Variables

So that value limitations need not be repeated, they will be provided here. For a vast majority of the limitations, typically whether they must be above a number, the limiter can be removed since it signifies the lowest value. In any case where the limiter **must** be adhered to for a formula, a specific note will be there to remind the reader.

Note: Do not be afraid of these foreign characters, $x \in \mathbb{Z}^+$ merely means that all values must be a positive integer, excluding 0. $\mathbb{R}^+$ means positive real number, excluding 0. $\mathbb{Q}$ means rational number, any number that can be stated as a ratio of another. $\mathbb{Z}^{nonneg}$ means all positive integers including 0. As an example of how to read it, $\{x|\ x \in \mathbb{Z}^+, x \geq 145\}$ equates to x such that x is a positive integer that is greater than or equal to 145. Another way of reading would be to call x the set of all numbers that fit the specific characteristics, such as the set x such that any element within x must be a positive integer that is greater than or equal to 145.

Player Related Variables

- $P_L =$ input level

$$P_L = \{x|\ x \in \mathbb{Z}^+\}$$

- $P_H =$ player health

$$P_H = \{x|\ x \in \mathbb{Z}^+, x \geq 145\}$$

- $P_{BH} =$ base player health

$$P_{BH} = \{x|\ x \in \mathbb{Z}^+, x \geq 115\}$$

- $P_S =$ player stamina

$$P_S = \{x|\ x \in \mathbb{R}^+, x \geq 105\}$$

- $P_{BS} =$ base player stamina

$$P_{BS} = \{x|\ x \in \mathbb{R}^+, x \geq 105\}$$

- $P_{BS} =$ player stamina regeneration

$$P_{BS} = \{x|\ x \in \mathbb{R}^+\}$$

- $P_E =$ player experience for a level

$$P_E = \{x|\ x \in \mathbb{R}^+, x \geq 1\}$$

- $P_{EP} =$ percentage of experience saved

Note: The percentage must be below or equal to 90% or 0.90.

$$P_{EP} = \{x|\ x \in \mathbb{Q}^{nonneg}, x \leq .9\}$$

- $P_{ES} =$ player experience saved

$$P_{ES} = \{x|\ x \in \mathbb{R}^{nonneg}\}$$

- $P_{SE} =$ player smithing experience

$$P_{SE} = \{x|\ x \in R^{nonneg}\}$$

- $P_{SK} =$ player smithing required sk

$$P_{SK} = \{x|\ x \in Z^+\}$$

Statistic Related Variables

- $V =$ points allocated to vitality
$$V = \{x | \, x \in \mathbb{Z}^{nonneg}, x \leq 500\}$$
- $S =$ points allocated to strength
$$S = \{x | \, x \in \mathbb{Z}^{nonneg}, x \leq 500\}$$
- $A =$ points allocated to agility
$$A = \{x | \, x \in \mathbb{Z}^{nonneg}, x \leq 500\}$$
- $D =$ points allocated to defense
$$D = \{x | \, x \in \mathbb{Z}^{nonneg}, x \leq 500\}$$
- $L =$ points allocated to luck
$$L = \{x | \, x \in \mathbb{Z}^{nonneg}, x \leq 500\}$$

Damage Related Variables

- $D_B =$ base damage
$$D_B = \{x | \, x \in \mathbb{R}^{+}\}$$
- $D_R =$ regular damage
$$D_R = \{x | \, x \in \mathbb{R}^{+}\}$$
- $D_C =$ critical damage
$$D_C = \{x | \, x \in \mathbb{R}^{+}\}$$
- $D_W =$ weapon multiplier
$$D_W = \{$$
$$\text{One-Hand} \wedge \text{Duel-Wield} = 1,$$
$$\text{Two-Hand} = 0.5,$$
$$\text{Rapier} = 1.4,$$
$$\text{Dagger} = 1.7$$
$$\}$$

Gear Related Variables

Gear includes but is not limited to Shields, Armor, Upper Headwear, and Lower Headwear.

