


# Diatonic Bending

**Bending** is a basic diatonic harmonica playing technique used to produce notes not otherwise available in the standard tuning of the harp, and to provide various sliding-note effects. Bends are, in large part, what give the diatonic harp its unique character, and are intimately related to the blues tradition.

Bends, whether draw bends or blow bends, produce notes lower in pitch than the natural, unbent note. I think that part of the “trick” to bending is knowing what note will result, and unconsciously anticipating that sound. If you think about singing for a second, paying attention to your vocal tract, when you sing a low note versus a high note your body sort-of automatically adjusts according to the pitch of the note.

You get the note in your “mind’s ear” and your body tends to adjust without thinking about what you’re doing. Try to feel how there are more physical actions than merely your vocal cords buzzing at a different frequency. You tend to “sink” lower and open up “bigger” for singing low notes as opposed to high notes, and it’s similar for harp. What is happening is that your body is naturally adjusting to a shape that is more suitable to the pitch you know ahead of time you want to sing.

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Bending notes on the harp is much the same way. You have to adjust your vocal tract shape—the position of your mouth, tongue, jaw, throat, and soft palette, to be suitable for the pitch of the bent note. It's easier to do that if you have a mental idea of what the note will sound like ahead of time. If you've never done bends before, that can be tough!

How do you know what the note will sound like? It helps to play the note on another instrument, like a piano or guitar, to get it in your ear while you are working on trying to bend. Various computer programs can play different pitches, so that's another way to try to get the pitch in your ear if you don't have any other instruments available.

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The amount you can bend a note depends on the pitches of the two reeds

in the hole. The higher pitch note in the hole can be bent down to just above the lower pitch note in the hole.

For example, the notes on a C harp in hole 2 are: blow-E, draw-G.

The higher G note can be bent down to Gb and F—and just a

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little lower.

It is best to only bend down to the desired note, and not further, in order

to minimize stress on the reeds. When you practice your bends, it

is good to use a piano, guitar, pitch pipe, electronic tuner or whatever

to check that you're hitting the correct pitch.

Bending is not something that is easy to describe how to do—and it is

difficult to show because all the movements are hidden inside the mouth

and throat. It takes practice to be able to do bends at all, and

*lots*

*more practice to do them well.* Bends are the first major hurdle

in playing the harp, and you should not expect to “get it” in a few minutes.


It may take months. That's okay. Don't be in a hurry, and don't get discouraged.

If you keep at it, you'll get it. You're learning new control of your breath

and your mouth, your breathing and your body's resonance, your tongue and

throat, and of your focus. Bends are something you'll keep


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working on,  
probably for as long as you play the harp. Bends aren't hard,  
but like  
anything else you have to get familiar with how to do it. You  
have to get  
familiar with how the harp responds to different vocal tract  
positions,  
and if you're just starting you're not yet familiar with how  
to set your  
mouth, tongue, and throat in different positions, much less  
particular  
positions needed to modify the air stream to produce different  
pitches.  
If you're not "getting it" don't get down on yourself! You  
just haven't  
put in the practice to get familiar with what you need to do  
yet.

There are draw bends available on holes 1 through 6,  
and  
blow bends available on holes 7 through 10, each of  
which require  
different playing techniques. To make matters more  
interesting, different  
key harps require different bending techniques, depending on  
the pitch  
range of the harp. Lower key harps (e.g. A, Ab, G, and low F)

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require more mouth/throat/tongue (or simply “vocal tract”) movement than the same holes on higher key harps (e.g. C, D, E, and F). Learning your bends not only gives you more notes and effects, it gives you more control over your notes, air stream, resonance, and tone.


So, celebrate when you finally get your first bends! But remember—that’s only just the beginning.

## Draw Bends

Draw bends are available on holes 1 through 6—but hole 5 will not bend as much as a full half step. (Don’t try to bend lower than the note will go or you risk damaging the reeds.)

Here are some tips for getting your first draw bends. Remember these are tips to help you get started with bending since I can’t show you what’s going on in my mouth (and if probably wouldn’t help if I could, since you can’t see what’s happening inside *your* mouth!) These are

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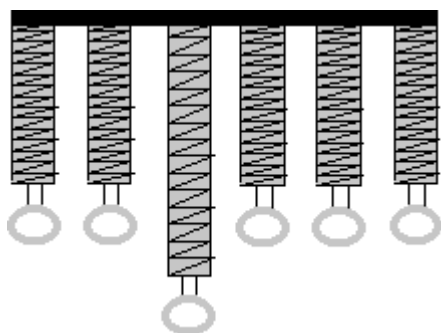
things  
to help you get the right feel, to help get your mouth,  
tongue, and throat  
in the right bending position.

