Wind chimes

You are just beginning your first job as an entry level engineer at Wind Chimes, Inc. Your first task is to design a new and creative wind chime with your team that meets the following criteria:

- It must be made out of hollow piping
- It must play at least four different notes that sound pleasing together
- It must be aesthetically pleasing
- Material cost must be under $10.00
- It cannot weigh more than 1.5 kg
- Each component/tube must make a distinct sound when suspended 1 meter away from a fan set at low.
- All research, documentation, and mathematical calculations must be provided to your supervisor (teacher).

Procedure

1. Research the problem:
   a. What are the parts of a wind chime?
   b. How does the length and width of the pipe effect the sound?
   c. List at least 3 different sources and include web address or book title.

2. Develop possible solutions:
   a. List possible materials
   b. Method of suspending pipes?
   c. Location for drilling pipes
   d. Make all required calculations for designing an effective wind chime.

3. Test and evaluate: Does the wind chime operate continuously giving out the expected notes under the test wind?

4. Select a solution: explain why you chose the solution and address all criteria listed in the introduction.

5. Construct a prototype: Record all dimensions including pipe lengths and location of hole to suspend the pipe while constructing the prototype.

6. Test prototype:
   a. What is the quality of the sound?
   b. Does the sound quality need to be modified?

7. Redesign: list any changes you made to the prototype and note all changes in calculations for the new model.
Calculations & notes:

<table>
<thead>
<tr>
<th>Chime (redesign step)</th>
<th>Weight</th>
<th>Diameter</th>
<th>Length</th>
<th>Material</th>
<th>Aesthetic appeal</th>
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Sketch of the wind chime with dimensions: