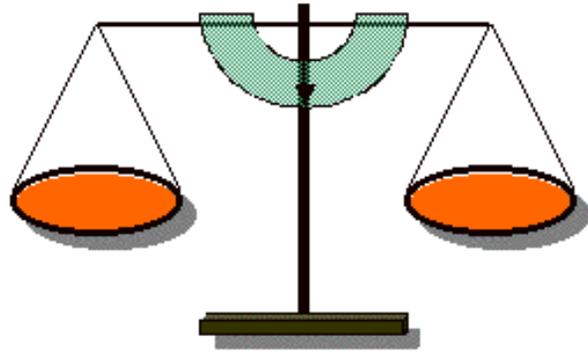


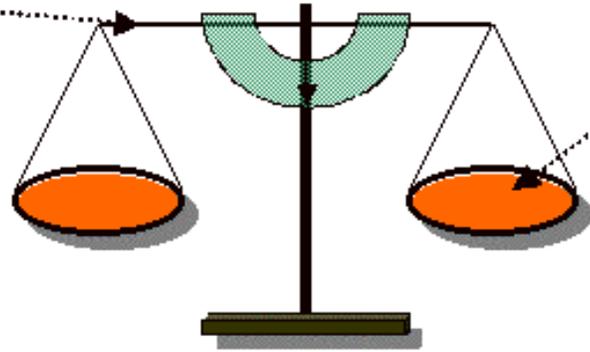
# **The Simple Balance**

## **Part I**



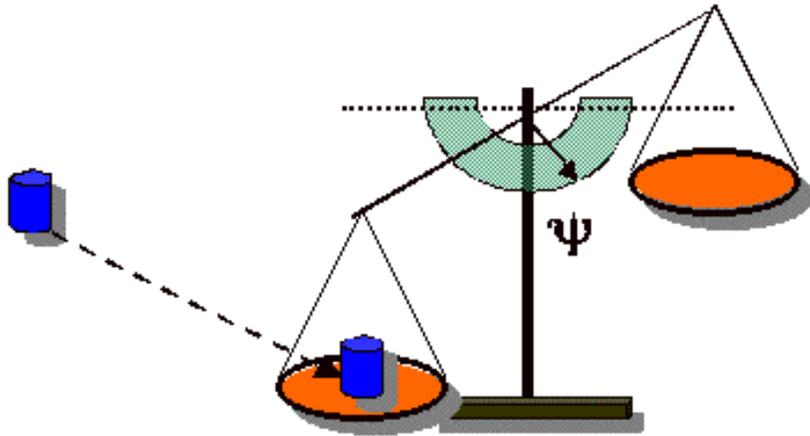
**This is an equal arm, two-pan balance**

