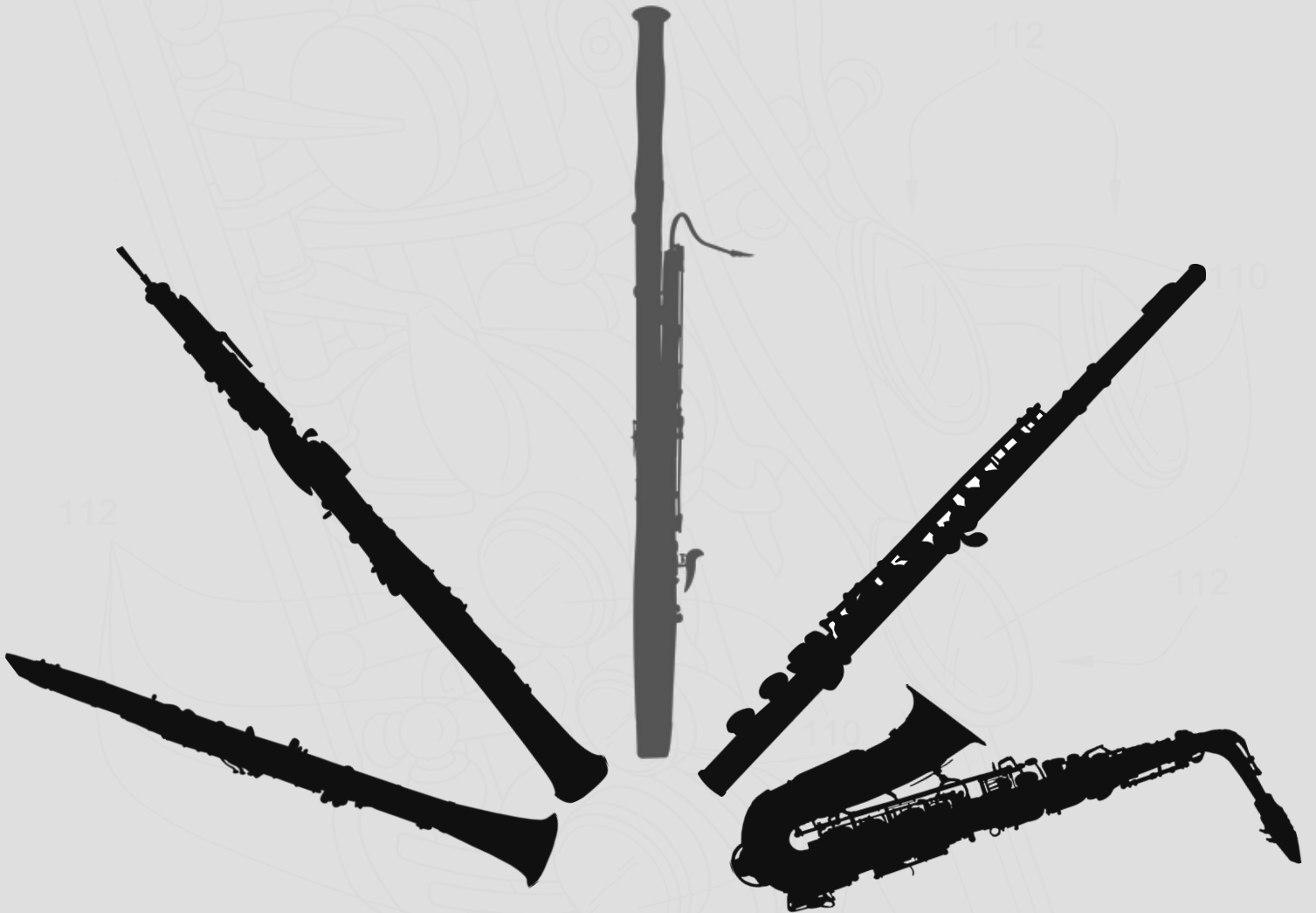


Woodwind Tuning Tendency Guidebook



A Practical Guide to Identifying, Addressing, and Teaching
Tuning Tendencies on Woodwind Instruments

Including **student resources** for discovery, study, and practice

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About This Project

As a band teacher and brass player, I found myself desiring better pitch in my woodwind sections without the tools to achieve it! Once I learned some of the basics of woodwind pitch tendencies, I immediately felt more equipped to address problematic intonation in my classroom.

However, as I dug into study of these pitch tendencies, I discovered that resources were either limited, outdated, or, at the opposite end of the spectrum, full of more information than I could hope to fully memorize. I set out to synthesize the most consistent information I could across multiple sources and present the information in a digestible, easy to read and reference format. Each set of tuning tendencies was drawn from at least four sources, and both conflicting and reinforcing information was evaluated in the creation of the tendency sets presented here. I also tried to curate what represents critical information so that the process of learning and memorizing pitch tendencies feels both doable and immediately effective in the classroom.

The student resource section of this guidebook is designed to provide woodwind students with enough information to discover pitch tendencies through personal study and practice, or alongside the guidance of a teacher.

For comprehensive information about all aspects of intonation (including brass instruments), I recommend *Tuning For Wind Instruments*, by Shelley Jagow.



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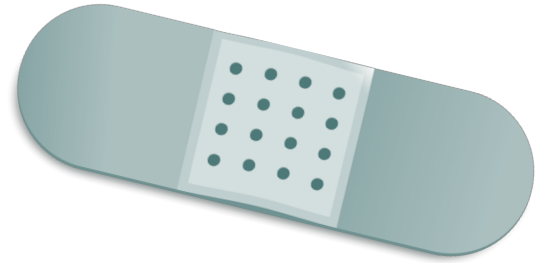
Introduction

The Purpose of this Guidebook

The Bad News

All wind instruments have inherent intonation problems due to the acoustical challenges of manufacturing reasonably playable instruments capable of producing all notes in a wide chromatic range. In other words, no wind instrument today is manufactured completely in tune with itself. Even when an instrument's mechanical tuning adjustments are ideally set for both environmental temperature and humidity¹ and the characteristics of the individual player, there are certain notes that will still be produced sharp or flat if not actively adjusted by the performer. These numerous **tuning tendencies** for individual notes present a real challenge for instrumentalists, especially young students who are only just developing their understanding and ability to listen for **intonation**.

Woodwind instruments in particular present a rather extensive array of tuning tendencies which do not generally follow a predictable pattern or rule. Because of this, the tendencies of each woodwind instrument must be studied and understood individually. The challenge goes deeper when we discover that even when examining a particular woodwind instrument, there can be considerable differences when comparing makes, models, and instruments in various states of repair.



