NR-103
Energy Equations

RADIATION

Total Energy Emitted = \( \varepsilon \sigma T^4 \)

where:

\( \varepsilon = \) object's emissivity (varies from approx. 0-1)

\( \sigma = \) Stephan-Boltzmann constant = \( \frac{8.132 \times 10^{-11} \text{Cal}}{\text{cm}^2 \times \text{min} \times \text{K}^4} \)

\( T = \) absolute temp (K) = \((^\circ\text{C} + 273)\)

2. Wavelength \( \lambda \) at which an object emits at its maximum intensity

\[ \lambda = \frac{2897 \mu \text{K}}{T} \]

where: \( T = \) absolute temperature \((^\circ\text{K})\)

NOTE: The only variable in the equation above is "temperature", \( \mu \) is a "unit" not a variable.
3. Potential solar radiation received by any surface =

\[ I_o \times \cos(\text{Effective Latitude}) \]

where:
\( I_o \) = intensity received by a surface perpendicular to the sun's rays.

Effective latitude = angle between the sun's rays and a line perpendicular to the surface.

4. Albedo (%) = \( \frac{\text{reflected shortwave radiation}}{\text{incoming incident shortwave radiation}} \times 100 \)

5. Rate of Conductance = \( K \times \Delta T \)

where: \( K \) = thermal conductivity of the media.
\( \Delta T \) = the difference in temperature between the two objects.

6. Latent Heat Transfer = \( LE \)

where:
\( L \) = latent heat of evaporation = \( \frac{590 \text{ cal}}{\text{cm}^3} \)
\( E \) = rate of evaporation expressed in \( \frac{\text{cm}}{\text{min}} \)