1. One of the first steps in moving sound land to math land is converting everything to numbers. Music has done a lot of the hard work already: it has converted the sounds that humans hear to a combination of letters and numbers and some other symbols. The basic scale is

A	A#	B	B#	C	D	D#	E	F	F#	G	G#

Try to find some of these notes using G-tune. If you can hit all 12 in a row you'll hear what's called "the chromatic scale."

There are different *versions* of each note, though. In music there are many "octaves," which are higher or lower versions of the same scale. So, instead of just the scale above, we might have something more like the chart attached.

As a team, pick a way to number these notes. I would suggest making $G\#_3 = -1$, $A_4 = 0$, $A\#_4 = 1$, etc, but you can actually pick any numbering system you want, as long as it makes sense to you. You need to be able to go from a note to a number and then back from the number to the note.

Possible discussion questions:

- Where should we start the numbering system?
- Should we start at zero? At what number should we start? At what note should we start?
- Do we have to go up by ones?
- Can there be negative numbers? What would that mean?

Write your number system in the third column of the attached chart.

2. Music has taken care of the note names - it has labeled the experience that humans have when we hear sounds. But what about the natural reality behind these experiences?

Vibrations of different "frequencies" cause us to hear different notes. G-tune can measure frequencies and tell you what note you're hearing.

Use g-tune to find the frequencies of ten different notes, and write your answers on the chart. Ask me for help when you get to this part so that I can show you the best way to hit notes perfectly.

When you are done finding the ten notes, let me know. We'll compare notes (hah) as a class soon.

Note Name	Note Frequency (Hz)	Note Number
A_2		
$A\#_2$		
B_2		
C_3		
$C\#_3$		
D_3		
$D\#_3$		
E_3		
F_3		
$F\#_3$		
G_3		
$G\#_3$		
A_3		
$A\#_3$		
B_3		
C_4		
$C\#_4$		
D_4		
$D\#_4$		
E_4		
F_4		
$F\#_4$		
G_4		
$G\#_4$		
A_4		
$A\#_4$		
B_4		
C_5		
$C\#_5$		
D_5		
$D\#_5$		
E_5		
F_5		
$F\#_5$		
G_5		
$G\#_5$