

1. Heat  $\neq$  Temperature  
*Heat* characterizes a *process*  
*Temperature* characterizes a *situation* (aka a 'state')  
 Today: temperature, not heat.
2. How do you get a *number* for temperature?
3. A 'Thermometric' property; examples; temperature 'scales'
4. Gas thermometry; a linear relation *vs* a direct proportion.  
 $P=aT+b$  *vs*  $P=aT$ ; Celsius  $\rightarrow$  Absolute.
5.  $PV = nRT!!$
6. It is a 'macroscopic' statement. Does  $\vec{F} = m\vec{a}$  apply?
7. Maybe. Make a 'microscopic' 'model'. Understand the details!  
 Does  $\vec{F} = m\vec{a}$  lead to  $PV=nRT$ ?
8. No. Only as far as  $PV = \left(\frac{1}{2}mv^2\right) \left(\frac{2}{3}nN_A\right)$ . Because there is no T in the model.
9. But *if*  $\left(\frac{1}{2}mv^2\right) = \frac{3}{2} \frac{R}{N_A} T$  *then*  $PV = nRT$ .  
 $\left(\frac{R}{N_A} \equiv k; \text{ called 'Boltzmann's constant' }\right)$
10. Can this connection be justified? (to be discussed (extensively!))