**One arm of  
the balance**

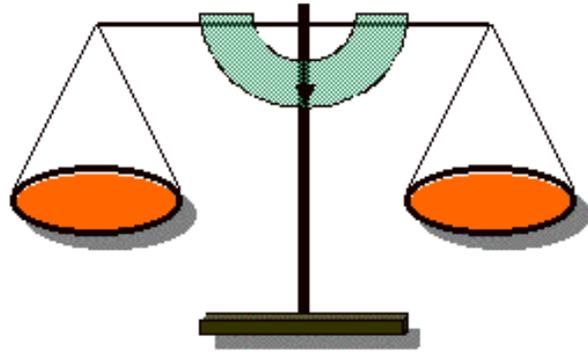


**One pan  
of the  
balance**

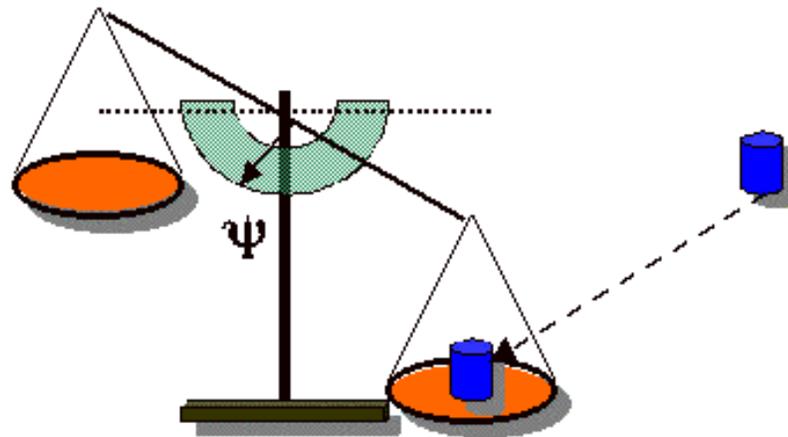
**This two-pan balance is in horizontal  
equilibrium without weights**



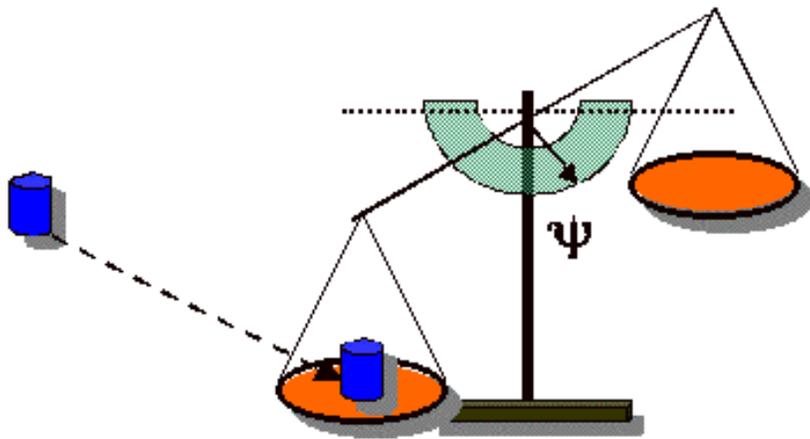
**The addition of a weight on one side shifts the balance by an angle  $\psi$**



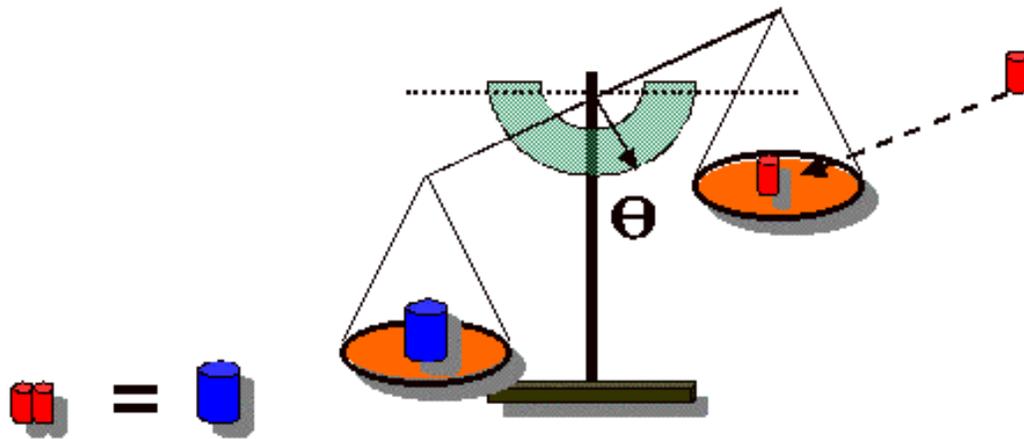
**Removing the weight restores the  
horizontal equilibrium**