- $G_{DEX} =$ total dexterity from gear
$$G_{DEX} = \{x | \, x \in \mathbb{R}^{+}, x \geq 3\}$$
- $G_{DEF} =$ total defense from gear
$$G_{DEF} = \{x | \, x \in \mathbb{R}^{+}, x \geq 0.5\}$$

- These gear variables are to be used within the weapon and gear data section.
  - $G_L =$ level of gear
$$G_L = \{x | \, x \in \mathbb{Z}^{+}\}$$
  - $G_{DEX} =$ dexterity from gear
$$G_{DEX} = \{x | \, x \in \mathbb{R}^{+}, x \geq 3\}$$
  - $G_{DEF} =$ defense from gear
$$G_{DEF} = \{x | \, x \in \mathbb{R}^{+}, x \geq 0.5\}$$
  - $G_W =$ gear worth
$$G_W = \{x | \, x \in \mathbb{R}^{+}, x \geq 380\}$$

Weapon Related Variables

- $W_T =$ weapon type

$$W_T = \{x | \ x = \text{One-Hand, Two-Hand, Rapier, or Dagger}\}$$

- W_{SK} = weapon sk

$$W_{SK} = \{x | \ x \in \mathbb{R}^+, x \geq 1\}$$

- W_{DMG} = weapon damage

$$W_{DMG} = \{x | \ x \in \mathbb{R}^+\}$$

- W_W = weapon worth

$$W_W = \{x | \ x \in \mathbb{R}^+, x \geq 231\}$$

Skill Related Variables

- S_U = carrier of skill

$$S_U = \{x | \ x = \text{User, Mob, Minion, or Boss}\}$$

- S_T = skill type

$$S_T = \{x | \ x = \text{One-Hand, Two-Hand, Rapier, or Dagger}\}$$

- S_N = number in chain, 1-7

$$S_N = \{x | \ x \in \mathbb{Z}^+, 1 \leq \ x \leq 7\}$$

- S_{DMG} = skill damage

$$S_{DMG} = \{x | \ x \in \mathbb{R}^+\}$$

- S_{DEC} = skill degradation rate

$$S_{DEC} = \{x | \ x \in \mathbb{R}^+\}$$

Mob Related Variables

- $M_L =$ mob level

$$M_L = \{x | \ x \in \mathbb{Z}^+\}$$

- $M_H =$ mob health

$$M_H = \{x | \ x \in \mathbb{Z}^+\}$$

- $M_E =$ mob experience

$$M_E = \{x | \ x \in \mathbb{Z}^+\}$$

- $M_D =$ mob damage

$$M_{DMG} = \{x | \ x \in \mathbb{R}^+\}$$

- $M_C =$ mob col

$$M_C = \{x | \ x \in \mathbb{Z}^+\}$$

Boss Related Variables

- $B_L =$ boss level

$$B_L = \{x | \ x \in \mathbb{Z}^+\}$$

- $B_H =$ boss health

$$B_H = \{x | \ x \in \mathbb{Z}^+\}$$

- $B_E =$ boss experience

$$B_E = \{x | \ x \in \mathbb{Z}^+\}$$

- $B_D =$ boss damage

$$B_{DMG} = \{x | \ x \in \mathbb{R}^+\}$$

- $B_C =$ boss col

$$B_C = \{x | \ x \in \mathbb{Z}^+\}$$

Status Effect Related Variables

- E_H = entity health
$$E_H = \{x | \ x \in \mathbb{Z}^+\}$$
- E_V = entity points allocated to vitality
$$E_V = \{x | \ x \in \mathbb{Z}^{nonneg}, x \leq 500\}$$
- E_A = has armor resistance to selected status effect
$$E_A = \{x | \ x = \text{true or false}\}$$
- E_{UH} = has upper headwear resistance to selected status effect
$$E_{UH} = \{x | \ x = \text{true or false}\}$$
- E_{LH} = has lower headwear resistance to selected status effect
$$E_{LH} = \{x | \ x = \text{true or false}\}$$
- S_E = status effect
$$S_E = \{x | \ x = \text{Poison, Bleed, Freeze, Burn, Paralysis, Decay, or Light }\}$$
- S_{DMG} = status effect damage
$$S_{DMG} = \{x | \ x \in \mathbb{Z}^+\}$$
- S_{DUR} = status effect duration
$$S_{DUR} = \{x | \ x \in \mathbb{R}^+\}$$
- S_{BDUR} = status effect boss duration
$$S_{BDUR} = \{x | \ x \in \mathbb{R}^+\}$$

There are incomplete sections and subsections, these sections have clear indications as to what is missing. Regarding the program aspect, there are a multitude of inquiries that can be tested. Such as creating a program where the user inputs their current statistics and the program outputs the most efficient level of mob to farm, giving estimated kills per minute. This program is only possible when the mob damage formula has been discovered, the same goes for various other formulas that have yet to be discovered. Discovering them can yield various necessary results that programs can utilize to simulate the game. The more knowledge given, the more knowledge obtained.

