

INTONATION CHARTING GUIDESHEET

An effective way to determine how well you play in tune is to chart your intonation with an electronic tuner such as the Peterson audio/visual tuner or the Korg chromatic tuner. Electronic tuners are highly accurate measuring devices that show deviation in pitch in relationship to an internal standard based on equal temperament – a compromise system of tuning in which the octave is divided into 12 equal semitones. The scientific unit of measurement used to calculate deviation in pitch is a “cent”. (Be sure that you do not confuse cents with frequencies or vibrations per second if the electronic tuner you are using shows both.) A cent equals 1/100th of a semitone. A semitone or half step equals 100 cents. The chromatic scale contains 1200 cents – C to C# = 100 cents, C# to D = 100 cents, and so on. A pitch that registers five or more cents sharp or flat on an electronic tuner is likely to be heard as being out of tune.

- Preparation:**
1. Thoroughly familiarize yourself with the electronic tuner that you will be using. Read the operating manual or ask your teacher for guidance.
 2. Read and follow the *General Procedures for Tuning the Instrument* given in the Tuning Guide for your instrument.
 3. Have the Intonation Chart for your instrument ready. The chart includes the chromatic scale (middle, low, and high registers), basic major and minor scales, and (for some instruments) random notes in various registers to check the pitch tendencies of different dynamics and mutes.

It is best to chart your intonation with a friend who will be your assistant. He or she operates the electronic tuner and records the intonation on the chart. *You should not look at the scope or meter while playing because this is likely to affect the accuracy of the charting.*

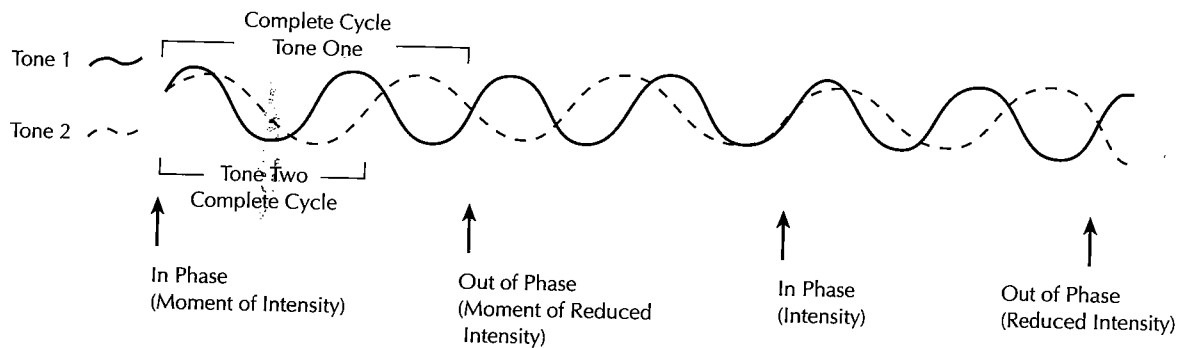
- Procedures:**
1. The first time through a scale, record the general intonation tendency of each pitch:
 (+) = sharp (0) = in tune (-) = flat
 2. The second time through a scale, record the degree of sharpness or flatness. For example: - 4, + 9, or 0 (in tune). To determine the precise deviation of pitch in cents on some electronic tuners, it is necessary to turn the cents knob and pointer in the same direction as that of the rotating disc until the disc is stabilized; then record the number indicated by the pointer. After recording the pitch deviation, return the cents knob back to zero before proceeding to the next note. With some hand held or portable tuners, one need only read and record the cents number to which the needle or indicator light is pointing.

Intonation charting takes time to complete. Familiarity with the process through repeated chartings will reduce the amount of time needed to complete the task. Please note that completion of the intonation chart provided for your instrument is only a beginning. To become proficient at playing in tune, you should periodically (quarterly or at least biannually) chart the intonation of *all* major and minor scales throughout the entire range of your instrument. Keep completed charts in a reference notebook or portfolio so that you can monitor progress.

