**Scientist\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Musical Straws Lab**

**I Purpose/Question:**

How does pitch depend on the length of the tube?

**II Theoretical:** Write a short summary (including equations and diagrams) about: *What is frequency? What is pitch? What is an open end and a closed end pipe? Formula for the length of the straw for closed end tube needed to produce certain pitch.*

**III Experimental:**

**Materials:**

Straw, Ruler, Scissors,

**Procedure:**

1. Calculate the length of the straw needed to produce fundamental frequencies for these tones. Show calculations.
2. Cut the straws to appropriate lengths.
3. Label the straws by the tones.
4. Practice the songs.
5. Perform.
6. Answer to the analysis questions.
7. **Analysis**

**vsound** = \_340 m/s\_\_\_\_ **Calculations:**

|  |  |  |
| --- | --- | --- |
| **TONE** | **f (Hz)** | **L (cm)** |
| **G** | **392** |  |
| **A** | **440** |  |
| **B**  | **494** |  |
| **C** | **524** |  |
| **D** | **587** |  |
| **E** | **660** |  |
| **F** | **698** |  |
| **\*G** | **784** |  |
| **\*C** | **1047** |  |

**Questions**

1. If you make the straw shorter, what happens to the *wavelength, frequency and speed*?
2. If you make the straw longer, what happens to the *wavelength, frequency and speed*?

**Mary had a little lamb**

**E D C D E E E\_\_\_\_**

**D D D\_\_\_\_ E G G\_\_\_\_**

**E D C D E E E E**

**D D E D C\_\_\_\_**

**Twinkle, Twinkle …**

**G G D D E E D\_\_\_\_**

**C C B B A A G\_\_\_\_**

**D D C C B B A\_\_\_\_**

**D D C C B B A\_\_\_\_**

**G G D D E E D\_\_\_\_**

**C C B B A A G\_\_\_\_**

**Jingle Bells**

**E E E\_\_\_\_ E E E\_\_\_\_**

**E \*G C D E\_\_\_\_**

**F F F F F E E E E**

**E D D E D\_\_\_\_ \*G\_\_\_\_**

**E E E\_\_\_\_ E E E\_\_\_\_**

**E \*G C D E\_\_\_\_**

**F F F F F E E E**

**\*G \*G F D C\_\_\_\_**

**Row, row …**

**C\_\_\_\_ C\_\_\_\_ C D E\_\_\_\_**

**E D E F \*G\_\_\_\_**

**\*C \*C \*C \*G \*G \*G**

**E E E C C C**

**\*G\_\_\_\_ F E\_\_\_\_ D C\_\_\_\_**