## Like Pulling On Springs

Draw bends feel like pulling down on a spring that's pulling back. You can yank it all the way down till it won't stretch any more, it pulling back as long as you hold it there; or you can slowly pull it down, starting at the top (or somewhere in between), and stopping at the bottom (or any in between place); or you can yank it down then slowly let it back up. The harp, or more properly the air stream, is going to act like a piece of exercise equipment for your vocal tract, your mouth, tongue, throat, and diaphragm.

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Think of pulling down on an exercise spring.

As you get used to the feel of the device you learn just how hard you have to pull it to get it just to the bottom; how much strength you have to use to just hold it down all the way; how you can use your leverage and balance to gently let it up to the top, without it jerking it's way up because your strength wasn't enough to control it at some point, and how to pull it smoothly down the same way. As you work out with the machine your muscles get stronger, your balance gets better, and your coordination improves to give you better and better control of the spring. Eventually you become strong enough and familiar enough with the feel of the equipment be able to quickly pull the spring right down into any

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intermediate point  
you want. You can pull it down and let it up smoothly,  
quickly, in rapid  
succession, as fast or slow as you want (vibrato). You can  
pull it part  
way down and work it up or down from there, or pull it all the  
way down  
and work it up and down to the bottom. You can apply just the  
right amount  
of force to where the spring won't quite move down, but it's  
right on the  
edge, ready to move down at the slightest increase of  
pressure, under your  
full control.

This is bending on the diatonic harp. There are a row of these  
springs  
hanging side by side, and they each pull differently, with  
different strengths  
and depths. You first have to select one spring and hold it  
firmly before  
you try to stretch it. If it's swinging or bumping into  
neighboring springs  
you don't have a firm enough grip to try to stretch it.

At first you probably won't be able to budge the spring. It's  
not that  
it's difficult, it's just that you haven't learned which


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muscles to use  
and how to coordinate them to pull hard enough on the spring.  
After a while  
you'll finally budge the spring and it will pull down a short  
way before  
pulling back away from you. After a while longer you'll pull  
it farther  
down, and a little farther until finally you snap it all the  
way down to  
the bottom. Or you may find the right muscles and coordination  
right off  
the bat and quickly be able to yank to spring all the way to  
the bottom.  
You may move to a different spring and not be able to budge  
that one at  
first. But your experience with the other spring helps you  
learn how to  
control the current one. As you practice and exercise you  
become familiar  
with each of the different springs, and can quickly move among  
them, pulling  
each one just the way you want as quickly as you move.  
Somewhere in the  
process you'll change equipment and add more sets of springs  
that don't  
quite act like the ones you're used to. Some of these new set-  
ups have

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springs that you can't handle yet, so you have to work with them and figure them out too.

## Requires Strong Single Notes

First, be sure you can get a good, clean, pure, loud, single note before going any further!

Don't even worry about bends if you can't get a consistent pure single note. One good approach to strong single notes is to use the "lip block" embouchure. It helps you relax and get your mouth open, which helps improve your resonance and makes bending easier.

Open your mouth wide enough to cover about 3 holes, with your upper

lip coming about 2/3 the way back over the top cover. Tilt the harp up

in back at around 45 degrees, and let the holes nestle into your lower


lip. Relax. Breathe slowly in and out, deeply. First, empty your lungs

and as slowly as you can, breathe in, with the harp settled onto your bottom

lip. With a little fiddling with the harp position, *not trying to force*

*anything*, you should be able to easily get a clean single

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note. Once you've mastered that, try your bending from this mouth position embouchure.

## Set Mouth Shape from Speaking Articulations

While breathing in slowly from your diaphragm, shape your mouth and vocal tract as if you were making a long "eeee" sound followed by a long "oh" sound. Notice how your jaw drops on the "oh" sound, and pay attention to the feeling of "opening up" in your throat. Feel the "oh" drop down as deep in the back of your throat as you can. The bend happens when you change your vocal tract shape from the "eee" position to the "oh" position. Try holes 2, 3, and 4 for your first bends. You can also try holes 1 and 6.


