Aquaria Design document

The aquarist’s toolkit • submitted by Francis michael tayag in partial fulfillment of it140p machine problem

# Features:

* Calculate volume and mass of aquarium
  + Inputs:
    - Shape of aquarium
    - … Relevant information specific to shape of aquarium
  + Outputs:
    - Volume (liters)
    - Mass of aquarium
* Calculate monthly expenses for a new aquarium
  + Inputs:
    - One-time expenses
      * Fish costs
      * Plants costs
      * Décor costs
      * Substrate costs
      * Aquarium tank cost
      * Medication costs
      * Filter cost
    - Monthly expenses
      * Filters (kilowatts)
      * Lighting (kilowatts)
      * Heaters (kilowatts)
      * Filter foams
      * Fish Food
    - No. of months to calculate

Process:

* + - Inputs are calculated as one-time and recurring
  + Outputs:
    - Current electricity charge (Meralco charges 10 pesos per kwH)
    - Estimated monthly cost
    - Estimated annual cost
* Fish compatibility checker
  + Inputs:
    - Fish #1
    - Fish #2
  + Process:
    - (Perhaps use a compatibility matrix)
  + Outputs:
    - Fish #1’s compatibility with Fish #2
    - Fish #1’s other compatible and incompatible tank mates
* Unit conversion (SI/metric to US customary, vice versa)
  + Volume
    - Cm3
    - Liter
    - US Gallon
  + Temperature
    - Celsius
    - Fahrenheit
    - Kelvin
  + Length
    - Meter
    - Centimeter
    - Foot
    - Inch

# Limitations

The available fish species are the most popular freshwater fish among aquarists (News 9, 2019)

* Available fish species:
  + Angelfish
  + Betta fish
  + Common goldfish
  + Fancy goldfish
  + Danio
  + Gourami
  + Guppy
  + Molly
* Available aquarium shapes:
  + Rectangle
  + Bow front
  + Corner prism
  + Corner pentagon
  + Cylinder
  + Half cylinder
  + Quarter cylinder

# aquarium volume & mass formulas

The formula for the bow front aquarium was retrieved from InchCalculator’s *Aquarium Tank Volume Calculator*.

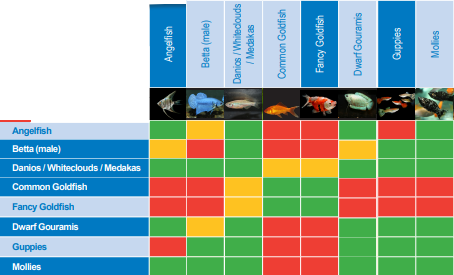
|  |  |  |
| --- | --- | --- |
| Rectangle |  |  |
| Bow front | First calculate the areas of the underlying shapes, namely the square and ellipse:  Then calculate the total volume of the bow front aquarium: | bow front aquarium top view showing length, width, and full width dimensions |
| Triangular prism |  |  |
| Corner pentagon | The corner pentagon will be calculated with three (3) inputs: the long side and the short side (as seen in the Figure), and the height.  The area of the underlying shapes would then be calculated as such:  Finally, to get the volume simply multiply the total area with the height, as such: |  |
| Cylinder |  |  |
| Half cylinder |  |  |
| Quarter cylinder |  |  |

The mass of the aquarium can be calculated as such:

\* The density (p) was derived from the density of water

# fish Compatibility matrix

Fish compatibilities were obtained from AquariumIndustries’ *Freshwater Fish Compatibility Chart* (Aquarium Industries, n.d.).



|  |  |
| --- | --- |
|  | Compatible |
|  | Usually compatible |
|  | Not compatible |

# Bibliography

Aquarium Industries. (n.d.). *Freshwater Fish Compatibility Chart*. Retrieved from AquariumIndustries: https://www.aquariumindustries.com.au/wp-content/uploads/2015/03/Freshwater-Fish-Compatibility-Chart.pdf

InchCalculator. (n.d.). *Aquarium Tank Volume Calculator*. Retrieved from InchCalculator: https://www.inchcalculator.com/aquarium-tank-volume-calculator/

News On 6. (2019, August 17). *17 Of The Most Popular Freshwater Fish*. Retrieved from News9: https://www.news9.com/story/5e6fc938f86011d4820c3ab7/17-of-the-most-popular-freshwater-fish

## OTHER REFERENCES

* Icons retrieved from flaticon.com (Freepik)
* Illustrations of tank shapes retrieved from homestratosphere.com