The Good News

Chances are that if you teach band or run rehearsals for developing instrumentalists, you're already doing things that will help students learn to handle their woodwind's individual tuning tendencies. Introducing students to tuning machines (or apps), taking tuning notes near the start of rehearsal, or having students play scales over a drone are just a few of the ways you may helping students develop an ear for intonation. And the reality is, the only long term solution for both **general intonation** and accounting for **tuning tendencies** is a well-developed ear. As a student's ear becomes more experienced and well trained, we can trust that their ability to perform within an ensemble (even when playing notes with problematic tuning tendencies) will improve.

In the short term, however, we still want our ensemble of growing musicians to perform with excellent intonation (plus we're scored on it at any serious adjudication!). So what tools or shortcuts can help even young students learn to play in tune despite the built-in shortcomings of their instruments? We must educate students about the existence of tuning tendencies on their woodwind instruments, provide them with techniques or fingerings that allow them to address those tendencies, and provide opportunities for those students to practice applying those techniques or fingerings. In this way, we can equip young woodwind players for the many of the tricky intonation scenarios they will encounter, and, in the process, further the development of their ears for intonation through experimentation.



How to use this book

The Woodwind Tuning Tendency Guidebook consists of two parts. **The Director's Guidebook** and a collection of **Student Resources** for flute, oboe, bassoon, clarinet, and saxophone.



Director's Guidebook

The Director's Guidebook is not a comprehensive guide on intonation, but rather focuses on identifying and addressing woodwind tuning tendencies within the rehearsal/classroom environment. It is designed to be read, studied, and referenced by band directors in order to efficiently provide practical information necessary for day-to-day woodwind instruction.

The first portion of the Director's Guidebook is a primer for learning to identify, teach, and fix woodwind tuning tendencies for student instrumentalists (generally within the classroom setting). This includes proper techniques for adjusting pitch while playing, tips for score study, and suggestions about how to notate potential or known intonation problems in both conducting scores and student parts.

The remainder of the guidebook is broken into sections dedicated to the specific tuning tendencies of each of the following woodwind instruments: Flute, Oboe, Bassoon, Clarinet, and Saxophone. Each section contains an overview of that instrument's tuning tendencies, a list of the notes students encounter most often (I call them "Red Flags"), suggested solutions to teach them, and a detailed list of the most problematic tuning tendencies and how to address them.

Student Resources

The Student Resources are designed as practical self-contained guides or quality teaching aids useful to students who are learning to account for tuning tendencies on their woodwind instruments.

Each woodwind instrument addressed in the Director's Guidebook has an accompanying Student Resource which has been created specifically for student use at the middle school or high school level. This resource introduces students to the concept of tuning tendencies, explains what skills and conditions are necessary before working to fix these problems, suggests and teaches a practical notation system for addressing tuning tendencies as they appear in sheet music, directs students' attention to common problematic notes, and provides short exercises to practice problematic notes in context. They are included in this manual, but meant to be printed and distributed separately.

Flute Tuning Tendencies

Quick Reference Tendency key: **SHARP** **FLAT**

The diagram shows two staves of musical notation. The first staff contains notes with various accidentals (sharps and flats) indicating tuning tendencies. The second staff shows notes with colored circles (red for sharp, blue for flat) placed below them to indicate the tendency of each note.

EXERCISES - Part 2

Alternate Fingerings Key:
ADD to normal fingering LIFT from normal fingering

In these exercises, you can get some practice with a few important alternate fingerings that help your instrument play in tune. In each exercise, **ALT** means to use an alternate fingering to help with tuning. **CIRCLE** each note in the exercise that uses the alternate fingering so you don't forget to use it! As you hold out the last note, check your tuner to see if the alternate fingering is helping.

- A and B** - Tendency: **SHARP**

Sakura Sakura

Alternate fingerings:
- G and A** - Tendency: **SHARP**

**Extra challenge: Lip these notes in tune!*

London Bridge

Alternate fingerings:
- Bb** - Tendency: **SHARP**

Snake Charmer

Alternate fingering:

3

Foundations

Preparing for Tuning Tendencies

You're already on your way...

Learning and then teaching all the individual woodwind tuning tendencies seems elaborate for what are, at first glance, micro-level benefits. After all, don't you spend enough time just trying to get students to hear intonation *in general*? How will we find the time to fine-tune a myriad of individual notes across the woodwinds? Did I mention brass instruments have their own tuning tendencies? Uh oh. But don't despair—while there is no one solution for developing students' ears to prepare them for dealing with tuning tendencies, all that we currently do puts students on the right track.

Year to year, and group to group, we do our best to train student musicians to accurately *adjust their instruments* for specific tuning notes, pushing in or pulling out as appropriate for each instrument. To do this, students typically compare their sound to a reference pitch or play into a tuning machine. **The result is that students understand the basics of how a tuning machine works, know something about how to listen for "sharpness" or "flatness", and can set their instruments in tune (or close) as the manufacturer intended.** These are required concepts and skills that prepare students to tackle *both general intonation and tuning tendencies*.

Additionally, directors understand that students must prioritize a steady and characteristic tone. We tirelessly train students through breathing activities, long tones, scales, and chorales. Their ability to hold a stable tone is another prerequisite for good basic intonation *and* makes learning to adjust individual notes practical.

Our students may be more prepared than we think to tackle the challenges of tuning tendencies. However, they do need good information about which notes to watch out for (a primary focus of this guidebook) and they need direction about how to adjust individual notes *as they play*.

When taking a tuning note, the "lipping" of pitches up or down is often discouraged in order to focus on centered, characteristic tone. Students then adjust the instrument mechanically to bring the note in tune. Since tuning tendencies are inherent pitch problems that occur consistently *even when the instrument is mechanically set correctly*, lipping up or down becomes the *primary* method of globally bringing notes in tune. Students must learn the appropriate techniques to adjust their pitch on the fly.

Discovering Flexibility

Introductory Activities for Adjusting Pitch

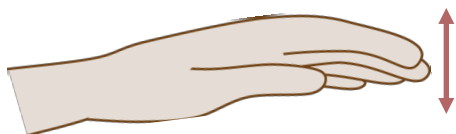
Demonstrate

This activity is best done with a tuner available for the whole room to see. Wall tuners can work, but I have found putting a regular handheld tuner underneath a document camera (or projecting it some other way) gives students a "big screen" view of the tuning needle without permanently mounting a distraction to the wall. Using a very flexible instrument (perhaps saxophone, clarinet, or even a trumpet), play a mid-range note for the ensemble that you know how to lip up and/or down significantly. Play the note in tune, then (with your back to the tuner on the projector screen) move the note sharp or flat. I like to include a facial expression change while "lipping" the note, or a hand gesture that matches the movement of the pitch if I have a free hand. Show that it's possible to know what changed simply by listening by confirming, "It went sharp, right?" without looking at the tuner yourself. You can follow up by taking the tuner away and asking students whether they hear the pitch being bent up or down as you play.

Experiment

This exploration activity works well just after the demonstration mentioned above. Before you give it a try, be sure to remove any tuning machine from view. Young students especially will continue to watch it and try to make it stop in the middle even as the full band plays. They'll try all sorts of unusual things as it jumps back and forth.

Simply have students hold in unison on a mid-range note such as Concert F (one of your usual tuning notes is often a good pick). Show a flat hand for the "centered" pitch, then bend or curl your hand up or down to indicate whether students should lip up or lip down.



This activity is the perfect time to teach appropriate techniques on each instrument for bending the pitch if students do not already know. See the section below on **Adjusting Pitch** for a list of techniques that allow players to adjust pitch on woodwind instruments.

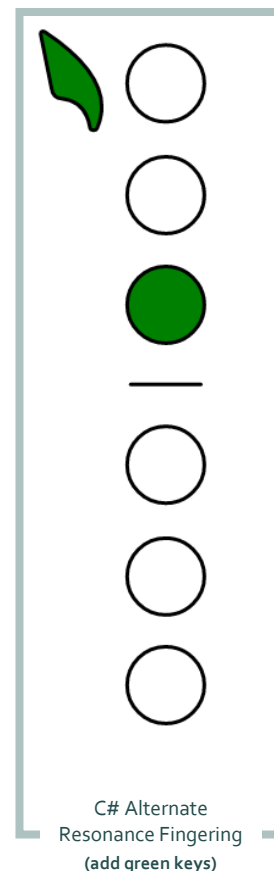
As a variation to this experiment for additional ear training, have half the ensemble hold steady on a tuning note while the other half bends the pitch up or down then returns to the center. Swap and have the other side bend away from center and back. Have them listen for the "waves" or dissonance this creates.



Introduce Alternate Fingerings

Pick a problematic note in one instrument section that has a "better" alternate fingering. For example, C# on the saxophone has a better sounding and more in tune resonance fingering shown here. Have individuals or the whole section alternate between playing their normal fingering and the alternate fingering. Have the rest of the band listen and evaluate what they're hearing.

Listening to one player alternate between fingering options, have students compare option one and option two. Which one sounds better? Which one sounds higher? Which one sounds stronger? Whatever guiding question is appropriate for what they're hearing. Follow up by having one student play the two different fingerings with a tuning machine visible to the whole ensemble. Is there evidence to show one fingering works better than the other based on the tuner?



Discuss that even though alternate fingerings can help get notes in tune, they aren't always practical in faster passages, and sometimes a "better" alternate just isn't available! This is why students must hone in on the techniques required to lip pitches up and down.



Tip: Useful alternate woodwind fingerings which are recommended for adjusting pitch will be addressed more thoroughly in the guides to each woodwind instrument. These guides begin on page 11.

Adjusting Pitch

Lipping Up and Down

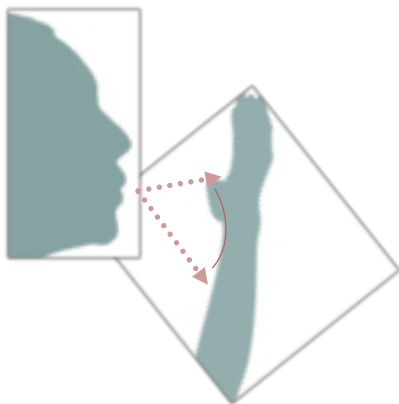
The following are suggested techniques for in-the-moment pitch adjustments

Flute

Air Direction

This is the most critical technique for adjusting pitch on the flute. **Raising the angle of the airstream raises the pitch. Lowering the airstream lowers the pitch.** This is generally accomplished using the shape of the lips and flexibility of the jaw, but can involve tipping the head as well.

Avoid teaching “roll in/roll out” to accomplish changes in air direction². This can lead to (or reinforce) bad habits, disturbs the contact point of the flute to the lip, and wreaks havoc on hand position. Always simply refer to adjusting the direction of the air. A flexible jaw and subtle manipulations in the embouchure will accomplish this. Students can practice moving an airstream up and down on the inside of their forearm (below), first by tipping the head forward and back, then by moving the lower jaw forward and back.



As students experiment, keep an eye out to ensure students are not covering too much of the tone hole with the lower lip. This makes it easier to get the flute to respond, but severely hampers intonation and full tone production.



Oboe

Embouchure

Controlling the firmness of the oboe embouchure is the most versatile approach to adjusting pitch. **A firmer embouchure exerts more pressure on the reed and raises the pitch. A relaxed embouchure exerts less pressure on the reed and lowers the pitch.** Use vowel shapes or imagery to help students avoid biting down on the reed. For example, an “oh” in the inner oral cavity helps keep the teeth apart and can be achieved by having the student say *no oboe*, setting the embouchure, then playing. Imagining a hot potato or a big bite of food that’s too hot inside the mouth encourages students to open wide inside. Opening the inner oral cavity helps to maintain the firm cushion of the lips without biting down.

Reed Position

While proper placement of the oboe reed for tone and response must be maintained, there is wiggle room to make small adjustments that affect pitch. **Moving the reed slightly further in raises the pitch by freeing the vibration at the tip of the reed. Pulling the reed further out lowers the pitch by dampening vibration with the lips.**

Remember that biting is a tempting habit you need to watch out for among young oboe players. If your oboe player plays *very loud and/or sharp*, check that the reed has not crept too far into the mouth (more than a couple of millimeters beyond the “wet line” between the outer and inner lip). The spine of the reed is more resilient and can handle more bite, and new oboe players may find that placing their lips near the spine makes the oboe much easier to play since they can bite down instead of maintaining a firm embouchure with the lips



Tip: Keep in mind that basic intonation for reed instruments (particularly the double-reeds) can be heavily influenced by the make and condition of the reed being played. A newer, harder, or more closed reed sounds higher. A used, softer, or more open reed sounds lower. Students need more than one reed!

Bassoon

Air-Embouchure Balance

As with the oboe, controlling the firmness of the embouchure is important to controlling pitch on the bassoon. However, tone stability and intonation on bassoon rely more on air supply than embouchure (utilizing about 60% air and 40% embouchure)³. A firmer embouchure does exert more pressure on the reed which raises the pitch, and a relaxed embouchure does exert less pressure on the reed which lowers the pitch. But **air supply** is usually the better place to start when teaching bassoonists to adjust pitch. Increasing airflow will raise the pitch (and generally produce a better tone) while decreasing airflow lowers the pitch.



Reed Position

*Adjusting the position of the embouchure on the reed is **not** a primary method of adjusting pitch on the bassoon. Focus more on balancing a strong air supply with adjustments to the firmness of the embouchure.*

Do ensure that the reed is placed properly to begin with. The upper lip should be close to or touching the first wire on the reed with the lower jaw relaxed back creating a slight overbite as if saying "dew". Focus on strong air supply and slight firming or loosening of the embouchure when practicing bassoon pitch-adjustment techniques.

Clarinet

Vowel Shape

Changing the vowel shape inside the mouth while playing the clarinet can cause significant changes in pitch. An **"ee" or "ew" shape raises the position of the tongue and results in higher pitch than an "oo" or "oh" shape which lowers the tongue and the pitch.** Dramatic changes in tongue and mouth position can be used to produce large bends or to "glisses" on the clarinet. Check out a number of videos here about the famous gliss at the beginning of Gershwin's "Rhapsody in Blue" that may be very interesting for students: <https://goo.gl/QzLms3>

Embouchure

Quality tone and some degree of pitch control rely on a firm embouchure. **Increasing the tension or firmness of the embouchure can raise pitch while loosening or relaxing the embouchure brings the pitch down.**

When requesting a firmer embouchure, double check that the chin remains flat and pulled downward. Firming up the embouchure raises the pitch by increasing the pressure applied to the reed. Unfortunately, this pressure can also be achieved by biting down on the mouthpiece. Biting is problematic for tone and can become a bad habit. Students who bite may misunderstand instructions about a firmer embouchure or may be using biting as an "alternative" technique to raise pitch when their embouchure is tired.



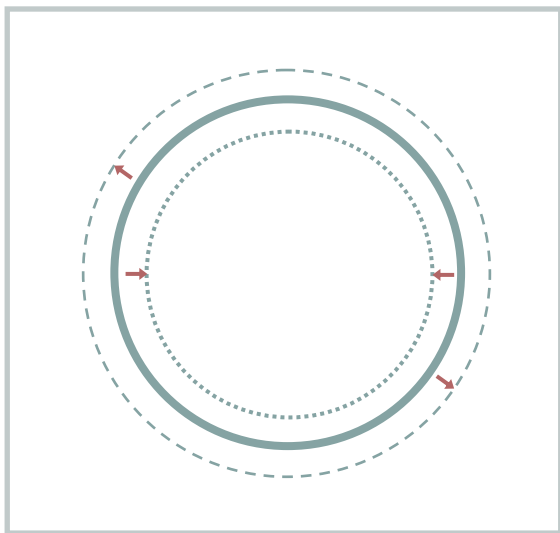
Reed and Instrument Position

*The position of the embouchure on the reed should **not** be adjusted when lipping up or down. Do ensure that the reed is placed properly to begin with. The "paper test" is a handy way to check the placement of the lower lip on the reed. Slip a piece of paper between the reed and mouthpiece and draw a horizontal pencil line across the reed where the paper comes to a firm stop. Students can put their thumb up to this pencil line, then use their thumb to gauge the placement of their lower lip when setting the embouchure.*

Saxophone

Embouchure

Think of the saxophone embouchure as a circle formed by thinking of the “oo” vowel shape⁶. **Students can raise or lower the pitch by making that circle a bit smaller or larger, respectively, in order to increase or decrease embouchure firmness.** Similar to the clarinet and other single-reed instruments, saxophonists who are asked to lip up or down with the embouchure may resort to biting or other undesirable habits. A mental picture, such as a circular embouchure, may help produce the desired pitch adjustments without doing more harm than good.

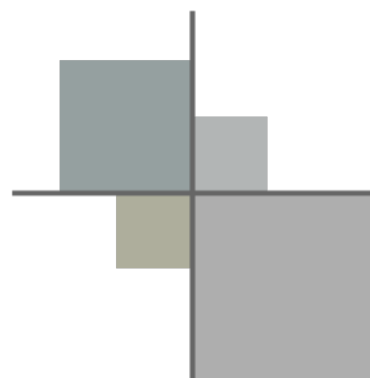
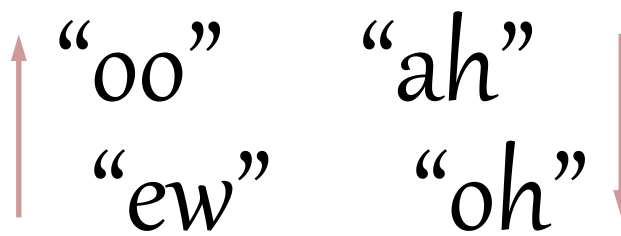


Jaw and Lower Lip

Since the lower lip (supported by the jaw) is the contact point for the reed, any manipulation of this connection has a considerable effect on pitch. **Lowering the lip, relaxing the lip, or getting “off” of the reed will lower the pitch. Firming up the lip or getting “up into” the reed will raise the pitch.** This technique deserves some focused practice with very slow adjustments at first as students improve their control. Try having students play a long tone while slowly dropping the jaw until the lip comes off the reed. They should maintain the sound as long as possible and listen to the pitch take a nose dive! This technique can also serve as a beginning step toward developing vibrato on the saxophone.

Vowel Shape

Changing the shape of the inner oral cavity by altering the position of the tongue and soft palate can also adjust pitch considerably. **Students can experiment with very low and open tongue positions which lower pitch (“ah” or “oh” vowel formations) and higher tongue positions which can raise pitch (“oo” or “ew” tongue positions).** Remind students to keep a careful ear on their quality tone as extreme changes in tongue position can produce unsatisfactory sound.



Getting Started

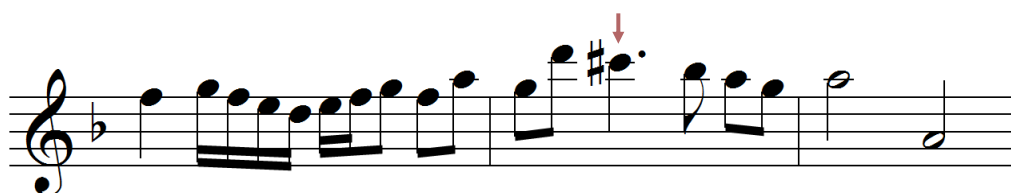
Strategies for Study and Teaching

As you introduce the concept of tuning tendencies, equip yourself and your students with a system for notating pitch adjustments, establish expectations about student accountability for intonation, and ensure students have the resources they need to improve independently.

Notation

As you encounter problematic notes on each woodwind instrument in rehearsal, students should have a quick and efficient way to mark those notes so they can anticipate how to solve the problem on approach. One such system is to notate a simple up or down arrow above the note that needs to be slightly raised or slightly lowered. Not all notes with tuning tendencies must be marked in this way, but long tones, unisons with other sections, or moments of arrival in exposed passages are prime candidates for marking with a permanent reminder about intonation.

Example: Flute part with an arrival on C# -- draw a reminder to lower this very sharp note while playing!



Another possibility is to write in a # or b symbol above notes that have those tendencies. This strategy may be particularly useful in your own score study. The conductor should be ready to point out sharp or flat tuning tendencies that will create challenging moments for intonation. More suggestions in the **Score Study** section on the next page.

