Singing is EASY!
(So...why do we make it so bloody difficult?!!)
By Tim Marron
Step 1: Effortlessly shape the resonating space between the vocal folds and the lips!

Step 2: Allow the vocal folds to vibrate freely!

It's easy!! But first, you'll need to know the details...
SHAPE THE RESONATING SPACE to emphasize the high harmonics. This is how professional singers get such pressure-free clarity/vibrancy in all styles/textures/colors and how the best quartets/choruses create "overtones" and sound like "one voice". There are no muscles that "open" the throat or "create space" in the back if the mouth. There are only constrictor muscles for swallowing! If you try to activate muscles to "create tall space", you are actually creating less space and unnecessary tension! In order to "open" the resonating space, one has to simply move things (larynx, back of the tongue, soft palate) out of the way!

LARYNX RELAXED, not raised or pressed down. A relaxed larynx lengthens the resonating space without effort. The larynx is hinged, and tilts forward to lengthen the vocal folds for higher notes. A flat tongue forces the larynx down while pressed singing forces the larynx to rise...both actions prevent the larynx from tilting freely, and limits the vocal range!!

TONGUE GENTLY ARCHED FORWARD: like "ee"...middle of tongue is relaxed and wide, touching the mid-upper molars. Leave it there for all vowels! It's the position of the front part of the tongue that determines what we hear as a vowel...NOT the back part! Allow the tip of the tongue to free to articulate with agility. If you flatten the back of the tongue, and allow it to drop from the upper molars, it fills up the resonating space in the throat. ALSO, tongue drop creates a bigger space in the front of the mouth, which makes the resonated tone slow down a few cycles per second, sounding a bit FLAT!! Intonation issues mostly come from tongue/jaw drop...NOT from "singing under the pitch!!"

SOFT PALATE ALWAYS "LIFTED": (except on "n", "ng", and "m"...it will automatically drop). The soft palate's sole function is to seal off the nasal space. Vibrations from singing into the nose are commonly confused with "mask resonance"...it's actually the opposite! Sealing off the nasal space helps create the optimal resonating space in the back of the mouth/throat resulting in "ring" (harmonics) to give clarity to the tone. "Mask vibrations" occur when harmonics create sympathetic vibrations through the hard palate/facial bones...NOT through the nose. People sing into their nose because they can hear themselves better (Eustachian tubes open into the nasal space) but this lessens/dampens the higher harmonics because it compromises the resonating chamber. When you breathe in and out of only the mouth, the soft palate is lifted without effort. It's a very subtle muscle! Most people activate many unnecessary muscles to get "lift". Simply seal off the nose from the inside...like when jumping into the pool (no hands!), blocking something stinky, blowing out a candle, or pretending to have a cold.
A few minor details...

NO JAW OVER-ARTICULATION: Don't allow jaw overuse...it causes the tongue to drop and changes size/shape of the resonating space...articulate as in everyday speech...use lips and tip of the tongue for crisp enunciation and drama. Exaggerated jaw movement for "target" or "matching" vowels create intonation and synch errors, and lessens harmonic clarity...(and it looks unnatural...)!! "Matched vowels" don't create "lock and ring" in ensembles...maintaining a consistent resonating space, as described above, does!!

AN OPTIMALLY SHAPED RESONATING SPACE CREATES "RING" (high frequency sound), WHICH CAN ADD UP TO 20 DECIBELS OF VOLUME, FOR A GIVEN AMOUNT OF AIR!!! This also creates constant "lock and ring", "expanded sound", "audible overtones" in a cappella ensembles. This is how singers can be heard of orchestras without microphones EVEN during soft passages! Singing without this space results in belting/pressed tone in an attempt to "ring".

PROVIDE OPTIMAL AIRFLOW: the vocal folds need a steady, unforced airflow in order to come together gently and vibrate freely. A relaxed audible sigh is what this feels like. Too much or too little air will cause the vocal folds to press together involuntarily in an attempt to continue to produce a clear tone.

MAINTAIN GENTLE torso(ribcage) expansion during the natural elastic recoil of the ribs during exhalation. Control airflow by using the elasticity of the ribcage muscles....keeping the abs relaxed! Higher notes require more airflow..."sighing faster". Good posture comes from the spine, NOT with locked ribs or abdominals. A common misunderstanding of "support" is rigid abs and a locked ribcage to prevent "chest breathing". This "support" method will involuntarily force the vocal folds to press together in order to make a clear tone from too much airflow, making it impossible to sing without pressure.
What it looks like!