The "Oh" articulation should feel like you're singing a deep full low

note. Try saying "Orange", and exaggerate your mouth movement and enunciation.

Your throat should feel like the first "Or" part. *Whisper it.* Orange. *Whisper it louder.* *Whisper it breathing in.* Try bending with the mouth/throat position of the "Or" part.

Go back to the "eee" position. Feel how much tighter your throat is.

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Say "sweet orange" over and over. Concentrate on your throat. Feel how it closes and opens. Accentuate the opening, and drop the pitch on the word "orange". Sing "sweet orange" while breathing in.

Now, play a strong clear draw note on hole 4 with your mouth in the "eee" shape. Very slowly change to the whispered "orange". The pitch not the note should bend down when you articulate the "or" part of orange, and bend smoothly back up as you articulate the "an" part. The final "ge" sound isn't part of the bend, but the word orange seems to open up the throat more than the name "Orin". (It might depend on what part of the country you're from...)

Another thing to do is try articulating the word "TOE" to bend and clear draw note on hole 2, 3 or 4. Start with a nice pure single draw note, then suddenly say a deep pitched TOE, still breathing in. The "T" in toe gets your tongue tip in action, and this ticking the top of your mouth with your tongue just as you go to the deep "Oh"

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mouth/throat/tongue

positioning can help get the bend started. Draw with “eee”, then pronounce “toe”.

Say **NO!** as if giving a command to your dog. Bark it out there, as if the dog was about to chew up your expensive sofa, or was ready to snatch your favorite harp off the coffee table. Notice how your voice naturally gets lower and deeper in pitch when you’re giving a command? Use that feeling from your diaphragm, the strong breath, the drop in pitch to command your bend to work. Start playing a clean steady single draw note on hole 2, 3, or 4, and then just say No! as if commanding your dog, while still breathing in. If you don’t have a dog, pretend it’s your child doing something wrong, or the neighbor’s kid about ready to pluck your favorite flower from your garden, or steal your newspaper.

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## Whistle Practice

Whistle a little bit. Now try whistling while breathing in. Now bend the pitch of your whistled note down. That's what it feels like to do draw bends. Practice bending notes while whistling breathing in. Focus on your mouth and jaw position. Match the pitch of your whistle to the pitch of the natural unbent note you're practicing bending, then bend the pitch of your whistle note down (while breathing in!). Now go back to working on your harmonica bend, while applying the feelings and vocal tract changes you used to bend your whistle down.

## Don't Pinch Your Lips

Don't let the whistle practice fool you into thinking you have to pucker up or pinch your lips. You don't, and you shouldn't. The danger is that you can actually get a note to bend a little by pinching your lips, but that's usually not the right way to play a bend. If you find yourself pinching

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your lips to get your bends, stop it. You're only learning something wrong that you'll eventually have to unlearn. The sooner you stop, the easier it'll be.

## No Air Leaks

Make sure NO AIR leaks in through your nose.

This is very important, and a very common cause of problems. If air leaks in through your nose it essentially prevents a bend from being able to occur. Try gently pinching your nostrils closed. Does it make any difference to your normal draw note? If air is coming in while you play, you need to work on controlling that air leak before you proceed with trying to bend. Focus your awareness on your nose, and practice breathing just through your mouth from your diaphragm. Control of your breathing, and of your venting of air in or out while you play is a basic requirement of playing the harp, so any practice time you put in now working on those muscles, that focus and control, is

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not wasted  
time, but valuable practice.

Also, make sure you have an air tight seal of your mouth on the harp.

Any air leaks get in the way of bends, whatever their cause.


## Air Direction

Hold the harp in your left hand and put it in playing position. Hold out the index finger of your right hand like you're making the number 1 sign, then point to the left so your finger is parallel to the back of the harp.

Put your pointing index finger a few inches behind the harp, parallel to it.

Now, hold your head up, look straight ahead, draw a natural note and visualize that you are pulling the air straight from your finger. When you do a draw bend, visualize that you are pulling the air from *underneath* your finger. The farther below your finger you draw from, the lower the pitch of the bend. Visualize pulling the air from 45 degrees

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below your  
finger, then from 30 degrees, 15 degrees, and so on.

## **Bending All the Way Down Should Feel Effortless**


Don't try to force it.

Bending doesn't require  
force, or loud hard play. If your mouth/throat/tongue shape  
are right  
the bend will naturally happen.