Player Data

The player data section is split into health, experience, stamina, damage, statistics, and smithing experience subsections. Each subsection contains multiple formulas, some of them relating to one another.

Player Health

Player health can be split into multiple sections, base health, health from dexterity, and health from vitality.

Given a player's level, total dexterity, and number of allocated stats towards vitality, a value representing the player's health can be estimated.

The player health formula is as follows:

$$P_H = P_{BH} + G_{DEX}\left(\frac{V}{100} + 10\right)$$

with P_{BH} being approximately the below equation.

$$\begin{aligned} P_{BH} \approx\ & -748031721.292P_L^{-1.90410567265} + 779370715.358P_L^{-1.90391429441} \\ & + 424.948514369P_L^{-28.5977515991} + 18.9008114238P_L^{0.894448718694} \\ & - 31339438.1954P_L^{-1.89936989279} + 3.58965212725P_L^{1.41199359695} \\ & + 111.690224049\ . \end{aligned}$$

Note: The health from dexterity is explicitly stated within the health formula, $G_{DEX}(10)$. The health from vitality is also explicitly stated within the health formula, as it relates to the health from dexterity, $G_{DEX}\left(\frac{V}{100} + 10\right)$.

Due to the sheer number of additions and values in the base health formula, using the graphing calculator below is encouraged.
https://www.desmos.com/calculator/bchwpebd8q

Player Experience

The player experience formula has been verified as of 3/25/2023 and a separate blog post has been made for it, however this post includes extra information.

Player experience can be split into multiple sections, experience, percentage saved, and experience saved. Player experience can be gained from smithing, mobs, and bosses. Within the percentage saved formula, there is a foreign concept, $\lfloor\ \ \rfloor$, this is called the floor function or greatest integer function. Basically, it rounds values down, from $1.1 \to 1,\ 1.9 \to 1,\ -1.1 \to -2$.

Given a player's level, the experience required for that level, percentage of the experience saved, and actual experience saved can be calculated.

The player experience formula is as follows:

$$P_E = 3P_L^2 + 9P_L - 3$$

The percentage saved formula is as follows from level 1 to 999:

$$P_{EP} = \left\lfloor \frac{P_L}{100} \right\rfloor * 10$$

any levels beyond 999 have a percentage saved of 90%.

The experience saved formula is as follows, so long as you have greater than the percentage saved * the player experience:

$$P_{ES} = P_E * \left(\frac{P_{EP}}{100}\right)$$

The graphing calculator below does not have a percentage saved nor experience saved within it. The program below contains a way to calculate the minimum level required for any action or set of actions.
https://www.desmos.com/calculator/3ebk7akhha

Player Stamina

The player stamina formula, although simple, considers multiple factors. These factors include the player level, AGI, STR, and VIT.

Given a player's level and points allocated to AGI, STR, and VIT, a value representing the player's current stamina can be derived.

The player stamina formula is as follows:

$$P_S = 100 + 5P_L + \left(\frac{1}{10}\right)(A + S + V)$$

with the base stamina formula being:

$$P_{BS} = 100 + 5P_L$$

The player stamina regeneration formula is approximately as follows:

$$P_{SR} \approx \frac{P_S}{28}$$

Action Requirements and Costs:

- Movement
  - Jump
    - Requires: 7 Stamina
    - Costs: 7 Stamina
  - Sprint
    - Requires: 10 Stamina
    - Costs: 10 Stamina per second
  - Block
    - Requires: 1 Stamina
    - Costs: ~4.375 Stamina per second
- Attack
  - One-Hand
    - Requires: 5 Stamina
    - Costs: 2.5 Stamina
  - Dual Wield
    - Requires: 10? Stamina - unconfirmed
    - Costs: 8 Stamina
  - Two-Hand
    - Requires: 5 Stamina

        - Costs: 4 Stamina
- ❖ Rapier
    - Requires: 5 Stamina
    - Costs: 1.5 Stamina
- ❖ Dagger
    - Requires: 5 Stamina
    - Costs: 1 Stamina

Player Damage

The player damage formula can be interpreted in multiple ways. The one provided differs from the one provided on the official Discord and on the wiki. The reason for this difference is that the formulas are easier to understand at face value for beginners. The player damage formula considers multiple factors. These factors being base damage, critical damage, regular damage, weapon multiplier, and points allocated to STR.

