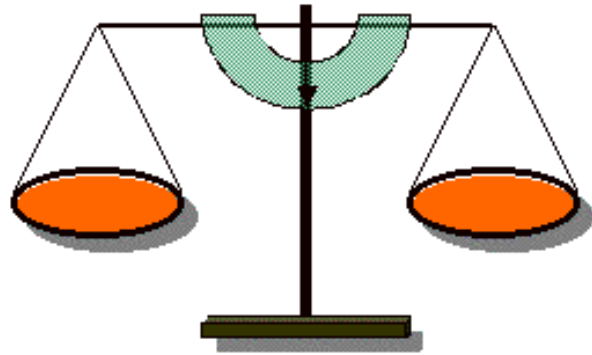


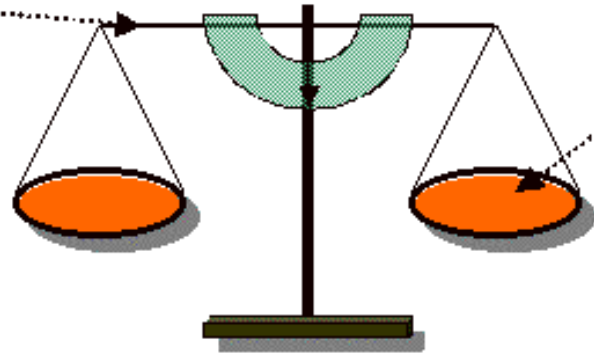
The Simple Balance

Part I



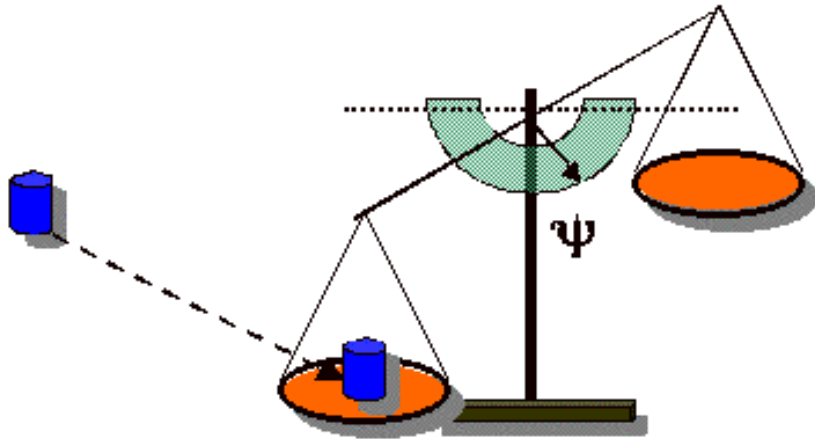
This is an equal arm, two-pan balance

**One arm of
the balance**

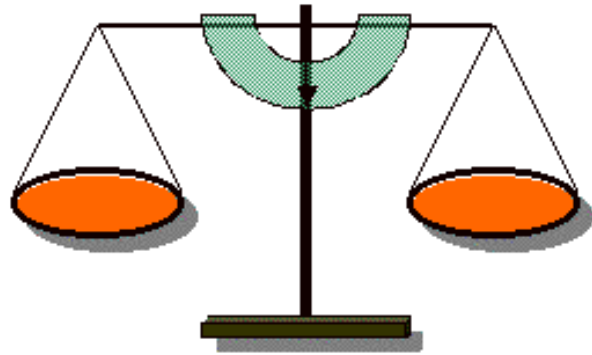


**One pan
of the
balance**

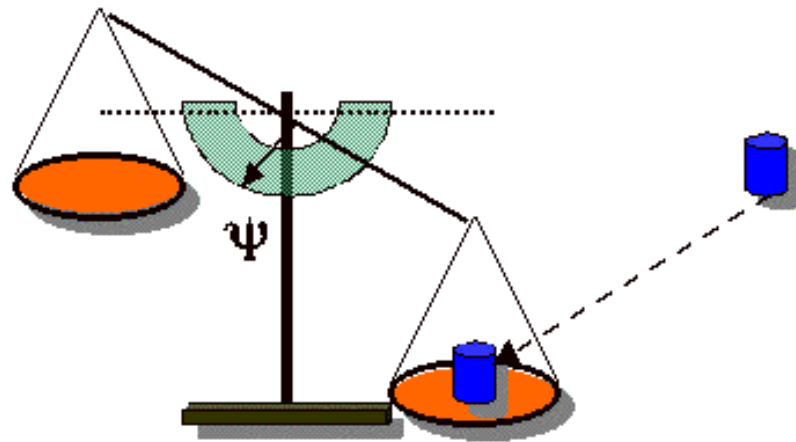
**This two-pan balance is in horizontal
equilibrium without weights**