***Think about holding  
an egg in your mouth during a bend***

. Keep playing with  
the shape of your mouth and your tongue position. Very minor  
changes  
in mouth/throat/tongue position make all the difference.  
Higher notes use  
smaller eggs, or even yolks. Low holes on special low harp  
tunings need  
ostrich eggs...

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## Still having problems?

The tongue is the key (for beginners). Start with it flat and forward in your mouth. While drawing in with the “eee” mouth shape,

*slowly*

pull your tongue back, keeping the front low and flat in the mouth, and humping it gradually more and more in the back as your tongue pulls in.

At some point the sound should begin to choke a little. That’s the crucial

spot. Treat it like the “friction point” on a clutch car... if you move

too fast you’ll stall the car—or in our case miss the bend.

At that

crucial spot, adjust your mouth position from “eee” to “oh”, or say orange


or toe or no (still breathing in). At first, it may help to increase

the air pressure a little. But,

you *don’t* have

to play loud or hard to get bends.

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You can bend notes playing quite softly.

Breathe in while making a hard “K” sound, as in Coke. Notice where you make that sound in your throat. That’s one place in your vocal tract from which you can get a draw bend. Focus on that spot, and articulate the “Co” part of Coke, or cocoa. The hard K articulation, like the T articulation discussed with saying “toe” above, can help kick-start the bend into action.

Breathe from deep within your body—from your diaphragm. Feel your stomach push out a little bit. This will help your resonance and make bending easier. Lie on your back and slowly breathe in. Put your hand on your stomach and notice how it moves up and down—that’s the location of your diaphragm. Draw in your air from there. Try playing the harp while lying on your back, and get the feel of your diaphragm in action.

Try different key harps. The mouth position is different for different

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pitch notes, and if you're having trouble with one key harp, another key might work better; might be a better fit to the particular degree of mouth changes you're doing. For example, if you can't seem to get it on a C harp, try an A harp or a D harp.


It ain't as easy as it looks! Don't give up! It can take a while to get it, and you just have to practice, practice, practice. And remember, don't try bending unless you can get consistent pure clean single notes—you have to master that first.

## Exercises

Practice smooth dip bends here, and work on your speed for this exercise. You also need to be able to hit each bend cleanly, without bending the pitch to get to the note.

4~4'~4 5	4~4' 3'	3~3''~3' 4	3' 3'' 2
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2~2"~2 3'

2~2" 1

2"~2 3'

2

## Draw Dip-Bend Exercise

### Intermediate Bends

The intermediate draw bends (2', 3', and 3") are more advanced techniques

because it is difficult to hit them cleanly on pitch with good tone. It

takes good diaphragm support, resonance, and control of your playing pressure.

You need to develop your ear so you know the correct pitches and can easily

recognize the note relationships. Repeat these patterns over and over,


paying attention to distinguishing the bends in the same hole from each

other.

***It's good to use a tuner or a piano to check that your are hitting each note on pitch***

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1 2	1	1	1
	2'	2''	2'

## Exercise for Hole 2 Bends


2	2	2	2	2	2
3	3'	3''	3'''	3''	3'

## Exercise for Hole 3 Bends

1	2	3"	2 2"	1
2"	3''	3'''		

## Exercise for Hole 2 and 3 Bends


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It is extremely valuable to play simple little tunes you are well familiar with utilizing the intermediate bends, because you know how each note should sound before you play it. For example, try it with “*Mary Had a Little Lamb*”, and try to make it sound good. Don’t forget that part, making it sound good. Don’t just stumble through the exercise quickly. Take your time with this or some other simple tune, and work to make it sound right, and good. Come back to practice like this from time to time, and see how well you’re doing. Don’t expect to get it sounding good right away, and don’t get discouraged because it “should” be so simple. It’s not easy to play simple things and make them sound good. It’s a major goal.

3 3" 3> 3"	3 3 3_3	3" 3" 3"_3"	3 4
			4_4

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3 3" 3> 3"	3 3 3 3	3" 3" 3 3"	3>
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## Draw Bend Exercise – “Mary Had a Little Lamb”


Here's something a little blusier. As you get better at it, double up on each note and swing the beat. Repeat these each over and over, don't just play it once and go on.