- Soft Palate sealing the nasal space
- Tongue (gently arched forward)
- Resonating "tube"
- Epiglottis (flap that seals off the airway)
- Epilaryngeal tube (inside larynx)
- Vocal folds
4 ways to shape the resonating chamber: relaxed larynx, forward tongue, lifted soft palate, and slightly lifted upper lip!

MRI Video: The Diva

http://www.youtube.com/watch?v=M2OdAp7MJA1
Common singing traps

PRESSURE at the vocal fold level: caused by forcing the air out with the abdominals (misunderstanding of "support")...The vocal folds react by pressing together to prevent a breathy sound. Relax the abs, control air with expansion of the ribcage. This will provide an optimal airflow, allowing the folds to vibrate freely. Additionally, pressurized singing with the abs prevents the larynx from tilting freely, thus preventing the vocal folds from lengthening/thinning enough for the upper range.

"Matching vowels"- This was an attempt to unify ensembles. Matched vowels don't create unit sound, expanded sound, or "overtones". Instead, each singer should create a consistent resonating "tube" by sealing off the nasal space with the soft palate, keeping the tongue gently arched forward without overly dropping the jaw, and keeping the larynx relaxed by not pressurizing the airflow with the abs/ribcage. Each singer's harmonics will combine to produce expanded "wall of sound/overtones"...even when different parts are singing different words. Generally people notice "mismatched vowels" due to some of the singers overly dropping their jaws. Dropping the jaw for open vowels "ah, oh, ooh", (attempting to match vowels) flattens the tongue, fills up the resonating space in the throat, causes the resonated sound to be slightly flat, and makes the singers "belt" to create "ring".

"Sing into the Mask": an attempt to feel the byproduct of proper resonance space shaping (feeling vibration in the bones of the face due to high frequency resonated sound). Often singers practice on a hum, and confuse vibration in the nasal space with proper "mask" resonance. Humming requires a dropped soft palate, which compromises the optimal resonance space in the mouth/throat. When singers sing into the nose, the end up pressing at the vocal fold level (belting) to try to create more "ring". To create optimal resonance/harmonics, the nasal space MUST be sealed off by the soft palate (except on "n, m, or ng").
What does it do?

**Soft palate:** lifts to seal off the nasal space for swallowing. In speech, soft palate lifts and seals off the nasal space to create the "B", "D", "T", "K", "P", "Ssss", "Ff", "Sh", "Ch" sounds. The soft palate hangs low, opening the nasal space for "n, m, ng" sounds. For centuries, trained speakers and singers knew that sealing off the nasal space was necessary for a vibrant sound. Sealing off the nasal space creates a complete resonating chamber or "tube" which emphasizes high frequencies...allowing "projection", vibrancy, and clarity at all volumes without vocal fold press. The invention of the microphone created generations of singers who suddenly didn't need that clarity and could sing into their noses...making them dependent on vocal press for volume. This interferes with acapella ensemble unit sound because the high frequencies aren't emphasized enough to "lock" together to create "expanded sound/audible overtones". Singing into the nose dampens the higher frequencies because the resonating chamber is compromised (like making a big hole in the body of a violin). Soft palate lift requires almost no muscular effort...merely a feeling of closing off the nose from the inside. "Humming" is singing into the nasal space...soft palate is hanging low. "Bubbling" requires the nasal space to be sealed off by the soft palate.

**Tongue:** used in swallowing, consonant articulation, and modifies the size/shape of the resonating space in the mouth and throat. The size and shape of this resonating space determines the frequencies and emphasized harmonics of the resonated sound. These different frequencies and harmonics are what we hear as different vowels, sound vibrancy/clarity, and whether a resonated tone sounds "in tune" with the simultaneously sung tone at the vocal fold level. The position of the front part of the tongue changes the frequencies that differentiate vowels sounds. Dropping the middle/back of the tongue fills up the resonating space, unnecessarily lowering the resonated frequencies which lessens ring and clarity, and results in flat intonation. This is unnecessary for vowel formation. Dropping the jaw past the hinge point in an attempt to "match vowels" causes the back of the tongue to drop, and is counterproductive, especially in aCappella ensemble singing. The tip of the tongue must be free for agile articulation.