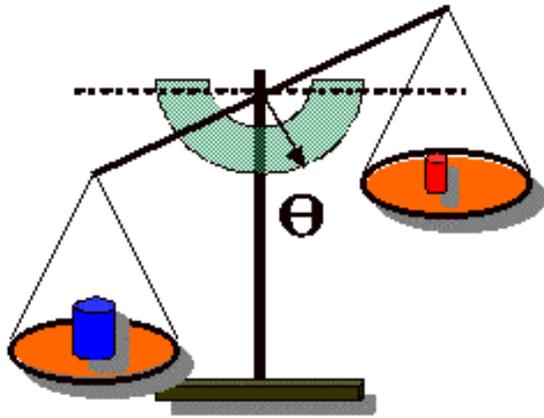
**Adding the same weight to the right side shifts the balance by the same angle but in the opposite direction -  $\psi$**



**Adding the weight on the left  
side shifts the balance by the  
angle  $\psi$**



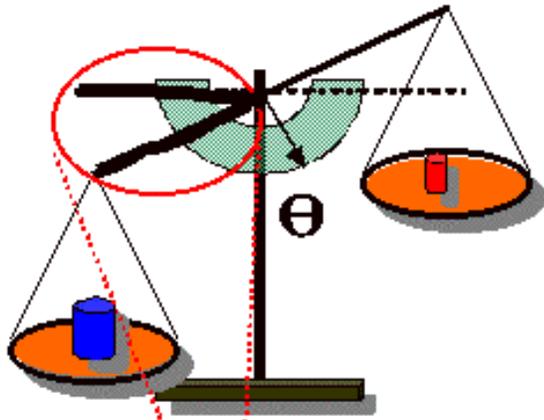
**Adding a smaller weight to the right side produces a smaller shift of the balance to an angle  $\theta$**



**Weight on  
the left side**

**>**

**Weight on the  
right side**



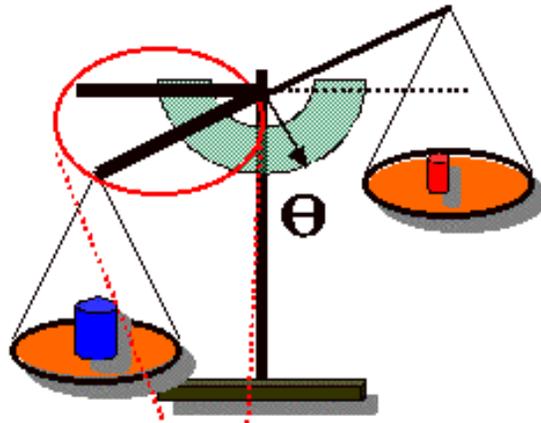
**Weight on  
the left side**

**>**

**Weight on the  
right side**

**The weight on the left is "greater than" the weight on the right. The sign ">" mimics the change in the balance from the horizontal**