Student Accountability

Especially in the early days of training students to listen for intonation, it is crucial to instill the sense that playing in tune *matters* and is the responsibility of *each individual player*. Accomplishing this can be as simple as demonstrating that intonation is important to *you*, the conductor, teacher, and musical leader². As you reveal the world of intonation to students through daily tuning activities or listening exercises, the emphasis eventually must move from “What is in-tune?” to “How do I play in-tune?”

Use student examples such as a pair of students attempting to “stop the waves” on a unison together. During a pitch or while holding a note for intonation in rehearsal, point at two students and cut off the rest of the group to hear “sound in progress”. Go down the row having each player in a section play a pitch, making it more obvious which students sounds higher or lower than their neighbors².

In addition to listening experience, students will gain the sense that holding a note in tune requires focus and fine adjustments *on their part*. It will become clear that the teacher/conductor isn’t the one who fixes the tuning – it’s the players who make the changes. Their developing ears combined with good instruction in tone production, pitch adjustment techniques, and now tuning tendencies will, over time, help students take ownership of their intonation.

Tools for Independence

In addition to a notation system and a self-reliant attitude, no student should set out to learn about tuning tendencies without some of the following resources:

Tuner

Your woodwind players should own a tuner so they can get accurate feedback while experimenting with pitch at home. Double-reed players especially need to own a tuner of their own so they can regularly practice pitch adjustments and evaluate the inevitable variations in their supply of reeds.

Recording Device

Many students have electronics readily available that are capable of making and playing recordings easily. Encourage them to record a minute of practice here or there and listen to themselves playing. This new perspective increases self-awareness and may open their eyes to issues they didn't know they had, intonation-related or otherwise. This also allows them to fully engage their ears without the distractions of simultaneously playing an instrument.

Time for Personal Exploration

With the right guidance, students with clear instructions can explore tuning tendencies individually or with a partner. After some teaching and explanation about woodwind tuning tendencies,, give them a tuner and some time in a practice room or another quiet space. This opportunity to explore and experiment will give them insight into the quirks and tendencies of their personal instruments. Provide them with the **Student Resources** from this guide which include the traditional chromatic tuning tendency chart in order to give structure for this exploration time.

Score Study

You will use the next section of this guidebook to study and eventually learn to quickly identify problematic tuning tendencies on woodwind instruments. As you begin to absorb this information, you will find notes in your score begin to jump out at you as red flags—notes you'll want to proactively address in rehearsal. You will also discover what a relief it is to hear a nasty tuning issues during rehearsal and look down at the score to discover a woodwind tuning tendency is obviously the cause. No need to spend excessive time identifying the problem—you can turn to the section(s) that need to account for the tuning tendency, explain the problem, and apply known solutions as needed.

Just as students need a notation system in order to anticipate and fix notes with problematic tuning tendencies, you should create your own system to use in your scores. **Circle problematic notes and include an up or down arrow if that seems the most clear to you. Add a # or b symbol above notes in your score for a quick reminder of the note's tuning tendency. Draw in alternate fingerings for these notes so they are ready to deliver in rehearsal early in the learning process.** By foreseeing intonation issues caused by tuning tendencies, you can accelerate good intonation on each new piece your ensemble encounters. As with many aspects of the literature we teach, we want to avoid students having to re-learn fingerings if an alternate will be necessary. Be sure to teach necessary alternates right away. Notating the score ahead of time is crucial since catching these problem notes can be a subtle challenge amongst the rest of the detail on the page.

Woodwind Trio

O Tannenbaum

German Carol

arranged by Jonathan Bletscher

no pinky (alternate)

Flute

Oboe

Clarinet in B \flat

Fl.

Ob.

B \flat Cl.

throat

Examples of various score study notations for tuning tendencies.

Sharps and flats indicate the tendency of notes in potentially problematic moments. Arrows indicate the appropriate fix for the tuning tendency on that note (lip up or lip down).

Preparation and Practice

It would be overload to notate every single tuning tendency in our music. The conductor should prepare the score looking specifically for moments in the arrangement that are likely to suffer intonation problems. These moments will jump out to you more and more as you learn your woodwind tuning tendencies. Long-tone unisons between sections, problematic notes voiced at or near the top of a chord, forte passages with sharp-tendency notes, piano passages with flat-tendency notes, and exposed melodic moments are all likely places for intonation problems to lurk.

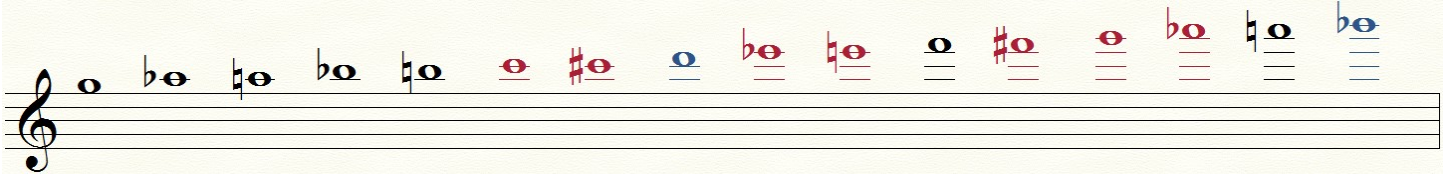
Find the shorthand that works best for you. Once you've notated enough scores, tuning tendencies start to become part of how you read an individual instrument line in rehearsal. Just like a new band student learning to name treble and bass clef notes, your ability to read tuning tendencies will become quicker and more automatic with practice.

Flute Tuning Tendencies

Quick Reference



Tendency key: **SHARP** **FLAT**



Red Flags





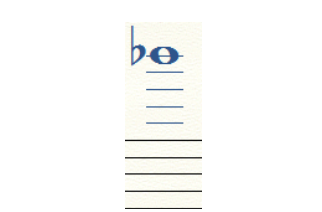
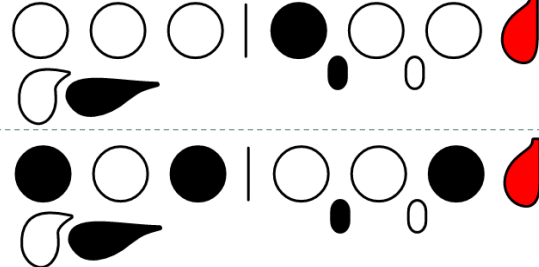
The following are notes with problematic tuning tendencies that appear very frequently. Memorize these tuning tendencies and the suggested fixes (alternate fingerings or “lipping” techniques), then go looking for them in your score.

Alternate Fingerings Key:
ADD to standard fingering **LIFT** from standard fingering

Note	Suggested Fix	Alternate Fingering
	This is the commonly suggested alternate. However, suggesting an adjustment in air direction is a better way to teach intonation for this problematic note ⁷ .	
	Raise the airstream The given alternate raises the pitch slightly ⁸ .	
	Lowering the airstream is the best way to account for this note's sharp tendency. For this note specifically, a slight amount of rolling in may be necessary ⁷ . Ensure students are aware they should not typically rely on rolling.	
	The given alternate lowers the pitch slightly ⁸ . This alternate can be taught as a standard fingering. On some flutes this E natural should almost always be played without the Eb pinky key for intonation purposes ⁷ .	
	This fingering replaces the use of RH 3 (right hand, third finger) with RH 2 in order to improve stability and tone ⁷ . The Low C# pinky key can replace the Eb pinky key to lower the pitch if necessary ⁸ .	

More Tendency Fixes

Here are other solutions to challenging notes and registers you may find useful. Remember, teaching students to lip pitches up and down and developing students' ears for intonation are the best overall strategies for addressing tuning tendencies.

Note(s)	Suggested Fix	Alternate Fingering(s)
	On some flutes, these notes tend to be flat or very flat. Encourage students to direct their airstream up in order to hold these notes up to pitch.	
	In many resources, this range is indicated to have a flat tendency. Dr. Cate Hummel ⁷ asserts that the physical scale of the modern flute has largely fixed this problem. Older flutes may still have this issue.	
	The given alternate lowers the pitch slightly ^{7,8} . Lowering the airstream is also a good solution.	
	There are many alternate fingerings for this note. Here are two choices. Removing RH pinky raises pitch slightly ⁸ .	

Flute Intonation Factors		
Factor	Makes sharper	Makes flatter
Head joint (Including cork adjustment)	Push in	Pull out
Air direction	Direct air upward	Direct air downward
Temperature	Hot	Cold
Extreme range	High notes (generally)	Low notes
Dynamics	Loud	Soft
Roll of the flute/head joint*	Out	In

*It is not recommended to teach rolling the flute in or out as the a method of adjusting pitch⁷. Use these terms to encourage correct placement, but focus on air direction when teaching pitch adjustment technique in performance.

Oboe Tuning Tendencies



Quick Reference

Tendency key: **SHARP** **FLAT**

*The **GREEN** Bb can tend to be sharp or flat. Focus on air support and embouchure control.

Red Flags

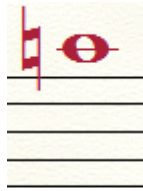
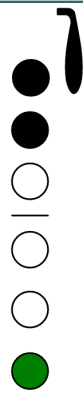


The following are notes with problematic tuning tendencies that appear very frequently. Memorize these tuning tendencies and the suggested fixes (alternate fingerings or "lipping" techniques), then go looking for them in your scores.

Alternate Fingerings Key:
ADD to standard fingering **LIFT** from standard fingering

Note(s)	Suggested Fix	Alternate Fingering(s)
	<p>Take more reed. Firm up embouchure and don't bite.</p> <p>Focus airstream up.</p>	
	<p>Control pitch with reed placement and embouchure.</p>	
	<p>These two notes share an easy alternate fingering that lowers the pitch slightly.</p> <p>Use alternate fingerings in combination with embouchure control of the pitch.</p>	<p>F# G</p>

More Tendency Fixes

Here are other solutions to challenging notes you may find useful. Remember, teaching students to lip pitches up and down and developing students' ears for intonation are the best overall strategies for addressing tuning tendencies.

Note	Suggested Fix	Alternate Fingering
	<p>Given alternate lowers pitch slightly⁸.</p> <p>Relax embouchure, open inner oral cavity.</p>	
 <p><i>sharp or flat</i></p>	<p>Possible alternate to try. Check if sound and intonation improve. Controlling this note by lipping the reed up or down is best.</p> <p>Check quality of reed and ensure student is not biting while playing⁸.</p>	

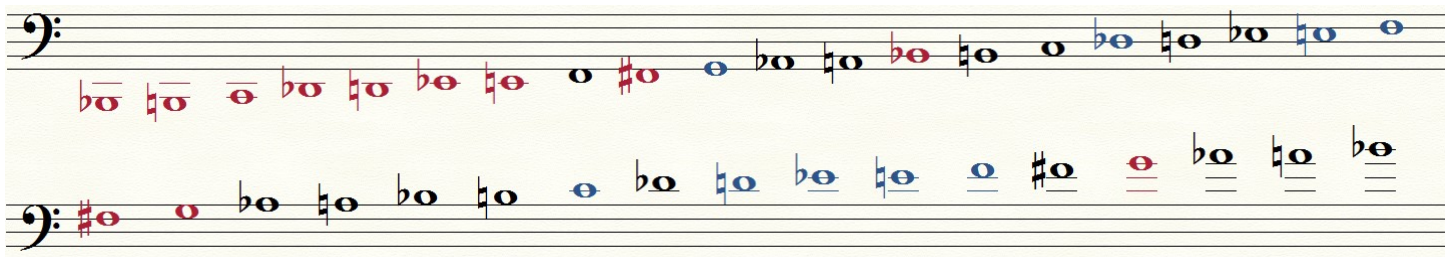
Oboe Intonation Factors		
Factor	Makes sharper	Makes flatter
Reed strength	Harder (or newer)	Softer (or worn out)
Amount of reed in mouth	More reed	Less reed
Embouchure	Firmer (or pinched)	Looser
Temperature	Hot	Cold
Extreme range	High notes	Low notes or high notes when player is inexperienced
Air speed / support	Faster, focused air	Weak support

- When playing notes above the staff, young oboe players often produce very flat tones. Biting or applying too much lip pressure to the reed prevents freedom of vibration. To help prevent biting, have students imagine a "hot potato" or other food in their mouth (opening wide inside as if avoiding the burning heat) and/or move the tip of the reed in slightly.
- Biting throughout the range of the oboe can cause sharpness. The variability of pitch on double reed instruments can have as much to do with the reed as it does with the technique of the player. Don't forget to ask students about how old their reeds are, check on the condition of the reed and the shape of the reed opening, and have students play reed only to see if any obvious problems become apparent. A good oboe reed should crow octave Cs.

Bassoon Tuning Tendencies

Quick Reference

Tendency key: **SHARP** **FLAT**



Red Flags

The following are notes with problematic tuning tendencies that appear very frequently. Memorize these tuning tendencies and the suggested fixes (alternate fingerings or "lipping" techniques), then go looking for them in your scores.

