



# Making Music

**Amount of time Demo takes: 1-5 minutes**

**Try this at home!**

## Lesson's Big Idea

- Music is vibrations that humans hear as a frequency, the faster the frequency, the higher the pitch.
- In this music box, the vibrations of the larger metal sections create the lower pitches and the smaller sections have higher pitches.
- The holes in the paper contact small spikes that cause the sections to vibrate. This causes a frequency to be released, that we hear as a pitch.
- All music is a frequency created by vibrations.

## Materials

- "Make your own music box" kit (Music box, sheets, hole punch)
- 1.75" x 18.75" ; 80lb paper (type of paper to make -refill music sheets)
- Sample sheet music
- Tape
- Set of 5 tuning forks

## **SAFETY!** - Safe Demo!

## Background Information

- $\text{Frequency} = \text{speed} / \text{wavelength}$

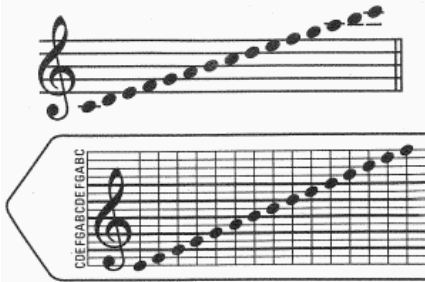
## Setup Instructions

1. If there are no saved music sheets, create a song by punching holes in one of the music sheets. Practice playing your song a couple of times.

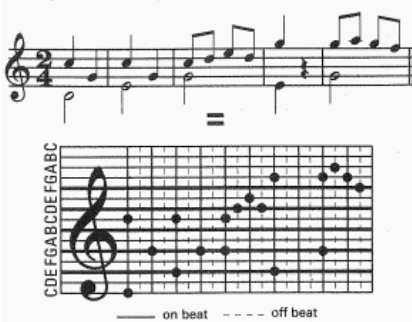
## Instructional Procedure

1. Take blank music sheet strip, punch holes on music sheet as shown below. Make sure to only punch holes on the cross sections. If you make a mistake, cover section with a small piece of tape.

**Diagram 1** the notes that can be used on the music box and where they are on the melody sheet



**Diagram 2** music transposed to the melody sheet



## ABOUT THE MELODY SHEET

Horizontal black lines indicate the pitch of the note. The green lines represent the standard music staff (as in Diagram 1).

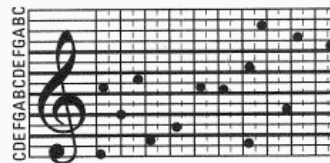
Solid vertical lines represent a beat, and dotted vertical lines represent an off beat.

The music box can only play melodies in the key of C so make sure your music is transposed to C prior to punching holes in the card.

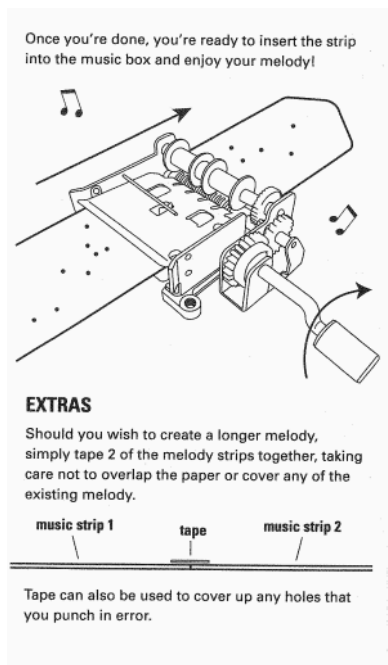
The length of a note is determined by the distance between holes. For rests, simply do not punch a hole. Repeating notes require at least one rest between notes. See diagram 2 for an example of how regular sheet music is transposed to the melody sheet.

Make sure that you do not mark any notes in between horizontal lines. See Diagram 3 below for an example of how not to mark the melody sheet.

**Diagram 3** how *not* to mark your melody sheet



2. Carefully insert paper with punched holes into music box as shown in the photo below:



3. Crank handle in a clockwise motion to turn the paper through and play music! Note: **DO NOT TRY TO PULL PAPER BACK OUT.** You **MUST** continue to crank (or pull) the paper through all the way, whether the whole sheet is being used or not.

## Tips & Tricks

- Coming soon!

## Assessment Questions

1. Why do you think the larger sections create a lower pitch?
  - a. They cannot oscillate as fast, therefore have a longer wavelength, and a lower frequency (pitch)

## Careers & Real-World Applications

- Coming soon!

## Clean Up

- Make sure to pack the music box carefully

## References

- <http://www.youtube.com/watch?v=mMgC74lgqlc>
- <http://science.howstuffworks.com/tuning-fork1.htm>

## Related Next Generation Science Standards

- K-5
  - 1-PS4 Waves and their Applications in Technologies for Information Transfer
  - 4-PS4 Waves and their Applications in Technologies for Information Transfer
- 6-8
  - MS-PS4 Waves and Their Applications in Technologies for Information Transfer
- 9-12
  - HS-PS4 Waves and Their Applications in Technologies for Information Transfer