**Epiglottis:** the flap attached to the base of the tongue that covers the airway when the tongue drops back in swallowing. When the jaw is dropped and tongue is flattened to form "tall" vowels, the epiglottis partially covers the airway, constricting the airway, which contributes to vocal pressure and vocal fold press.

**Larynx:** the "Adam's apple". Made of cartilage, and contains the vocal folds. The larynx is hinged, and tilts forward to lengthen and thin the vocal folds to produce higher notes. The larynx is suspended in a web of muscles attached to the hyoid bone, tongue root, jaw, skull, collar bones, and sternum. The larynx moves up and down to facilitate swallowing. Raising the larynx shortens the over length of the resonating tube, which prevents the emphasis of lower frequencies, resulting in a child-like sound". Relaxing the larynx increases the overall length, resulting in more lower harmonic emphasis, creating a deeper, more mature sound. Note: vocal fold press causes the larynx to rise due to air pressure, thus shortening the resonating tube!

If the swallowing (constrictor) muscles in the throat and/or the tongue is tensed during speech or singing, the jaw is overly dropped, or the head held in extreme positions, the muscles suspending the larynx limit its "tilting" range of motion, thus limiting the vocal range. When singers are told to "open the throat", "create space", or "lift the soft palate", they often tense the swallowing muscles, including the tongue. There are no muscles that "open" the throat, only muscles to constrict it for swallowing!! Creating space in the throat is accomplished merely by relaxing the swallowing muscles, relaxing the larynx, and keeping the tongue forward. Because singers often feel like they have to "do" something to create space, they tense muscles that are unnecessary and counterproductive to singing.
What does it do?

**Vocal Folds:** located inside the larynx, the vocal folds rest apart in a "v" shape. When the brain sends the signal for sound (phonation), the folds are brought together and airflow causes them to vibrate. The tiny muscles attached to the folds cause them to thin and lengthen, or shorten and thicken, depending on the pitch desired, AND depending on the amount of airflow provided! If too much air is forced out (when the abdominal muscles tense or press, or the ribcage is pressed), the folds will forcibly press together to attempt to create a clear tone. The same thing will occur if too little airflow is provided, like at the end of a long singing phrase. The ideal airflow is provided when the abs are not engaged, and when the elastic recoil of the ribcage muscles creates an easy flow of air, as in a relaxed, voiced, sigh. As soon as the abs are tensed/pressed, and/or the ribcage is pressed or overly tensed, the vocal folds react to the high air pressure by pressing together!

"Chest voice, head voice, falsetto" are described as different "registers". These different registers are really just different layers of the vocal folds vibrating. For lower notes, the vocal folds aren't stretched as tightly, so the entire fold vibrates. For higher notes, as the folds thin and lengthen, the tension of the underlying muscles allow only the outer layers of the folds to vibrate. Falsetto is when only the outer layer of the fold is vibrating. Increasing airflow (like a faster "sigh", without press) is necessary for smooth transitions higher in the vocal range, because the stretched folds need to vibrate faster.

**Eyebrows/facial/nostril muscles:** completely unrelated to vocal production! Some people simultaneously happen to seal off the nasal space, relax the larynx, and bring the tongue forward when using the facial muscles, and create an misplaced association with "lift" in the sound. The muscles used for singing, articulation, and resonance-space creation act independently of facial muscles!! Lip position does alter the length of the "resonating tube" and SLIGHTLY changes the harmonics, but this can be accomplished with a SLIGHT lift of the upper lip in the course of normal articulation (trumpet lips are unnecessary...). This is a case of mistaking correlation with causation...
Now that you know how it works....

Step 1: Effortlessly shape (and maintain) the resonating space between the vocal folds and the lips!

Step 2: Allow the vocal folds to vibrate freely!

"It's not a mystery. It's...SCIENCE!!"
Every singer...
Should know how their voice works!!

The information for this presentation was compiled by
Tim Marron... marrontm@hotmail.com

This presentation is based on studies and research from:
The National Center for Voice and Speech, USA. ncvso.org
Johann Sundberg, KTH Voice Research Centre, Stockholm
http://www.speech.kth.se/~pjohan/

- National Center for Voice and Speech, The Denver Center for the Performing Arts, Denver, Colorado 80204 and Department of Communication Sciences and Disorders, The University of Iowa, Iowa City, Iowa 52242 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2757425/