NOTES ON ACOUSTICAL BEATS

The acoustical phenomenon resulting from the interference of two sound waves with slightly different frequencies is called beats (see illustration below). Acoustical beats are heard as small, yet clearly audible, intensifications of sound at regular intervals of time—a “wah” “wah” “wah” or pulsating effect. The presence of beats in two or more tones indicates faulty intonation. The number of beats occurring per second indicates the degree of faulty intonation. For example, a tone with a frequency of 440 vibrations per second and another tone with a frequency of 444 vibrations will produce exactly four acoustical beats or pulsations per second. When the sound waves of the two tones coincide (are in phase), they reinforce each other and produce a louder sound. When the sound waves are out of phase, they produce a partial cancellation of sound.

Sine Wave Diagram Illustrating Acoustical Beats



Beatless Tuning

The process of correcting faulty intonation in ensemble performance involves the constant listening for the presence of acoustical beats and quick elimination of the pulsations by adjustment techniques. Once beats are heard, you must determine if you are sharp or flat to the other player(s). If you are not sure, slowly start adjusting the pitch upward or downward using a physical and/or mechanical technique that is appropriate for your instrument and the note being played. If the beats begin to get faster, you are going in the wrong direction, reverse the adjustment. As soon as the sound becomes clear or resonant (beatless), you are in tune.

The beat elimination process just explained is a performance skill. Performance skills are mastered through diligent practice. You should practice using the mechanical and physical techniques for adjusting pitches while playing so that you will become proficient at eliminating acoustical beats in performance.

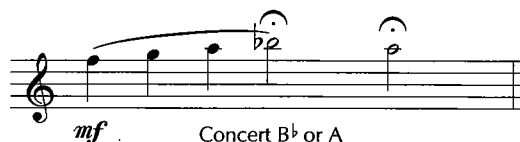
FLUTE/PICCOLO TUNING GUIDE

Procedures for Tuning the Instrument

1. Warm up thoroughly before tuning.
2. Tune at a mezzo-forte dynamic level and do not use vibrato.
3. Tune to a reliable frequency (electronic tuner, etc.) using the recommended tuning note(s) below.
4. Do not humor the tuning note; play it straight. Adjust the head joint if the pitch is sharp or flat.

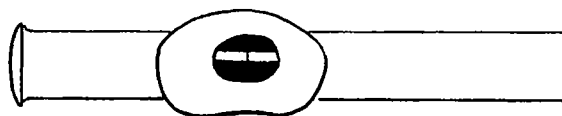
BASIC TUNING NOTE(S)

Tuning pitches are indicated with half notes; quarter note pitches are used to help "groove" the tuning note by approaching it from below.



Tuning Mechanism: Head Joint. Pull out the head joint if the pitch is sharp; push it in if the pitch is flat.

Note: The head joint has an adjustable tuning plug at the closed end. The exact location of this plug is critical for good tuning and intonation. To check the placement of the plug, carefully insert the bottom end of the cleaning rod into the open end of the head joint until it touches the stopper. The etched line on the cleaning rod should appear exactly in the center of the tone hole.

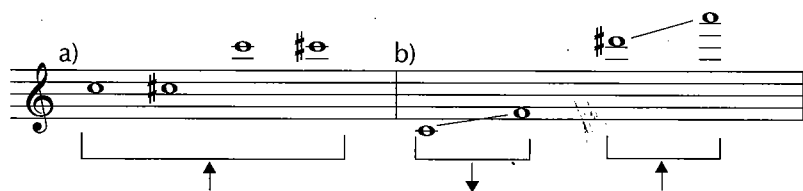


If the plug needs to be moved outward (away from the open end), tighten down on the threaded cap. To move the plug toward the open end, loosen the cap and push in. It is best to seek professional guidance when adjusting the tuning plug. Once the plug is properly adjusted, it should not be moved.

Techniques for Adjusting Pitches While Playing

1. Rolling the Tone Hole
2. Alternate Fingerings
3. Combinations of the Above

INHERENT INTONATION FLAWS*



- a) These notes are usually sharp, especially the C sharps. Roll the tone hole inward to lower the pitches.
- b) The low register tends to be flat and the high register tends to be sharp. For the low notes roll the tone hole outward to counteract the tendency to play flat. For the high notes try alternate fingerings or roll the tone hole inward.

The primary causes of poor intonation in extreme register playing on flute and piccolo are inadequate breath support, a poorly formed embouchure, and poor listening habits.