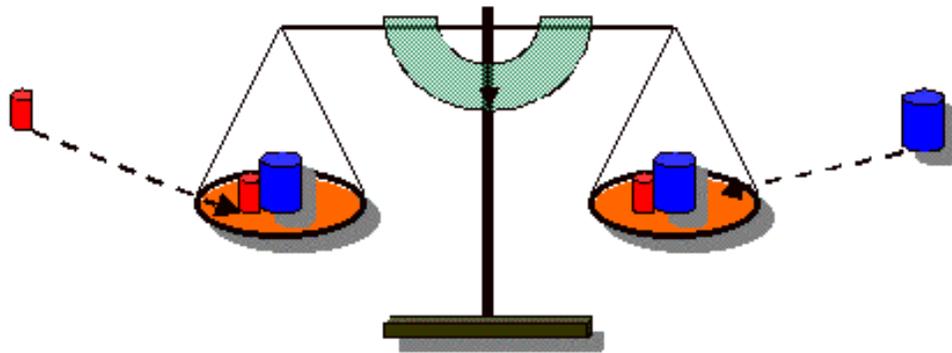
**Weight on  
the left side**

**>**

**Weight on the  
right side**

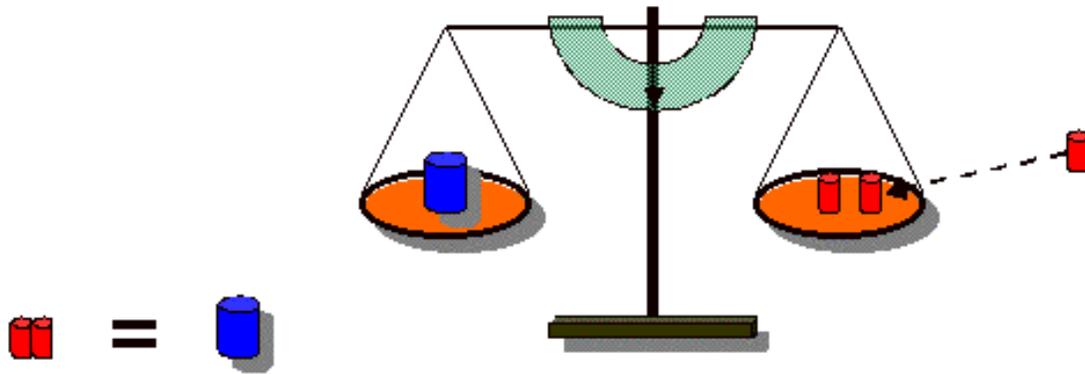
**This is an easy way to tell which weight  
is larger, because the unequal sign**

**">" mimics the change in the balance**



$$w_1 = w_2$$

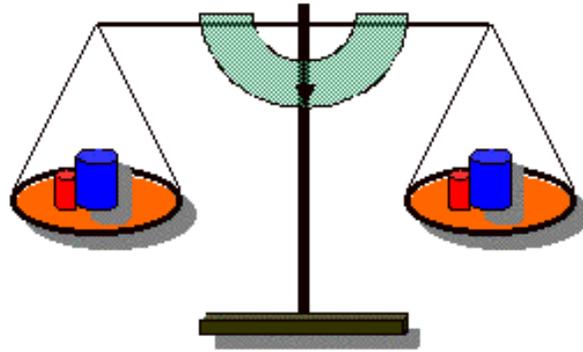
**Adding appropriate weights to each side restores the horizontal equilibrium when the total weights are equal,  $w_1 = w_2$**



$$w_1 = w_2$$

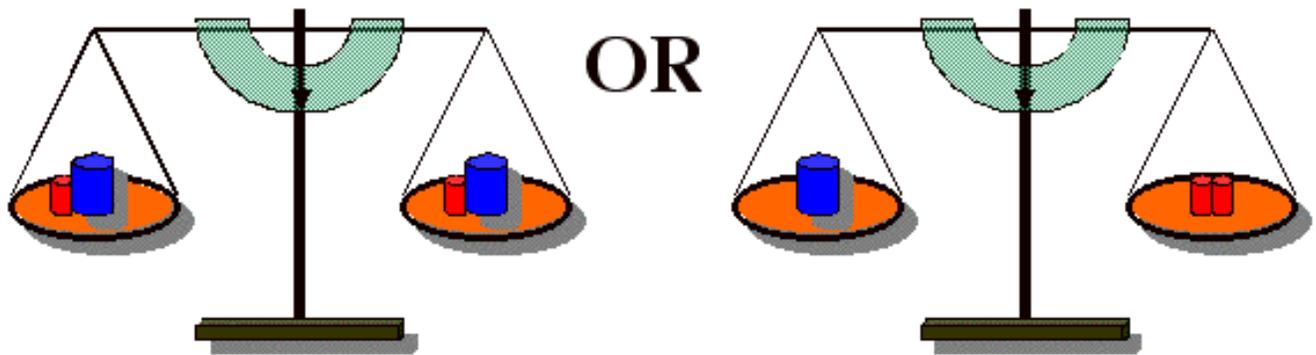
**Or by adding the appropriate weight to the right side, the horizontal equilibrium is restored when the total weights on each side are equal,**

$$w_1 = w_2$$



$$w_1 = w_2$$

**A principle law of the balance is that when the total weights from each side are equal, then the horizontal equilibrium is restored**



$$w_1 = w_2$$

**the horizontal equilibrium can be restored by more than one way**