Important Atmospheric Chemistry Formulas PDF

Formulas
Examples
with Units

List of 10
Important Atmospheric Chemistry Formulas

1) Affluence Count by IPAT Equation Formula

Evaluate Formula

Formula

$$A = \frac{I}{T \cdot P}$$

Example

$$20 = \frac{1000}{5 \cdot 10}$$

2) Drake's Equation for Number of Planets with Intelligent Communicative Extraterrestrial Life Formula

Evaluate Formula

Formula

$$N_{civilization} = \left(R \cdot f_p \cdot f_l \cdot n_e \cdot f_i \cdot f_c \cdot L \right)$$

Example

$$4.7E+7 = \left(24 \cdot 7 \cdot 11 \cdot 6 \cdot 14 \cdot 12 \cdot 25 \right)$$

3) Human Impact on Environment by IPAT Equation Formula

Evaluate Formula

Formula

$$I = \left(P \cdot A \cdot T \right)$$

Example

$$1000 = \left(10 \cdot 20 \cdot 5 \right)$$

4) Instantaneous Growth Rates of Predator using Lotka Volterra Equation Formula

Evaluate Formula

Formula

$$dPdt = \left(c \cdot a' \cdot N_{P/C} \cdot N \right) - \left(q \cdot N_{P/C} \right)$$

Example

$$2081.7 = \left(4 \cdot 22 \cdot 3 \cdot 8 \right) - \left(10.1 \cdot 3 \right)$$

5) Instantaneous Growth Rates of Prey using Lotka Volterra Equation Formula

Evaluate Formula

Formula

$$dNdt = \left(\left(r \cdot N \right) - \left(a' \cdot N_{P/C} \cdot N \right) \right)$$

Example

$$32 = \left(\left(70 \cdot 8 \right) - \left(22 \cdot 3 \cdot 8 \right) \right)$$

6) Net Biomass Formula

Evaluate Formula

Formula

$$N_{biomass} = I_{biomass} - D_{biomass}$$

Example with Units

$$84\,\text{kg/m^2} = 100\,\text{kg/m^2} - 16\,\text{kg/m^2}$$

7) Net Primary Production Formula

Evaluate Formula

Formula

$$NPP = I_{biomass} - R_{loss}$$

Example with Units

$$90.8\,\text{kg/m^2} = 100\,\text{kg/m^2} - 9.2\,\text{1/s}$$

8) Population Count by IPAT Equation Formula

Evaluate Formula

Formula

$$P = \frac{I}{A \cdot T}$$

Example

$$10 = \frac{1000}{20 \cdot 5}$$

9) Residence Time of Gas Formula

Evaluate Formula

Formula

$$T_{residence} = \frac{M}{F}$$

Example with Units

$$3.1667\,\text{s} = \frac{19\,\text{kg}}{6.0\,\text{kg/s}}$$

10) Technology Count by IPAT Equation Formula

Evaluate Formula

Formula

$$T = \frac{I}{A \cdot P}$$

Example

$$5 = \frac{1000}{20 \cdot 10}$$

Variables used in list of Atmospheric Chemistry Formulas above

- **A** Affluence
- **a'** Attack Rate of Predator
- **c** Conversion Efficiency into Offspring
- **$D_{biomass}$** Gross Decrease in Biomass *(Biomass Kilogram per Square Meter)*
- **dNdt** Instantaneous Growth Rates of Prey
- **dPdt** Instantaneous Growth Rates of Predator
- **F** Total Average Influx or Outflux *(Kilogram per Second)*
- **f_c** Fraction of Communicative Planets
- **f_i** Fraction of Life Sites where Intelligence Develops
- **f_l** Fraction of Earth sized Planets where Life Grows
- **f_p** Fraction of Those Stars with Planets
- **I** Human Impact on Environment
- **$I_{biomass}$** Gross Primary Production *(Biomass Kilogram per Square Meter)*
- **L** Lifetime of Communicating Civilizations
- **M** Average Mass in Atmosphere *(Kilogram)*
- **N** Number of Prey
- **$N_{biomass}$** Net Biomass *(Biomass Kilogram per Square Meter)*
- **$N_{civilization}$** Number of Communicative Civilizations
- **n_e** Number of Earth-sized Worlds per Planetary System
- **$N_{P/C}$** Number of Predators or Consumers
- **NPP** Net Primary Production *(Biomass Kilogram per Square Meter)*
- **P** Population
- **q** Predator or Consumer Mortality Rate
- **r** Growth Rate of Prey
- **R** Rate of Formation of Suitable Stars
- **R_{loss}** Respiratory Loss *(1 Per Second)*
- **T** Technology

Constants, Functions, Measurements used in list of Atmospheric Chemistry Formulas above

- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion
- Measurement: **Time** in Second (s)
  Time Unit Conversion
- Measurement: **Mass Flow Rate** in Kilogram per Second (kg/s)
  Mass Flow Rate Unit Conversion
- Measurement: **Time Inverse** in 1 Per Second (1/s)
  Time Inverse Unit Conversion
- Measurement: **Biomass Scale** in Biomass Kilogram per Square Meter (kg/m^2)
  Biomass Scale Unit Conversion

- $T_{residence}$ Residence Time of Gas *(Second)*

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