*Arrows pointing up indicate that the notes tend to be sharp; arrows pointing down indicate that the notes tend to be flat.

FLUTE/PICCOLO INTONATION CHART

Name _____ Date _____

Instrument Make and Model _____

Carefully follow the procedures outlined in the Tuning Guide for your instrument before beginning to chart your intonation with a friend. Your teacher should provide an Intonation Charting Guidesheet with instructions on how to use an electronic tuner. Mark intonation discrepancies for lower octave scales below the staff.

Tuning Notes

Flute/Piccolo

mf Concert B^b or A Check Octaves

Chromatic Scale

Major Scales

Harmonic Minor Scales

Pitch Tendencies of Dynamics

mf pp ff pp ff pp ff

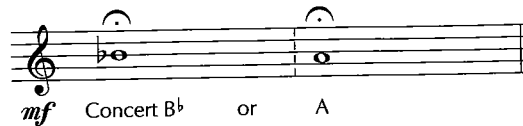
OBOE/ENGLISH HORN TUNING GUIDE

Procedures for Tuning the Instrument(s)

1. Warm up thoroughly before tuning.
2. Tune at a mezzo-forte dynamic level and do not use vibrato.
3. Tune to a reliable frequency (electronic tuner, etc.) using the recommended tuning note(s) below.
4. Do not humor the tuning note; play it straight. Adjust the reed if the pitch is sharp or flat (see below).

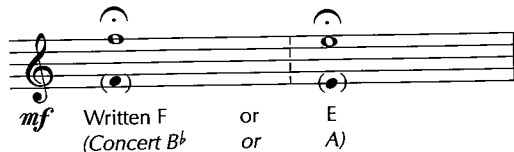
BASIC TUNING NOTE(S)

OBOE



Tuning Mechanism: None. It is not advisable to adjust the overall pitch of the instrument. Oboe tuning is primarily dependent upon good embouchure formation and a properly adjusted reed.

ENGLISH HORN

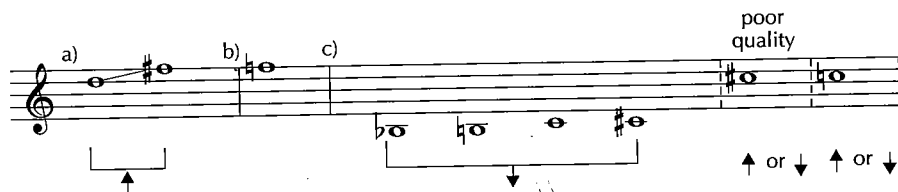


Tuning Mechanism: None. Although English horn tuning is primarily dependent upon good embouchure formation and a properly adjusted reed, it is possible to use bocals of slightly different length to raise or lower the pitch of the instrument.

Techniques for Adjusting Pitches While Playing

1. Amount of Reed in the Mouth and/or Embouchure Pressure
2. Alternate Fingerings
3. Finger Shading
4. Combinations of the Above

INHERENT INTONATION FLAWS*



- a) Add the low B key if these notes are sharp.
- b) Add the E flat key to improve the intonation and tone quality of this note.
- c) The four lowest notes on the oboe tend to be flat. The third space C sharp and C natural tend to be either sharp or flat depending on the instrument, reed, or player. Increase the amount of reed in the mouth and embouchure firmness to raise a pitch; reverse these procedures to lower a pitch.

Be sure that your instrument is properly adjusted and that you have a good quality reed.

**Arrows pointing up indicate that the notes tend to be sharp; arrows pointing down indicate that the notes tend to be flat.*

OBOE/ENGLISH HORN INTONATION CHART

Name _____ Date _____

Instrument Make and Model _____

Carefully follow the procedures outlined in the Tuning Guide for your instrument before beginning to chart your intonation with a friend. Your teacher should provide an Intonation Charting Guidesheet with instructions on how to use an electronic tuner. Mark intonation discrepancies for lower octave scales below the staff.

