Arts with Numeracy:
Music

Name of Lesson/Unit: Tuning	Subject and Grade: Music, Grade 7&8
Arts Expectations: C1.1	Math Strand Connections: ☑ Number Sense & Numeration ☑ Measurement ☐ Patterning & Algebra ☑ Geometry & Spatial Sense ☐ Data Management & Probability

- ☐ Warm-up (minds on)
- ☑ Activity (one class)
- ☐ Mini-unit (several classes)

Terminology Frequency, concert pitch	Materials Access to an iPad or app of an oscilloscope, for example Oscillo

Learning Goal (*student-friendly language that can be shared with the students*):
I can understand that a sound has a frequency that can be seen.
I can understand how a sound can be "sharper" or "flatter" than the ideal frequency.
I can change my pitch to match the frequency of another.

- This is written from the perspective of instrumental music but can be easily adapted for vocal music as well.
- Open the oscilloscope app. Have one student play into the app to see the frequency on the screen. (you can do this lesson without this step but it is cool!)
- Explain that sounds are produced when we displace the air, the air moves in waves toward your ear drum, the ear drums vibrate in relation to these waves and then our brains translate that information.
- Draw a sound wave on the board
- Tell the students that this is the sound wave for a concert A at 440 Hertz (Hertz is the measurement for sound frequencies)
- Have two students play a Concert A. If they are playing EXACTLY the same pitch the sound waves will be EXACTLY the same. They will be so close you can't hear two players, only one. IF the student's are 'out of tune' we will hear that the sound waves are different.
- The spaces created between the waves sounds like a 'beat'. (wah-wah-wah)
- If the second pitch is slightly higher than the original, it will have a faster wave length ie 444Hz perhaps. If the second pitch is slightly lower than the original, it will have a slower wave length ie 438HZ perhaps.
- Have two students play together and have them try to match their wave lengths by altering their embouchures to raise or lower the pitch. Alternatively, they could alter their instruments by lengthening or shortening the instrument.

➔ Math Strand Connection:
Identify the relationship between different lines and patterns in a real world situation by measuring sound waves.