**Student Handout**

**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:
   1. What are the parts of a wind chime?
   2. How does the length and width of the pipe effect the sound?
   3. List at least 3 different sources and include web address or book title.
2. Develop possible solutions:
   1. List possible materials
   2. Method of suspending pipes?
   3. Location for drilling pipes
   4. 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:
   1. What is the quality of the sound?
   2. 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:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chime**  **(redesign step)** | | **Weight** | **Diameter** | **Length** | **Material** | **Aesthetic appeal** |
| 1 |  | |  |  |  |  |
| 2 |  | |  |  |  |  |
| 3 |  | |  |  |  |  |
| 4 |  | |  |  |  |  |
| 5 |  | |  |  |  |  |

**Sketch of the wind chime with dimensions:**