Given any combination of these 5 factors, so long as at least two are obtained aside from the weapon multiplier which is a given, all the other values can be obtained. The set of formulas provided will only include finding current damage given base damage and points allocated to STR and finding critical damage given current damage and base damage.

The regular damage formula is as follows:

$$D_R = \frac{S * D_B}{250} + D_B$$

The critical damage formula is as follows:

$$D_c = D_w * D_B + D_R$$

The other formulas are within the Finder section of the below graphing calculator.
https://www.desmos.com/calculator/nnayr855iu

Player Statistics

This subsection holds all related formulas for VIT, STR, AGI, LUK, and DEF, without any descriptors. Most if not all the information provided here can be seen within the Stats wiki page linked below, the wiki page also has in depth descriptions for each stat.
https://swordbloxonlinerebirth.fandom.com/wiki/Stats

Given any statistical value, i.e., VIT, STR, AGI, LUK, or DEF, all the below formulas can be defined. In regards to VIT, the gear dexterity must be known when attempting to find the increased health. In regards to STR, the base damage must be known when attempting to find the increased damage. Other formula variants can be derived, using these formulas and other formulas provided within this post.

Vitality:

Increased Health

$$G_{DEX}\left(\frac{V}{100}+10\right)$$

Increased Stamina

$$\frac{V}{10}$$

Increased Resistance (%)

$$\frac{V}{100}$$

Strength:

Increased Damage

$$\frac{S * D_B}{250}$$

Increased Stamina

$$\frac{S}{10}$$

Increased Multi-Hit (%)

Note: Hard caps at 15%.

$$\frac{S}{50}$$

Agility:

Increased Stamina

$$\frac{A}{10}$$

Increased Walk Speed

Note: Base is 14.

$$\frac{A}{250}$$

Increased Run Speed

Note: Base is 28, Dagger gets +2 by default.

$$\frac{A}{50}$$

Reduced Hit Cooldown [Estimations]

One-Hand

Note: Base is ~5/6 seconds.

$$\frac{A}{2000}$$

Dual-Wield

Note: Base is ~1 second.

$$\frac{A}{1000}$$

Two-Hand

Note: Base is ~7/6 seconds.

$$\frac{A}{1500}$$

Rapier

Note: Base is ~7/12 seconds.

$$\frac{39A}{54000}$$

Dagger

Note: Base is ~5/12 seconds.

$$\frac{A}{6000}$$

Reduced Jump Cooldown

Note: Base is ~1 second. Lv. 500 sets the cooldown to ~0.5 seconds. Both AGI 500 and Lv. 500 result in a ~0.3 second cooldown.

$$\frac{A}{1000}$$

Luck:

Increased Critical Chance

Note: Base is 15%.

$$\frac{L}{100}$$

Increased Drop Chance

Note: (item not obtained and max luck)→(2x drop chance for that item).

$$\frac{L}{100}$$

Increased Multi-Hit (%)

Note: Hard caps at 15%.

$$\frac{L}{50}$$

Defense:

Damage Reduced

$$G_{DEF}(\frac{D}{100}+5)$$

Smithing Experience

Smithing experience varies depending on the item crafted, the more sk required the more experience given. There are other factors that change the amount of experience given, which are

boosts and game-passes. There are four formulas related to smithing experience, normal, boost, Game-pass, and Game-pass with boost.

Given the smithing sk required and whether the user has a boost or/and the Master Blacksmith Game-pass, the smithing experience formula can be estimated.

The smithing experience formula for normal is as follows:

$$P_{SE} \approx [1.2524P_{SK} - 0.415796]$$

The smithing experience formula for boost or Game-pass is as follows:

$$P_{SE} \approx [1.2524P_{SK} - 0.415796] + 2.5$$

The smithing experience formula for boost with Game-pass is as follows:

$$P_{SE} \approx [1.2524P_{SK} - 0.415796] + 5$$

Weapon and Gear Data

The weapon and gear data section is split into weapon sk damage, weapon worth, skill damage, gear dexterity, gear defense, and gear worth subsections.