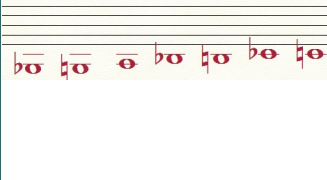

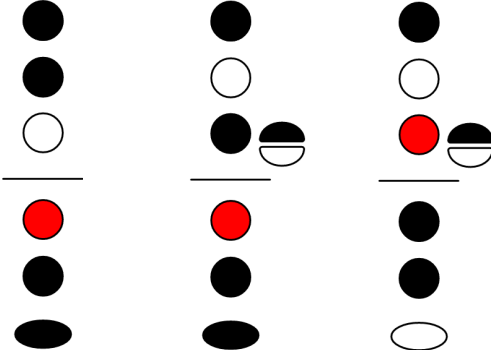
Alternate Fingerings Key:

ADD to standard fingering **LIFT** from standard fingering

Note(s)	Suggested Fix	Alternate Fingering
	Adding the Eb key with the LH pinky raises pitch slightly. <i>This is a good habit as the same Eb key should be used as a "vent" in the standard G fingering one octave higher.</i>	
	Flatness on these notes is a typical sign of poor air support in young players. Increase airflow!	
	Relax embouchure (allowing reed to open slightly) to lower pitch. Check half hole: Half-hole coverage is not the same for each note ⁹ — 1/3 for F# and 1/2 for G	
	Increase airflow and/or firm embouchure to raise pitch on these notes Add Bb thumb key (RH) on D to raise pitch slightly ⁸	Alternate high D fingering:

More Tendency Fixes

Here are other solutions to challenging notes you may find useful. Remember, teaching students to lip pitches up and down and developing students' ears for intonation are the best overall strategies for addressing tuning tendencies.

Note(s)	Suggested Fix	Alternate Fingering(s)
	<p>Low register</p> <p>Alternate fingerings in this range are probably more challenging to remember and apply than they are worth. Instead, address sharpness in the low register by relaxing the embouchure to open the reed tip⁸.</p>	
	<p>Increase air supply and/or firm embouchure to raise pitch.</p> <p>Removing just one finger from the fingerings of each of these flat-tendency notes raises the pitch slightly⁸.</p>	

Bassoon Intonation Factors		
Factor	Makes sharper	Makes flatter
Reed strength	Harder (or newer)	Softer (or worn out)
Bocal length*	Shorter (1, 0, 00)	Longer (3, 4)
Embouchure	Firmer (or pinched)	Looser
Air support	More air	Less/weak air
Dynamics	Softer (inconsistent**)	Louder (inconsistent**)
Extreme range	Low notes	No general rule applies

* It is recommended that students generally play on a #2 bocal¹⁴. Recommendation: **Fox 2**. Also note that the bocal should NOT be "pulled out" of the bocal well to adjust pitch.

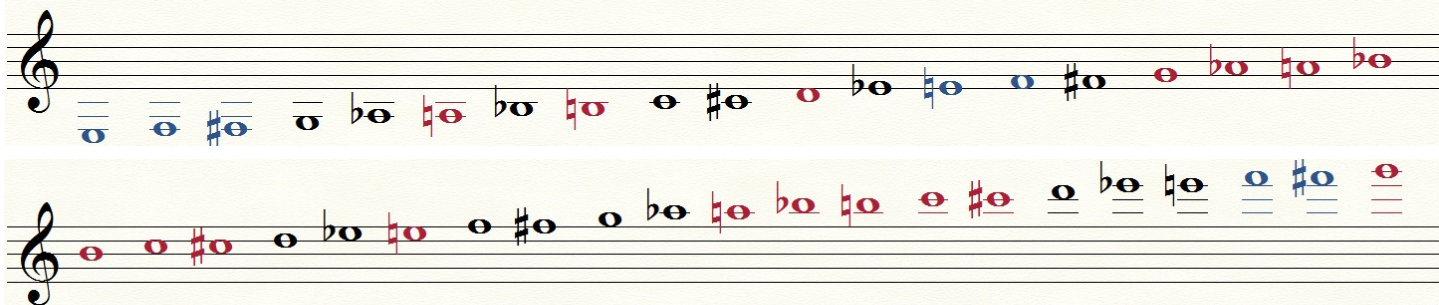
** In younger players, intonation problems at different dynamic levels are often more closely tied to fundamental technique factors such as air supply and embouchure support.

- **To help lower pitch**, allow the reed to open by relaxing the embouchure. Use the vowel "haw" to help open the inside of the mouth and reduce biting.
- **To help raise pitch**, take a good full breath in order to increase air supply. Firm the corners of the embouchure and think of pressing the lip corners into the sides of the reed. Move the reed further into the mouth if necessary. The top lip should be nearly touching the wire.

Clarinet Tuning Tendencies

Quick Reference

Tendency key: **SHARP** **FLAT**



Red Flags

The following are notes with problematic tuning tendencies that appear very frequently. Memorize these tuning tendencies and the suggested fixes (alternate fingerings or "lipping" techniques), then go looking for them in your scores.


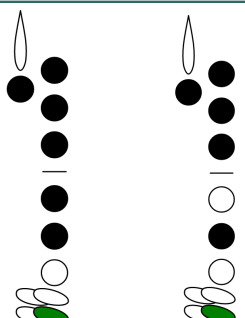
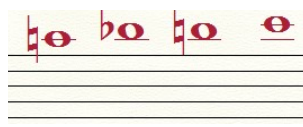
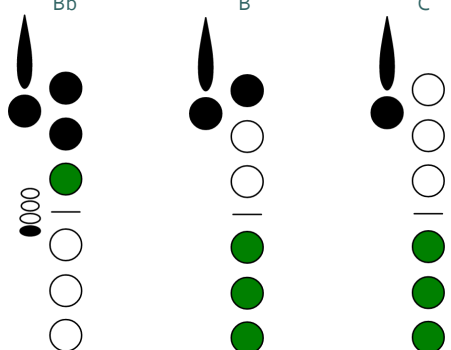
Alternate Fingerings Key:

ADD to standard fingering **LIFT** from standard fingering

Note(s)	Suggested Fix	Alternate Fingering(s)
	<p>Firm embouchure, think "ew" vowel shape.</p> <p>Adding the keys shown in these alternate fingerings helps to raise the pitch slightly⁸.</p> <p>Ensure student does not bite to raise pitch!</p>	
	<p>"Throat Tones"</p> <p>Add keys shown to any of these notes.</p> <p>For younger players, teaching "RH Closed" with 3 or 4 fingers helps facilitate playing across the break. This conveniently helps improve the intonation of these notes as well.</p> <p>Also shown is a good alternate for "pinch" Bb¹³.</p>	<p>Fingers for RH Closed</p> <p>Side Bb (better tone / tune)</p>
	<p>Provide good air supply, relax embouchure slightly. Think "oo" or "oh".</p>	

More Tendency Fixes

Here are other solutions to challenging notes you may find useful. Remember, teaching students to lip pitches up and down and developing students' ears for intonation are the best overall strategies for addressing tuning tendencies.