1>	3' 3" 3>	1>	3' 3" 3>
2> 3> 3"	2>	2> 3> 3"	2>

## Exercise for Hole 3 Intermediate Bends

2"	3"	4>	4	5	4	4>	3"
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## Exercise for Whole Step Bends

### Blow Bends

Blow bends are normally learned after draw bends, because the low end of the harp (holes 1 through 6) are used more, especially by beginners, than the top end of the harp, holes 7 through 10, where the blow bends are available.


Note that hole 7 will not bend as much as a full half step, so don't try to force it or you could damage the reed.

Blow bends are done by constricting the air stream by

tiny movements toward the front of the tongue

. Smooth downward bends can also be controlled with a very slight tightening at the back of the throat. Sometimes the blow bends have a tendency to "snap" into place,

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with little indication that a smooth bend is lurking there. A well set up air tight harp helps, and remember, the tongue movements are very slow and very tiny indeed.


Start the natural blow note with your tongue flat in the bottom of your mouth. Slowly, keeping the tongue flat, lift the tongue toward the roof of the mouth. Keep the air stream constant, and where you feel the note start to choke—that's the crucial spot. Very tiny changes to your tongue position cause the note to transition from the natural note to the bent note. You have to experiment and remember your exact mouth position. The vocal tract is more constricted in the mouth and throat for blow bends than for draw bends.

Try whistling a note and bending the pitch upwards. A similar tongue movement happens when doing blow bends on the harp.

## Exercises

The blow bends are easier on lower key harps, so I suggest

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practicing them  
at first with an A or a G harp. After you can play them on the  
low keys,  
then move to higher key harps like C and D. I show smooth dip  
bends in  
this exercise. You almost must be able to play each bend  
cleanly, without  
sliding down to the bent note.

9>~9>'~9>	8>~8>'~8>	9>~9>'~9>	10
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## Exercise for Blow Bends

7>	10>' 10	7> 8> 9>	10>' 10
8> 9> 10	9> 8>	10	9> 8>

## Exercise for Hole 10 Whole Step Bend

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## How Bends Work

In a normal bend on a diatonic harmonica, both reeds can participate in making the sound. Consider a draw bend (blow bends work the same only the reeds are the other way around). At first, the draw reed is doing most of the speaking. As the bend gets lower the blow reed starts taking over, and at the bottom of the bend the blow reed is producing almost all of the sound.

Bending lowers the pitch of the natural note of the highest reed in the hole. However, since both reeds participate in producing the bent note, the natural note of the lower pitch reed in the hole actually raises while the higher pitch reed lowers in pitch. For example, for a draw bend the pitch of the draw reed gets lower while the pitch of the blow reed gets higher.

The note in a hole can be bent down to about a semitone

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higher than the lower pitched reed in the cell.

This is the best I've been able to determine on the physics of how bends

work on a diatonic harp.

1. The blow/draw air flow contains a broad spectrum of air compression wave frequencies.
2. Each reed has a range of vibration frequencies to which it will respond.
3. Resonance adds energy to a frequency because of reinforcing wave forms.
4. The range of frequencies to which a reed will respond overlaps for both reeds in a cell.
5. By adjusting the resonant frequency of the "playing tract" (tongue, mouth, throat, and other airways) we alter the frequency that has the most energy.
6. This frequency with the most energy will dominate the random broad spectrum of frequencies produced by the blow/draw air flow.
7. The reed will respond to the driving compression wave frequency with the highest energy.
8. Both reeds in a 2-reed cell will respond to the same driving frequency

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because that driving frequency falls in the range of frequencies to which each reed will respond, that is, where the response frequencies overlap for the two reeds.

9. So the note that sounds depends on the resonant frequency of the airway tract, subject to the mechanical response characteristics of the reed pair.

Thus, bends are induced by changing resonance characteristics in the vocal tract, and the reed vibration rate is coupled to the playing tract.

If one uses *only* mouth adjustments to the resonance chamber, the range of resonant frequencies is smaller than if adjustments to other parts of the airway are included. When the other airways in the vocal tract, e.g. the throat and below, are tuned to the same resonant frequency as the mouth, this will accentuate the frequency energy advantage, and the bending range and tone of the note will improve. This is why it is best to play "from the diaphragm", using as much of the vocal tract

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as possible.

One of the few scientific papers on the physics of harmonicas is at:

<http://www.bs.monash.edu.au/staff/johnno/acust2.html>

Also, see the section on “Harp Physics” in the chapter on “How a Diatonic Harp Works” for some interesting experimental results.

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