Weapon SK Damage

The weapon damage formula, based on SK, differs depending on the weapon and whether the weapon is a Badge/Game-pass weapon or a Legendary. Regular weapons scale lower than Badge weapons, which in turn scale equal or less than Game-pass weapons, which in turn scale lower than Legendary weapons.

Given the weapon sk for any desired weapon, the formulas below can be estimated.

The One-Hand weapon sk damage formula is as follows:

$$W_{DMG} \approx 1053.83{W_{SK}}^{-28.6} + 0.629964{W_{SK}}^{1.37402} + 0.073082W_{SK} - 1.8146 * 10^{7} * {W_{SK}}^{-2.63841}\sin(-3.14165{W_{SK}}^{-0.000128815})$$

The Two-Hand weapon sk damage formula is as follows:

$$W_{DMG} \approx 0.987388{W_{SK}}^{1.36874} - 1.08924{W_{SK}}^{0.230083} + 3.82497$$

The Rapier weapon sk damage formula is as follows:

$$W_{DMG} \approx 0.605588{W_{SK}}^{1.36133} - 0.429357{W_{SK}}^{0.624546} + 2.766$$

The Dagger weapon sk damage formula is as follows:

$$W_{DMG} \approx 21.4516{W_{SK}}^{-1.14518} + .511652{W_{SK}}^{1.37416} + 0.057236W_{SK} - 23.5568{W_{SK}}^{-1.81666} sin\left(2.16489{W_{SK}}^{0.731571}\right)$$

The badge and game-pass and legendary formulas were never estimated, multiple badge and legendary values were found, but not enough.

Weapon Worth

The weapon worth formula describes the weapons that can be sold or purchased with Col, not all can.

Given the SK of any weapon, the worth value for that SK can be estimated.

The weapon worth formula is as follows:

$$W_W \approx 289.008{W_{SK}}^{1.00062} - 19.1322$$

Skill Damage

Each skill has a different formula for the **maximum** damage dealt. The skill damage correlates with the currently held weapon. The skill damage degrades with time and maximum damage is based on a random number generator.

The skill damage formulas provided will be related to **Daggers**, other skills have not been tested and thus will not be publicized. The formulas provided will have flaws, since there are RNG variables at play, however expect similar results upon first hit. Within the Reaver formula there is a foreign concept, $\lfloor \quad \rfloor$, this is called the floor function or greatest integer function. Basically, it rounds values down, from $1.1 \to 1,\ 1.9 \to 1,\ -1.1 \to -2$. Within the Fading Edge II formula there is a foreign concept, $[\quad]$, this is called the round function. It rounds the number as usual, $1.3 \to 1,\ 1.6 \to 2$. Within the Canine formula there is a foreign concept, $\lceil \quad \rceil$, this is called the ceil function or the least integer function. Basically it acts similar to the floor function except it rounds values up, from $1.1 \to 2,\ 1.9 \to 2,\ -1.1 \to -1$.

Given that the skill carrier is a user, the type, the number, and the weapon damage the skill damage formula can be estimated.

The skill damage formula for Daggers consists of multiple parts, since there are seven skills. These seven formulas are all for users with 0 STR.
Reaver, otherwise known as 1, has the skill damage formula as follows:

$$S_{DMG} \approx \lfloor 1.4951W_{DMG} \rfloor$$

Fading Edge, otherwise known as 2, has the skill damage formula as follows:

$$S_{DMG} \approx \lfloor 2.14103W_{DMG} \rfloor$$

Fading Edge II, otherwise known as 3, has the skill damage formula as follows:

$$S_{DMG} \approx [2.64W_{DMG}]$$

Fading Edge III, otherwise known as 4, has the skill damage formula as follows:

$$S_{DMG} \approx [3.14W_{DMG}]$$

Canine, otherwise known as 5, has the skill damage formula as follows:

$$S_{DMG} \approx [3.342W_{DMG}]$$

Canine II, otherwise known as 6, has the skill damage formula as follows:

$$S_{DMG} \approx [3.5485W_{DMG}]$$

Rapid Bite, otherwise known as 7, has the skill damage formula as follows:

$$S_{DMG} \approx [3.7485W_{DMG}]$$

The other weapon skill formulas were never obtained, it is assumed that strength increases skill damage, however the exact amount or scale is unknown, thus it is not included within the formula. Strength may not be constant for each skill, however farming a 250 and 500 STR build to SK 375 for all weapons, then rechecking each maximum value is too laborious as a user with 0 STR. The decrease rate exists, but is also unknown, it is assumed that it is a percentage of damage based on the time elapsed.

