

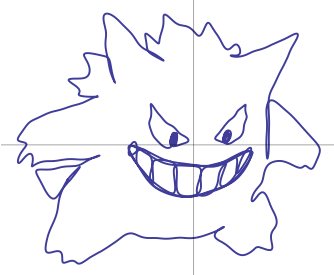
MATH:1260 Pokémath

The Mathematics of Pokémon Go[®]

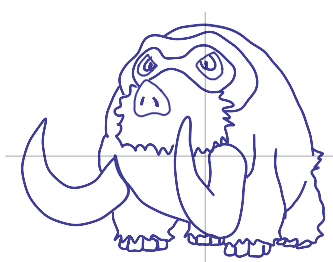
Week 14 Wednesday, Spring 24

Popular curves:

Gengar-like curve



Mamoswine-like curve



Plan for Today

- Module 3: To Be The Very Best!
 - Math with Units
 - In Pokemon and in life!

Reminders

- GW 12 (last GW!) is Thursday.
- HW 9 (last HW!) is due tonight at midnight.
- Project 3 Stage 1 is due tonight at midnight.
- Project 3 Stage 2 is due Wednesday May 1.
 - We will have a battle day on Monday April 29, so you can meet with your rival and battle during class.

An example: Gengar vs Mamoswine



Moves

Fast Moves

Gengar uses Hex
Mamoswine uses Powder Snow

Fast Move	Power	Energy	Duration	STAB(1or1.2	Type Effectiv	Multiplier	unrdd damage	damage
Hex	6	12	3	1.2	1	1.56	8.12377358	9
Powder Snow	5	8	2	1.2	1	1.56	6.20670732	7

Charge Moves

Gengar uses Shadow Ball
Mamoswine uses Avalanche

Charge Move	power	energy	STAB(1or1.2	Type Effectiv	Multiplier	unrdd max d	max damage
Shadow Ball	100	55	1.2	1	1.56	135.396226	136
Avalanche	90	45	1.2	1	1.56	111.720732	112

Motivational Example: Where do the Units go?

Gengar's Hex charges up 12 energy every three turns.

$$\text{"Energy per Turn"} = \frac{12}{3} \frac{\text{Energy}}{\text{Turn}} =$$

There are two turns every second

$$\text{"Turns per second"} = \frac{2}{1} \frac{\text{Turns}}{\text{Second}} =$$

What is the average "energy per second"?

Rules for Units

1) The English word “per” signals a rate of change so the units are divided.

Pokemon Examples:

“Damage per turn” =

“Candy per level up” =

Real Life Examples:

“Miles per hour” =

“Caffeine per serving” =

2) When you multiply quantities, you multiply units.

We multiplied two quantities to find “energy per second” earlier. We must also multiply those units!

Another example: one measure of the overall usefulness of a fast move is “Power per turn” * “Energy per turn”. What do the units look like in this case? How does Hex compare to Powder Snow?

3) Units can cancel!

This gives us a way to check our answer on “energy per second”.

Let’s follow the units as we calculate damage per turn, turns per cycle and total damage per cycle for Gengar (assume no shields).

Fast Move	Power	Energy	Duration	STAB(1or1.2	Type Effectiver	Multiplier	unrdd
Hex	6	12	3	1.2	1	1.56	8.123
Powder Snow	5	8	2	1.2	1	1.56	6.206
Charge Move	power	energy	STAB(1or1.2	Type Effectiv	Multiplier	unrdd ma	
Shadow Ball	100	55	1.2	1	1.56	135.3962	
Avalanche	90	45	1.2	1	1.56	111.7207	

4) When you try to add (or subtract) terms, make sure the units match.

These examples may seem silly, but these kinds of mistakes can crash rockets!

<https://www.latimes.com/archives/la-xpm-1999-oct-01-mn-17288-story.html>

5) When you want to change units, you can multiply by “1”.