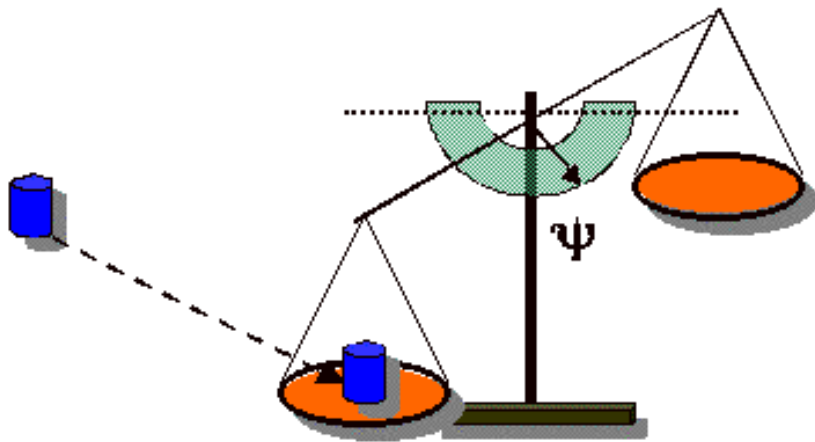
The addition of a weight on one side shifts the balance by an angle ψ



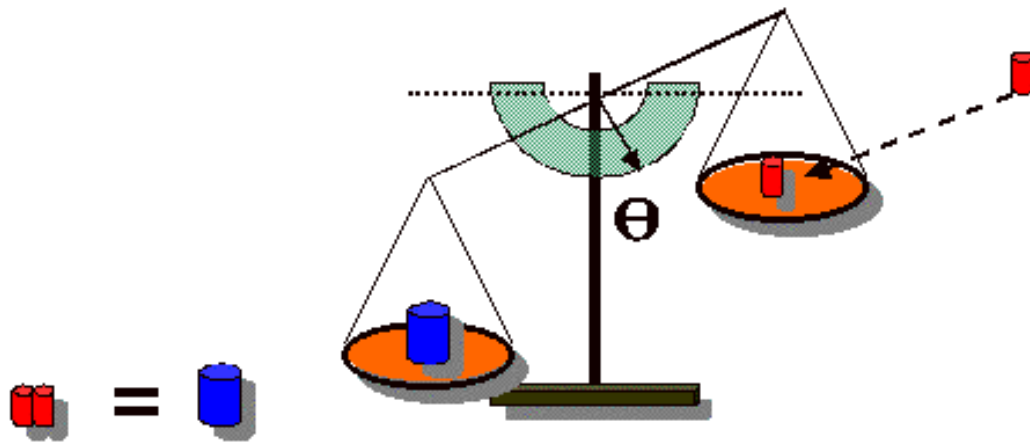
**Removing the weight restores the
horizontal equilibrium**



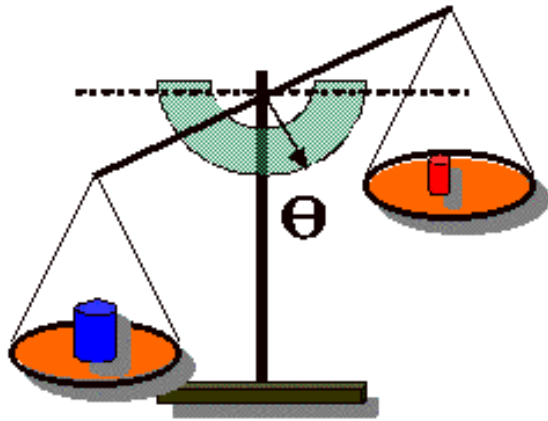
Adding the same weight to the right side shifts the balance by the same angle but in the opposite direction - ψ