Tuning Notes

Oboe/English Horn

OBOE

ENGLISH HORN

mf Concert B \flat or A

mf Written F or E
(Concert B \flat or A)

Chromatic Scale

Major Scales

Harmonic Minor Scales

Pitch Tendencies of Dynamics

mf *pp* *ff* < > *pp* *ff* < > *pp* *ff* < >

CLARINET TUNING GUIDE

Procedures for Tuning the Instrument

1. Warm up thoroughly before tuning.
2. Tune at a mezzo-forte dynamic level and do not use vibrato.
3. Tune to a reliable frequency (electronic tuner, etc.) using the recommended tuning note(s) below.
4. Do not humor the tuning note; play it straight. Adjust the barrel (middle joint and bell) if the pitch is sharp or flat.

BASIC TUNING NOTE(S)

Tuning pitches are indicated with half notes; quarter note pitches are used to help "groove" each tuning note by approaching it from below or above.

Tuning Mechanism: Barrel (Middle Joint, Bell). Pull out or push in the barrel (never the mouthpiece) to tune the open tone G if it is sharp or flat (the barrel is the main tuning mechanism). Next, adjust the middle joint to tune the G on top of the staff. Last, adjust the bell to tune the C or B in the staff if necessary.

Note: If your soprano clarinet is extremely sharp and you have to pull the barrel more than 1 1/2 mm, use tuning rings to fill in the gap, otherwise poor intonation will result.

The concert tuning pitches for B flat soprano, bass and contrabass clarinets are F and B flat or A; the concert tuning pitches for E flat soprano, alto and contraalto clarinets are B flat and E flat or D.

Techniques for Adjusting Pitches While Playing

1. Alternate Fingerings
2. Finger Shading
3. Embouchure Adjustment-Lipping
4. Combinations of the Above

INHERENT INTONATION FLAWS*

- a) The throat tones may be sharp or flat depending on the instrument, mouthpiece, reed, and/or player. Use finger shading or alternate fingerings to correct faulty intonation.
- b) For B natural, lower the second finger of the left hand over the second tone hole until the note is in tune. For C natural, lower the first finger of the left hand over the first tone hole.
- c) These notes (and possibly others) may be out of tune on your instrument. If so, experiment with finger shading and alternate fingerings. Remember that the clarinet is the least flexible of all wind instruments as regards pitch adjustment by lipping.

Good clarinet intonation and tone quality are largely dependent upon correct embouchure formation, sufficient air support, and a good quality mouthpiece and reed.

*Arrows pointing up indicate that the notes tend to be sharp; arrows pointing down indicate that the notes tend to be flat.

CLARINET INTONATION CHART

Name _____ Date _____

Instrument Make and Model _____

Mouthpiece and Reed Used _____

Carefully follow the procedures outlined in the Tuning Guide for your instrument before beginning to chart your intonation with a friend. Your teacher should provide an Intonation Charting Guidesheet with instructions on how to use an electronic tuner. Mark intonation discrepancies for lower octave scales below the staff.

Tuning Notes

Clarinet

mf Written G G C or B

Chromatic Scale

Major Scales

Harmonic Minor Scales

Pitch Tendencies of Dynamics

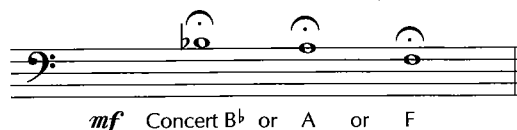
mf *pp* *ff* < > *pp* *ff* < > *pp* *ff* < >

BASSOON/CONTRABASSOON TUNING GUIDE

Procedures for Tuning the Instrument(s)

1. Warm up thoroughly before tuning.
2. Tune at a mezzo-forte dynamic level and do not use vibrato.
3. Tune to a reliable frequency (electronic tuner, etc.) using the recommended tuning note(s) below.
4. Do not humor the tuning note; play it straight. Adjust the reed if the pitch is sharp or flat (see below).

BASIC TUNING NOTE(S)



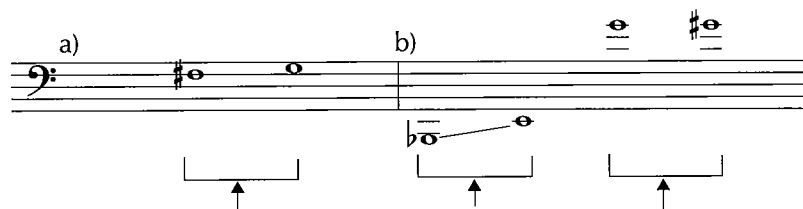
Tuning Mechanism: None.

