

Umgang mit Formeln – Einstieg

Aufgabe:

- Beschreiben Sie die folgenden Formeln in Worten.
- Beurteilen Sie, ob die Formeln sinnvoll eingesetzt sind.
- Diskutieren Sie, ob die Benutzung der Formeln physikalisch korrekt ist.

Aus dem Flyer eines Schülerwettbewerbs:

$$\begin{aligned} \vec{a} &\sim \vec{F} \\ \Rightarrow m \cdot \vec{a} &\sim \vec{F} \\ \Rightarrow \vec{F} &\sim m \cdot \vec{a} \\ \vec{F} &= \frac{d(m \cdot \vec{v})}{dt} = \frac{d\vec{p}}{dt} = \dot{\vec{p}} \\ \vec{p} &= m \cdot \vec{v} \quad [\text{Impuls}] \end{aligned}$$

xkcd – The Drake Equation:

THE DRAKE EQUATION

NUMBER OF COMMUNICATING CIVILIZATIONS IN OUR GALAXY

N

PROBABILITY THAT LIFE ON A PLANET BECOMES INTELLIGENT

f_i

$$N = R * f_p n_e f_l f_i f_c L B_s$$

NUMBER OF LIFE-SUPPORTING PLANETS PER SOLAR SYSTEM

n_e

AMOUNT OF BULLSHIT YOU'RE WILLING TO BUY FROM FRANK DRAKE

B_s

xkcd – The Flake Equation:

THE FLAKE EQUATION:

FRACTION OF PEOPLE WHO IMAGINE AN ALIEN ENCOUNTER BECAUSE THEY'RE CRAZY OR WANT TO FEEL SPECIAL

W_p

PROBABILITY THAT THEY'LL TELL SOMEONE

T_k

AVERAGE NUMBER OF PEOPLE EACH FRIEND TELLS THIS 'FIRSTHAND' ACCOUNT

F_o

FRACTION OF PEOPLE WITH THE MEANS AND MOTIVATION TO SHARE THE STORY WITH A WIDER AUDIENCE (BLOGS, FORUMS, REPORTERS)

A_v

$$P = W_p \times (C_R + M_I) \times T_k \times F_o \times F_i \times D_r \times A_v \approx 100,000$$

WORLD POPULATION

(7,000,000,000)

FRACTION OF PEOPLE WHO MISINTERPRET A PHYSICAL OR PHYSIOLOGICAL EXPERIENCE AS AN ALIEN SIGHTING

$(\frac{1}{10,000})$

AVERAGE NUMBER OF PEOPLE THEY TELL

(10)

PROBABILITY THAT ANY DETAILS NOT FITTING THE NARRATIVE WILL BE REVISED OR FORGOTTEN IN RETELLING

$(\frac{1}{100})$

EVEN WITH CONSERVATIVE GUESSES FOR THE VALUES OF THE VARIABLES, THIS SUGGESTS THERE MUST BE A HUGE NUMBER OF CREDIBLE-SOUNDING ALIEN SIGHTINGS OUT THERE, AVAILABLE TO ANYONE WHO WANTS TO BELIEVE!

xkcd-Bilder (cc) by-nc 2.5 – The Drake Equation: <http://xkcd.com/384/> – The Flake Equation: <http://xkcd.com/718/>

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