**Adding the weight on the left
side shifts the balance by the
angle ψ**



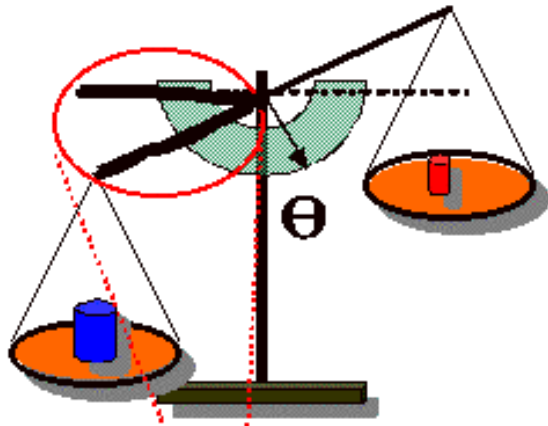
Adding a smaller weight to the right side produces a smaller shift of the balance to an angle θ



**Weight on
the left side**

>

**Weight on the
right side**

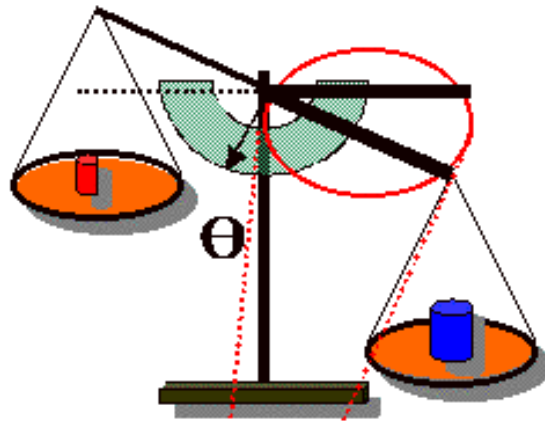


**Weight on
the left side**

>

**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

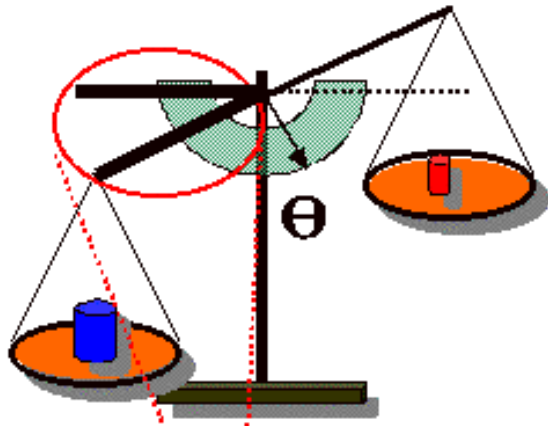


**Weight on
the left side**

<

**Weight on the
right side**

**If the weights are reversed, then the
total weight on the right is larger than
the total weight on the left**



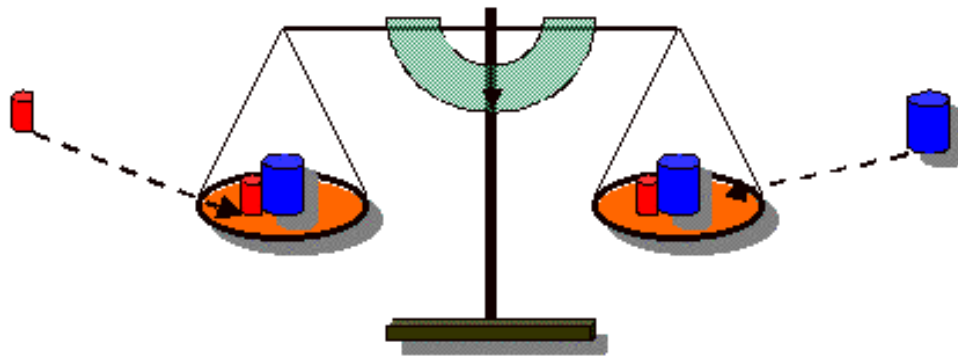
