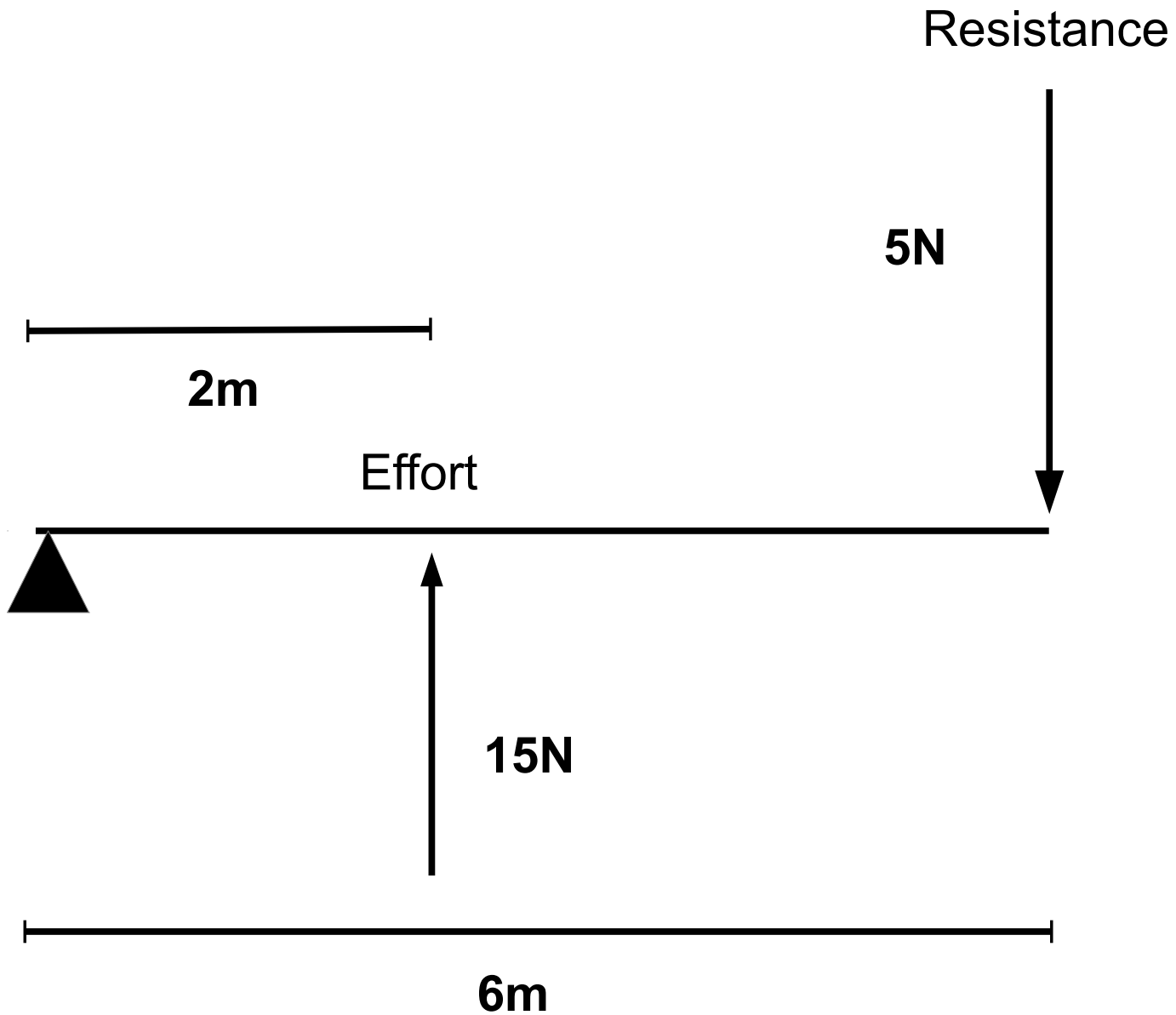
$$\text{Moment} = 5\text{N} * 6\text{m} = 30\text{Nm}$$