Note: It is not advisable to adjust the overall pitch of the bassoon by moving the bocal in or out of the instrument because the vent hole must be positioned so that the pad covers it. Although bassoon tuning is primarily dependent upon good embouchure formation and a properly adjusted reed, it is possible to use bocals of slightly different length to raise or lower the pitch of the instrument. The higher the bocal number, the lower the pitch.

Techniques for Adjusting Pitches While Playing

1. Alternate Fingerings
2. Amount of Reed in the Mouth
3. Embouchure Adjustment-Lipping
4. Finger Shading (Rare)
5. Combinations of the Above

INHERENT INTONATION FLAWS*



- a) Fourth space G is probably the most out of tune note on the bassoon. Use the supplementary key for this note if available (except in fast passages). Be sure to set the adjustment screw so that the tone is in tune.
- b) The low register notes and some high register notes tend to be sharp. Lip the low notes in tune by decreasing the amount of reed in the mouth and embouchure firmness. For the high notes, try alternate fingerings.

Because the bassoon uses an old key system, almost every instrument is different as regards inherent intonation flaws. The bassoon has an extraordinarily large number of alternate fingerings available to correct faulty intonation. (Be sure that your instrument is properly adjusted and that you have a good quality reed.)

**Arrows pointing up indicate that the notes tend to be sharp;
arrows pointing down indicate that the notes tend to be flat.*

BASSOON/CONTRABASSOON INTONATION CHART

Name _____ Date _____

Instrument Make and Model _____

Carefully follow the procedures outlined in the Tuning Guide for your instrument before beginning to chart your intonation with a friend. Your teacher should provide an Intonation Charting Guidesheet with instructions on how to use an electronic tuner. Mark intonation discrepancies for lower octave scales below the staff.

Tuning Notes

Bassoon

mf Concert B \flat or A or F

Chromatic Scale

Major Scales

Harmonic Minor Scales

Pitch Tendencies of Dynamics

mf *pp* *ff* < > *pp* *ff* < > *pp* *ff* < >

SAXOPHONE TUNING GUIDE

Procedures for Tuning the Instrument

1. Warm up thoroughly before tuning.
2. Tune at a mezzo-forte dynamic level and do not use vibrato.
3. Tune to a reliable frequency (electronic tuner, etc.) using the recommended tuning note(s) below.
4. Do not humor the tuning note; play it straight. Adjust the mouthpiece if the pitch is sharp or flat.

BASIC TUNING NOTE(S)

Tuning pitches are indicated with half notes; quarter note pitches are used to help "groove" the tuning note by approaching it from below.



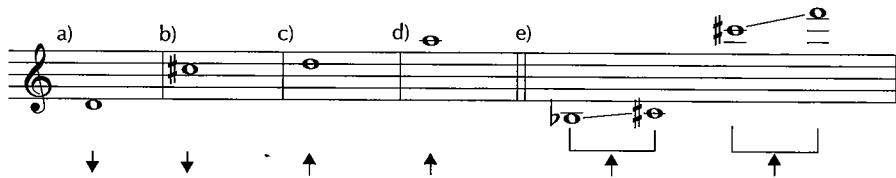
Tuning Mechanism: Mouthpiece. Pull out the mouthpiece on the cork of the neck if the pitch is sharp; push it in if the pitch is flat. After the mouthpiece has been properly adjusted, mark the cork with a pen for future reference.

The concert tuning pitches for alto and baritone saxophones are B flat or A; the concert tuning pitches for soprano and tenor saxophone are F or E.

Techniques for Adjusting Pitches While Playing

1. Embouchure Adjustment-Lipping
2. Alternate Fingerings
3. Combinations of the Above

INHERENT INTONATION FLAWS*



- a) If the low D is flat, add the low C sharp key.
- b) If this C sharp is flat, add the bottom side keys B flat and C.
- c) If this D is sharp, add the low B key.
- d) If this A is sharp, add the F sharp key.
- e) Saxophones tend to be sharp in the low and extreme high register. Lip these notes in tune by relaxing the embouchure and pulling back the lower jaw.

**Arrows pointing up indicate that the notes tend to be sharp; arrows pointing down indicate that the notes tend to be flat.*

