

Useful Calculations in Pokemon

November 20, 2018

1 Damage Calculation

$$\text{Damage} = \left(\frac{\left(\frac{2 \times \text{Level}}{5} + 2 \right) \times \text{Power} \times \frac{A}{D}}{50} + 2 \right) \times \text{Modifier} \quad (1)$$

where,

- Level is the level of attacking Pokémon (or twice the level for a critical hit in Generation I)
- A is the effective Attack stat of the attacking Pokémon if the used move is a physical move, or the effective Special Attack stat of the attacking Pokémon if the used move is a special move
- D is the effective Defense stat of the target if the used move is a physical move or a special move that uses the target's Defense stat, or the effective Special Defense of the target if the used move is an other special move
- Power is the effective power of the move

And Modifier is:

$$\text{Modifier} = \text{Targets} \times \text{Weather} \times \text{Badge} \times \text{Critical} \times \text{random} \times \text{STAB} \times \text{Type} \times \text{Burn} \times \text{other} \quad (2)$$

where,

- Targets is 0.75 if the move has more than one target, and 1 otherwise
- Weather is 1.5 if a Water-type move is being used during rain or a Fire-type move during harsh sunlight, and 0.5 if a Water-type move is used during harsh sunlight or a Fire-type move during rain, and 1 otherwise
- Badge is applied in Generation II only. It is 1.25 if the attacking Pokémon is controlled by the player and if the player has obtained the Badge corresponding to the used move's type, and 1 otherwise

- Critical is applied starting in Generation II. It is 2 for a critical hit in Generations II-V, 1.5 for a critical hit from Generation VI onward, and 1 otherwise
- random is a random factor between 0.85 and 1.00 (inclusive):
 - In Generations I and II, it is realized as a multiplication by a random uniformly distributed integer between 217 and 255 (inclusive), followed by an integer division by 255
 - From Generation III onward, it is a random integer percentage between 0.85 and 1.00 (inclusive)
- STAB is the same-type attack bonus. This is equal to 1.5 if the move's type matches any of the user's types, 2 if the user of the move additionally has Adaptability, and 1 if otherwise
- Type is the type effectiveness (as detailed below). This can be 0 (ineffective); 0.25, 0.5 (not very effective); 1 (normally effective); 2 or 4 (super effective) depending on both the move's and target's types
- Burn is 0.5 (from Generation III onward) if the attacker is burned, its Ability is not Guts, and the used move is a physical move (other than Facade from Generation VI onward), and 1 otherwise