$$\text{Moment due to Resistance} + \text{Moment due to Effort} = 0$$

$$\mathbf{-30Nm} \quad + \quad \mathbf{30Nm} \quad = \mathbf{0Nm}$$

This lever is in equilibrium

3rd class lever example



3rd class lever example

Resistance

$$\text{Force} = -5\text{N}$$

$$\text{Moment arm} = 6\text{m}$$

$$\text{Moment} = -5\text{N} * 6\text{m} = -30\text{Nm}$$

Effort

$$\text{Force} = 15\text{N}$$

$$\text{Moment arm} = 2\text{m}$$

$$\text{Moment} = 15\text{N} * 2\text{m} = 30\text{Nm}$$

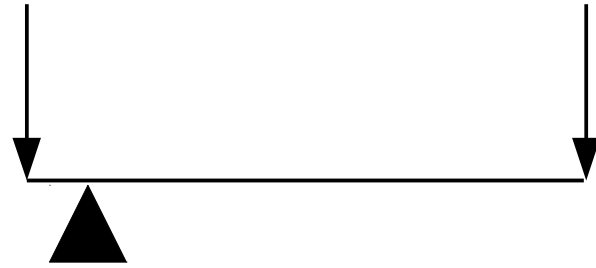
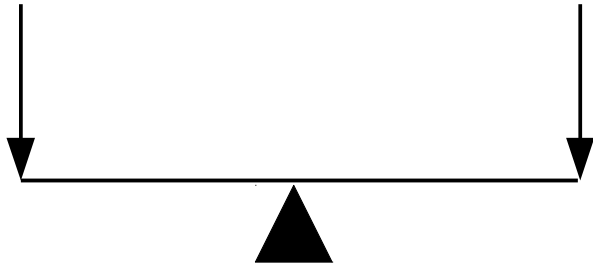
$$\text{Moment due to Resistance} + \text{Moment due to Effort} = 0$$

$$\mathbf{-30\text{Nm} \quad + \quad 30\text{Nm} \quad = \quad 0\text{Nm}}$$

This lever is in equilibrium

Things to keep in mind

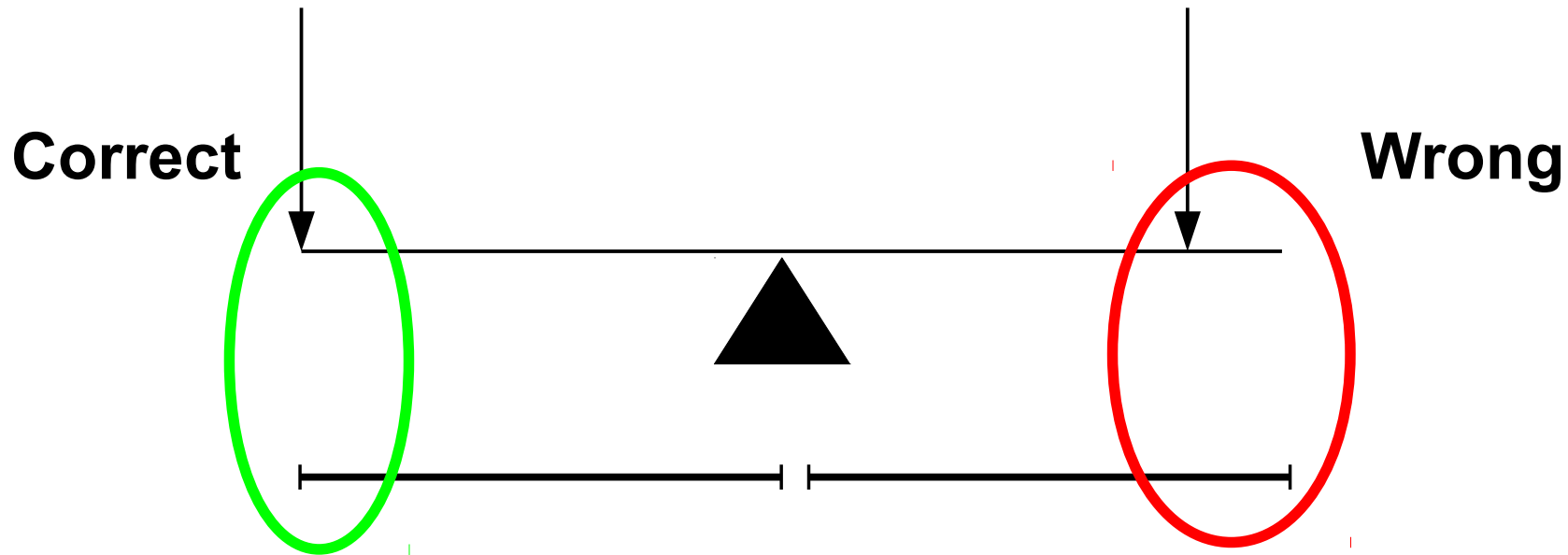
The axis of a 1st class lever does not have to be centered



These are both first class levers!

Things to keep in mind

Make sure your force is drawn at the correct distance (do not have your moment arm longer than where your force is applied)



Things to keep in mind

Make sure your moment arm is the perpendicular distance between the axis and the force