Armor Dexterity

The armor dexterity formula can branch into three sections, normal, Badge, and Game-pass armor dexterity. Both normal and Badge armor dexterity formulas have been estimated, meaning they are accurate to an extent; however, the Game-pass armor dexterity formula has not been touched.

Given the level of the gear desired, the formula can be estimated.

The normal armor dexterity formula is as follows:

$$G_{DEX} \approx 1.31732{G_L}^{-500} + 1.49258{G_L}^{1.33823} - 0.380652G_L + 7.20016{G_L}^{-0.939635}sin(0.079352G_L)$$

The badge armor dexterity formula is as follows:

$$G_{DEX} \approx 0.457371{G_L}^{1.45233} + 5.08398{G_L}^{1.0922} - 4.68986G_L + 4.16089$$

As stated above, the Game-pass armor dexterity formula has not been touched.

Armor Defense

The armor defense formula can branch into three sections, normal, Badge, and Game-pass armor defense. Both normal and Badge armor defense formulas have been estimated, meaning they are accurate to an extent; however, the Game-pass armor defense formula has not been touched.

Given the level of the gear desired, the formula can be estimated.

The normal armor defense formula is as follows:

$$G_{DEF} \approx -0.123213{G_L}^{1.02241} + 0.292028{G_L}^{1.32682} + 0.517196$$

The badge armor defense formula is as follows:

$$G_{DEF} \approx 0.615838{G_L}^{-0.343928} + 0.226188{G_L}^{1.36863} + 0.0898362G_L + 0.51296{G_L}^{-0.424603}sin(0.121605G_L)$$

As stated above, the Game-pass armor defense formula has not been touched.

Shield Defense

The shield defense formula can branch into three sections, normal, Badge, and Game-pass shield defense.

Given the level of the gear desired, the shield defense formula can be estimated.

The normal shield defense formula is as follows:

$$G_{DEF} \approx 0.150619{G_L}^{1.34907} - 1.81904{G_L}^{0.0925967} + 2.26883$$

The Badge and Game-pass shield defense formulas have not been touched.

Headwear Dexterity

The headwear dexterity formula can branch into two subsections, normal and Badge headwear dexterity.

Given the level of the gear desired, the formula can be estimated.

The normal headwear dexterity formula is as follows:

$$G_{DEX} \approx 0.556583{G_L}^{1.32396} + 0.422066{G_L}^{0.171806} + -0.244749G_L + (4.7701 * 10^{-9}){G_L}^{3.71974}sin(0.20283G_L)$$

The Badge headwear dexterity formula has not been touched.

Headwear Defense

The headwear defense formula has not been possible due to the lack in defense-oriented headwear, although there are some from previous events. Normal and Badge headwear with defense will be available, making it possible to find this formula, in due time. Hopefully.

Gear Worth

The gear worth formula describes gear that can be sold or purchased with Col, not all gear can. The formula is sectioned into armor, shield, and headwear worth since each has their own set of values, thus each has their own formula.

Given the gear level, the formula can be derived.

The armor worth formula is as follows:

$$G_W = 480G_L$$

The shield worth formula is as follows:

$$G_W = 380G_L$$

The headwear worth formula is as follows:

$$G_W = 260G_L$$

Mob Data

The mob data section is split into mob health, mob experience, mob damage, and mob col subsections.

Mob Health

The mob health formula describes how mob health increases as its level increases. Within the mob health formula there is a foreign concept, [ ], this is called the round function. It rounds the number as usual, $1.3 \to 1,\ 1.6 \to 2$.

Given the mob level, the mob health formula can be closely approximated.

The mob health formula is as follows, where [] is the round function:

$$M_H \approx \left[\frac{-\frac{4}{3}M_L + 20.6013{M_L}^{1.36611} + 19.4195}{10}\right] * 10$$

Mob Experience

The mob experience formula describes how experience dropped increases as its level increases. Within the mob experience formula there is a foreign concept, ⌊ ⌋, this is called the floor function or greatest integer function. Basically, it rounds values down, from $1.1 \to 1,\ 1.9 \to 1,\ -1.1 \to -2$. The formula also contains another foreign concept, [ ], this is called the round function. It rounds the number as usual, $1.3 \to 1,\ 1.6 \to 2$.

Given the mob level, the mob experience formula can be derived.