Note(s)	Suggested Fix	Alternate Fingering(s)
	<p>Relaxed embouchure, think "oh" vowel shape.</p> <p>Adding the low F key to either note helps to lower the pitch slightly⁸.</p>	
	<p>Relax embouchure. Voice "oo" or "oh" shape.</p> <p>Bb, B, and C have alternates that lower pitch⁸.</p>	<p>Bb B C</p> 

Clarinet Intonation Factors		
Factor	Makes sharper	Makes flatter
Adjustment of Barrel / Middle Joint	Push together	Pull apart
Reed strength	Harder (or newer)	Softer (or worn out)
Embouchure	Firmer (or biting)	Looser
Vowel shape	'ee' or 'ew' shape in mouth	'oo' or 'oh' shape in mouth
Dynamics	Softer	Louder
Temperature	Hot	Cold
Angle of instrument	Held too close	Held too far out

- **To help lower pitch:** Relax embouchure. Keep chin flat and focus firmness of embouchure on bringing corners of the mouth in toward mouthpiece. Open inside of mouth by thinking 'OH' or "dropping" the floor of the mouth
- **To help raise pitch:** Check for a firm "bench" of bunched muscle created by the lower lip. Ask the student to say "protrude" emphasizing the "oo" vowel, and indicate that the way the lower jaw moves forward is desirable²². Have students breathe deeply and increase the intensity of the air. Ask them to "blow all the way to the bottom" of the instrument to increase air supply. Have students try aiming their air higher in the mouth or "projecting" their air upward.

Saxophone Tuning Tendencies



Quick Reference

Tendency key: **SHARP** **FLAT**



Red Flags

The following are notes with problematic tuning tendencies that appear very frequently. Memorize these tuning tendencies and the suggested fixes (alternate fingerings or "lipping" techniques), then go looking for them in your scores.

Alternate Fingerings Key:
ADD to standard fingering *LIFT from standard fingering*

Note(s)	Suggested Fix	Alternate Fingering(s)
	<p>Increase embouchure firmness or raise tongue position with "oo" vowel shape</p> <p>The chromatic "side C" fingering can improve intonation. The LH pinky G# key can also be added to raise pitch^{2, 8}.</p>	
	<p>Increase embouchure firmness or raise tongue position with "oo" vowel shape.</p> <p>The thumb/3rd finger resonance fingering to the right is highly recommended^{2, 8, 10}. Fingers can be added to find the best tone / intonation for individual saxes^{2, 8, 10}.</p>	<p>Resonance Fingering</p>
	<p>Because these notes are so common, make students aware of the pitch tendency in this area of the instrument and teach them to lip down. Relax embouchure or think "ah".</p> <p>These notes share an alternate key that lowers the pitch slightly^{2, 8}.</p>	

More Tendency Fixes

Here are other solutions to challenging notes you may find useful. Remember, teaching students to lip pitches up and down and developing students' ears for intonation are the best overall strategies for addressing tuning tendencies.

Note(s)	Suggested Fix	Alternate Fingering(s)
	Lip down with looser embouchure. Use vowel shape 'ah' to lower pitch.	
	Lip up with firmer embouchure. Use vowel shape 'oo' to raise pitch.	
	Side Bb (the standard fingering) should be lipped down if sharp using a looser embouchure or the 'ah' vowel shape. Bis Bb can be combined with RH 1st finger to lower the pitch as needed (Jagow)	
	High range alternates Each of the following alternates can help to lower pitch on these sharp-tendency notes. "Lipping" can prove particularly challenging for young players in the high range.	

Saxophone Intonation Factors		
Factor	Makes sharper	Makes flatter
Mouthpiece position	Push in	Pull out
Reed strength	Harder (or newer)	Softer (or worn out)
Embouchure	Firmer (or biting/pinching)	Looser
Vowel shape	'oo' or 'ew' shape in mouth	'oh' or 'ah' shape in mouth
Dynamics	Softer	Louder
Temperature	Hot	Cold
Extreme range	High register (usually)	Low register (usually)

Most saxophone tuning tendencies are sharp tendencies. Try using the imagery of **warming up the airstream** with the syllable "haw" as a general tool for addressing sharp tendencies throughout the instrument. Using vowel shapes avoids disrupting reed and embouchure control and avoids accidentally creating bad embouchure habits.

Mechanical Considerations

Additional Details to Know and Teach

Flute

- Check that the head cork is in the correct position using the notch in the cleaning rod. The notch should be centered in the tone hole when the cork is set correctly.
- As a general rule, the head joint should be pulled out 3-5mm from the fully “pushed in” position. If it is pulled out too far students will deal with flat low notes, splitting tones, and a dull high register. If it is pushed too far in, students will have to constantly adjust pitch down using air direction.
- The modern-scale flute has reduced the quantity and severity of a number of tuning tendencies. Some alternate fingerings are no longer necessary⁷.



[^]Checking the cork assembly

Oboe

- Pulling the reed out slightly is not an effective means for adjusting pitch and can seriously harm response.
- Oboe reeds typically last only 4-5 weeks of play in good condition. They are not as durable as bassoon reeds, and therefore must be replaced more often.
- The natural tendency of the oboe is toward sharpness, especially as players get tired, play in the upper register, or work to make a stiff reed respond.

Bassoon

- Pulling the bocal out slightly is not an effective means for adjusting pitch and can seriously harm response.
- A #2 bocal is typically considered standard. Only choose a shorter or longer bocal if a student *consistently* plays flat or sharp and seems otherwise fundamentally sound.
- The lower register is intentionally built to be somewhat sharp—otherwise those long-tube notes would be impossible to bring up to pitch in cold weather conditions.

Clarinet

- When pushed all the way together, clarinets are designed to be sharp. The barrel should usually be pulled out about 1.5-2.5mm
- Mouthpiece selection affects intonation, and some mouthpieces are designed to achieve global scale pitch adjustments
- The height of each individual key and pad affects both pitch and tone color. Clarinets, as with most woodwinds, should be professional adjusted at least every 3 months for the best quality sound.

Saxophone

- Because the position of the mouthpiece is so flexible, good intonation on the saxophone relies greatly on the control of the player. Ensure young players do not have the mouthpiece too far onto the cork since the instrument is built to tend toward sharpness.
- Pulling the mouthpiece off too far (check this by wiggling the mouthpiece to see if it is set securely against the cork) affects response and has a disproportionate effect on shorter fingerings.
- Intonation is closely tied to mouthpiece selection, so consider carefully whether or not it's a good idea to have students playing professional or jazz mouthpieces since they require excellent control.

Dryer-Beers, Thomas. "Instrumental Tuning And Design - Proper Tuning Approaches". *Windplayeradvice.blogspot.com*.

N.p., 2017. Web. 18 June 2017.

