Definitions

Unit

- *Definition*: An (arbitrary), agreed-upon standard or convention for measuring the amount of some quantity

Dimension (of a quantity)

- *Definition*: A characterization of the type or kind of a quantity; determines the types of units used to express or measure the amount of the quantity
- *Basic dimensions*:
  - mass
  - distance/length
  - time
- *Composite dimensions:*
  - distance/time (speed)
  - distance x distance (area)
  - distance x distance x distance (volume)
  - mass/volume (density)
  - etc.

Definitions (cont'd)

Rate or **rate of change**:

- *Definition*: Change in some quantity over (per) some unit of time
- *Dimensions*: (dimensions of the quantity that is changing)/time

Flux:

- *Definition*: *Rate* at which some quantity encounters (strikes), or passes through, or is absorbed by, or is emitted from, or reflects from a *unit of surface area* (*rate per unit area*).
- *Dimensions*: [(dimensions of the quantity of interest)/time]/area

Definitions (cont'd)

Energy

- *Definition*: Capacity to do work
  (Work: Force acting on an object × distance that the object moves in response to the force)
- *Dimensions*: force × distance, or mass × speed^2 (etc.)
- *Units*:
  - Joule (MKS system)
  - erg (CGS system)
  - calorie (amount of heat needed to warm 1 gram of water by 1°C)
  - Calorie (1000 calories; used to measure energy content of food)
  - etc.

Definitions (cont'd)

Power

- *Definition*: rate at which energy is transferred/gained/lost
- *Dimensions*: energy/time
- *Units*:
  - Joule/sec (Watt) (MKS system)
  - etc.

Energy Flux

- *Dimensions*: (energy/time)/area, or power/area
- *Units*:
  - (Joules/sec)/m^2 or Watts/m^2
  - (calories/minute)/cm^2 (also called a *Langley*).
  - etc.

Definitions (cont'd)

Radiative intensity

- *Definition*: Flux of radiative energy (such as solar radiation striking a surface, or infrared radiation emitted from a surface)

Insolation

- *Definition*: Flux or intensity of solar radiation striking a surface
  - Sometimes the definition is narrowed to refer to a *horizontal* surface