The mob experience formula is as follows:

$$M_E = \left\lfloor 2.5M_L + 10\left\lfloor \frac{M_L}{10} \right\rfloor \right\rfloor$$

Mob Damage

Mob damage is solely RNG based, taking the maximum damage values can yield a formula. The minimum damage formula also exists.

Given the mob's level, the maximum and minimum mob damage formula can be extremely roughly approximated, as in they may be close for lower levels but they are not for higher levels.

The minimum mob damage is as follows:

$$M_D \approx -5.518 * 10^6 {M_L}^{-1.31869} + 0.46077 {M_L}^{1.73794} + 5.518 * 10^6 {M_L}^{-1.31868} + 8.62832M_L - 24.3971$$

The maximum mob damage formula is as follows:

$$M_D \approx -0.00393671 {M_L}^{2.31455} + 9.2093 * 10^{-18} {M_L}^{8.79928} + 20.2464 {M_L}^{1.19025} - 20.2696M_L + 10.5413$$

Again. These formulas are extremely inaccurate, they are used as temporary filler until more values are obtained and a more accurate equation is generated.

Mob Col

The mob col formula describes how the col obtained from killing a mob increases as the level of the mob increases.

Given the mob level, the mob col formula can be derived.

The mob col formula is as follows:

$$M_C = 5M_L$$

Boss Data

The boss data section is split into boss health, boss experience, boss damage, and boss col subsections.

Boss Health

The boss health formula describes how boss health increases for each level the boss has. The boss health formula has not been perfected, however the below formula is accurate for all current Bosses except Shadesworn and Illfang, as of 1/29/2023. Within the boss health formula there is

a foreign concept, [ ], this is called the round function. It rounds the number as usual, $1.3 \rightarrow 1$, $1.6 \rightarrow 2$.

Given the boss level, the boss health formula can be approximated.

The boss health formula is as follows:

$$B_H \approx \left\lfloor \frac{503.152{B_L}^{1.36891} + 7660.28}{1000} \right\rfloor * 1000$$

Boss Experience

The boss experience formula describes how experience obtained increases as its level increases.

Given the boss level, the boss experience formula can be derived.

The boss experience formula is as follows:

$$B_E = 180B_L$$

Boss Damage

Boss damage is solely RNG based, taking the maximum damage values can yield a formula. The minimum damage formula may also exist, however both of these formulas have not seen the light of day.

Boss Col

The boss col formula describes how the col obtained increases as the boss level increases.

Given the boss level, the boss col formula can be derived.

The boss col formula is as follows:

$$B_C = 24B_L$$

Status Effect

The status effect section is split up into status effect damage and status effect duration.

Status Effect Damage

Status Effect damage depends on the status effect and the user's health and resistance. Bleeding causes 0.5% of the player's health to be depleted. The list of the percentages are as follows:

- Paralysis: 0%
- Bleeding/Poison: 0.5%
- Frozen: 1.25%
- Fire: 2.5%
- Decay: 5%

Given the resistance and points allocated to VIT one can derive the status effect damage. Resistance is obtained by Armor (40%), Upper Headwear (20%), and Lower Headwear (20%).

The status effect damage formula is as follows:

$$S_{DMG} = \left\lceil E_H * \frac{1 - \left((E_A + E_{UH} + E_{LH}) + \frac{E_V}{10000} \right)}{\frac{1}{S_E}} \right\rceil$$

This formula does not work for Frozen or Paralysis, since these effects' duration is reduced as resistance increases.

Status Effect Duration

Status Effect duration is directly tied to resistance and VIT, since as either increase the duration decreases. Whether the entity in question is a mob, boss, or player also affects the duration. Mob status effects typically last between 4-6 seconds, with Boss status effects lasting 6-8 seconds. Player weapon effects sometimes last for 3 seconds and other times 5.

Given the resistance and points allocated to VIT one can derive the status effect damage. Resistance is obtained by Armor (40%), Upper Headwear (20%), and Lower Headwear (20%).

The status effect duration formula is as follows:

$$S_{DUR} = 5 * \left(1 - \left((E_A + E_{UH} + E_{LH}) + \frac{E_V}{10000} \right) \right)$$

The status effect duration formula for bosses is as follows:

$$S_{BDUR} = 7 * \left(1 - \left((E_A + E_{UH} + E_{LH}) + \frac{E_V}{10000} \right) \right)$$