

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

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

NUMBER OF COMMUNICATING CIVILIZATIONS IN OUR GALAXY

PROBABILITY THAT LIFE ON A PLANET BECOMES INTELLIGENT

NUMBER OF LIFE-SUPPORTING PLANETS PER SOLAR SYSTEM

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

xkcd – The Flake Equation:

THE FLAKE EQUATION:

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

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

PROBABILITY THAT THEY'LL TELL SOMEONE

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

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

WORLD POPULATION

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

AVERAGE NUMBER OF PEOPLE THEY TELL

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

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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