

## Physics Musical Instrument Project (75 points)

**\*\*OUT OF CLASS PROJECT\*\***

### Objectives:

1. To design and build a musical instrument that plays three different notes.
2. To explain the physics behind the operation of the musical instrument and to demonstrate how to play the instrument.
3. To construct a poster that explains how the instrument works.

### Time:

#### 2 weeks

- Design plan due May 3rd. (10 points) (In your notebook)
- Presentation/Demonstration Due May 10 (40 points)
- Poster Due May 10 (25 points)

### Examples of instruments:

Flute, xylophone, banjo, guitar, trumpet, trombone, drum set, other

### Suggested Materials

You may use almost anything to build your musical instrument, such as different sizes of rubber bands, cardboard boxes, different lengths of cardboard tubes or plastic pipes, string, wooden craft sticks or tongue depressors, drinking straws, and bottles. Practically anything can be incorporated into a musical instrument. **Once again, this is a trash to treasure project so you should incorporate things from around your house instead of buying items!**

### Project Hints

- Think about whether you will want to play your instrument by blowing into it, strumming it, striking it, or by some other method.
- Be creative! Don't limit yourself to the materials suggested by your teacher. *And don't just copy an existing instrument.* Part of your teacher's assessment of your project will be based on originality.
- As you decide on the design of your instrument, remember that you will need to play something on it. Your instrument must not only make sounds, but it must make different sounds.

*The following tasks will help you start the design phase of this project.*

1. Brainstorm all the ways you can think of that musical instruments make and modify sound.
2. Draw a diagram of your proposed instrument. Be sure to label its parts, and the materials you will use. *This will be an assignment in your notebook.*
3. How will you play your instrument? Exactly how will your instrument make sounds? What will vibrate to create sound waves? How will your instrument make sounds of different pitch and volume?
4. Make detailed notes on the construction of your instrument. Will you need to use other materials for certain parts of your instrument? How will the parts fit together? Will you need glue or special tools to make your instrument? *This will be an assignment in your notebook.*

## Scoring Rubric

In evaluating how well you complete the project, I will judge your work based on your efforts to creatively create the instrument as well as how functional it is. You will also complete a detailed drawing and description in your notebook.

### Labeled drawing of your instrument in your notebook (10 points)

Must include all parts labeled

Detail what each piece is made out of

### Description of how you constructed your project as a poster (25 points)

Explain what you attached where, how, and why (written either in paragraph form or as part of a labeled diagram)

Explain how your musical instrument plays three different notes using physics and a labeled diagram

### Musical Instrument (40 points)

Your instrument will be graded based on this rubric:

<p><b>Instrument appearance and quality (20 points)</b></p>	<p>The instrument is well-made and creative. The instrument is neatly done. An obvious amount of time was spent planning your project.</p>	<p>The instrument is well-made and creative. Some elements were done in a hurry. Some effort was made but more could have been done.</p>	<p>The instrument is untidy and rushed. It functions, but does not function very well. Minimal effort was made.</p>
<p><b>Varying pitch (20 points)</b></p>	<p>The instrument can play at least three different notes (frequencies). You can demonstrate a simple tune or rhythm with your instrument.</p>	<p>The instrument can play two different notes (frequencies). You can demonstrate a simple tune or rhythm with your instrument.</p>	<p>The instrument can only play one note (frequency). You cannot play a simple tune or rhythm with your instrument,</p>

*Suggested easy tune (B – high note, A – middle note, G – low note):*

B A G A B B B A A A B B B  
Mary had a li - ttle lamb, li - ttle lamb, li - ttle lamb,

B A G A B B B B A A B A G  
Mary had a li - ttle lamb, it's fleece was white as snow.