**Weight on
the left side**

>

**Weight on the
right side**

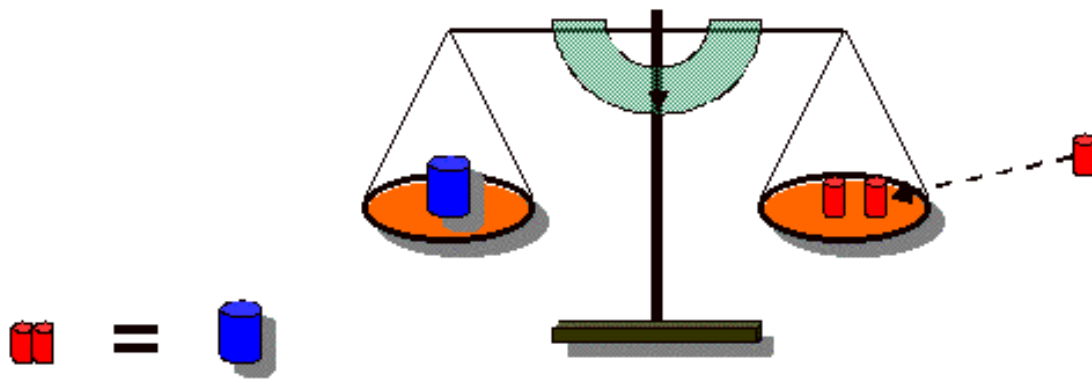
**This is an easy way to tell which weight
is larger, because the unequal sign**

">" mimics the change in the balance



$$w_1 = w_2$$

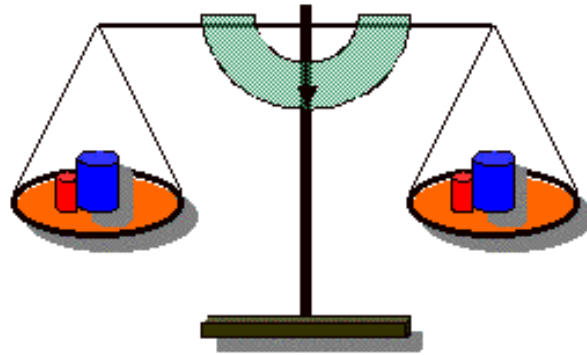
Adding appropriate weights to each side restores the horizontal equilibrium when the total weights are equal, $w_1 = w_2$



$$w_1 = w_2$$

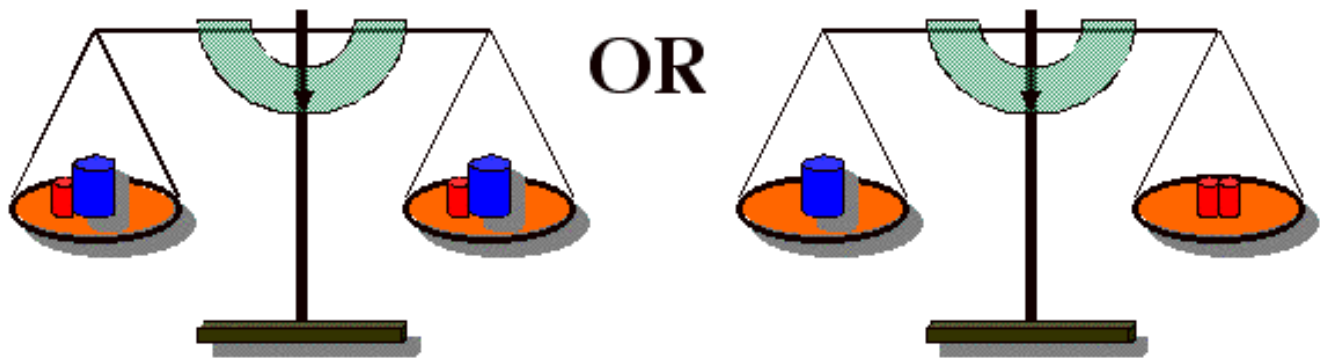
Or by adding the appropriate weight to the right side, the horizontal equilibrium is restored when the total weights on each side are equal,

$$w_1 = w_2$$



$$w_1 = w_2$$

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