Using Brain-Friendly Music in the Classroom

"Music is good for you—physically, emotionally, and spiritually. It can strengthen the mind, unlock the creative spirit, and, miraculously, even heal the body." --Don Campbell

Reasons for Using Music in the Classroom

Use music because it

- positively influences brain function, mood, pulse rate, respiration, blood pressure, posture, and stress level.
- activates the cognitive, visual, auditory, affective, and motor systems because it is processed in specialized areas in both brain hemispheres.
- acts as a "limbic trigger" that changes learners' states/emotions and, therefore, can change behavior.
- affects levels of several brain chemicals (such as epinephrine, endorphins, and cortisol).
- facilitates learning by making it less threatening and more engaging.
- makes learning more memorable; re-stimulates prior learning and facilitates recall.
- is a great ice-breaker as students are coming in for the first day of class.
- facilitates transitions from one activity to another.
- masks groups' discussions so individuals feel free to speak up.
- is a familiar, integral part of most students' lives.

Moreover, music can

- change students' states very quickly.
- create positive expectations about what class will be like that day.
- bring a class together and create camaraderie.
- energize or calm.
- introduce elements of humor and novelty, both of which the brain craves.
- be used instructionally.
- relieve fatigue.
- aid creativity, sensitivity, inspiration, thinking, and concentration.
- add an emotional element, important because students' mental states are linked with their emotions. (Information with a strong emotional content gets priority from the limbic system and passes into long-term memory. The emotional aspect of music is also important because emotion drives attention, and attention drives learning.)
- end class on a positive note.
- make both *teaching* and learning more fun and engaging.

The Equipment You Need

Taking a CD player to class is one option, but it's definitely cumbersome. Much easier is an **MP3 player** and **travel speakers**. An MP3 player is simply a small hard drive. MP3 players come in different sizes (GBs) and, depending on the size will hold in varying numbers songs,

photos, podcasts, games, TV episodes, audiobooks, a calendar, an address book, and documents—the same types of things that can be put on any hard drive. Any quality MP3 player will work fine: Apple (iPod), Samsung, Toshiba, Sansa, Dell, and many other companies manufacture them. With an MP3 player and a hookup to a classroom sound system or small, lightweight travel speakers, you're in business.

These tips will help when purchasing equipment:

- When choosing an MP3 player, select one that has a large, bright display screen and enough storage space (GBs). There's nothing more frustrating than buying one, only to discover rather quickly that's its too small for your needs.
- Buy travel speakers that come with a remote control and that recharge the MP3 player while it is in use in the dock of the speakers.
- Consider the MP3 player's and speakers' battery play times: the longer, the better.
- To evaluate the portability of the speakers, look at both the weight and shape. Round speakers that look great may not be very convenient to take to class.
- After you determine what suits your needs, shop around. A slightly older and therefore less-expensive model MP3 player may suit your needs nicely. Prices vary considerably, and they are always dropping as new versions and products come on the market.

Locating Music and Transferring It to an MP3 Player

Before you can transfer music to an MP3 player, you must first have the music on your computer's hard drive. There are two sources for this music: (1) You can purchase and download songs from a music website or (2) you can also transfer music to your hard drive from a CD in your CD-ROM drive.

Let's look first at music download sites. You can register (set up an online account) with a music website, such as Napster, Yahoo! Music Unlimited, or iTunes, download their player software (if necessary), and purchase and download music from them. When you create your account, you give your credit card number or PayPal account. Purchases are charged to them.

Music download sites are appealing not only because of their vast offerings, but because you can buy specific songs that you want (usually for $.99 or less) without having to buy an entire CD. Some sites offer certain songs free. Some music websites, such as Yahoo! Music Unlimited, Napster, and Rhapsody to Go, offer subscription services that give you access to their libraries for a flat monthly fee of $10-$15. If your subscription expires and you do not renew it, you lose access to the songs.

Yahoo! Music Unlimited requires Windows XP or Vista and a broadband connection for streaming and downloading music. It offers more than 2 million songs and charges $.79 per song if you want to keep the music and have the option of burning it to a CD. You can listen to full tracks of the songs before making a purchase. Remember that some songs have both clean and explicit versions.

There are innumerable music websites: Google "music download sites" for a list of them. Windows users can download from iTunes, but iPod users, however, can download only from iTunes. (Things can change, of course.) At iTunes you can listen to 30 seconds of a song to see if it's the one you want or one that might work.

How can you locate appropriate songs?

There are three ways to locate the music you want. One way is to go to the music download site and type in the search box an artist's name, song title, or a word (such as "goodbye," for example, if you're looking for music to play at the end of class or if you can't remember the complete song title). It'll bring up all the songs by that artist, all versions of the song, or all songs that have that word in the title.

Second, you can consult Jeff Green's *The Green Book of Songs by Subject: The Thematic Guide to Popular Music,* 5th ed. This invaluable reference book lists more than 35,000 songs and album tracks by themes and subjects (more than 1800 categories), representing all genres and eras. Listings include titles, artists, discographies, and labels. (See "Resources" at the end of this document.)

Third, you can ask students and others for suggestions. Be sure you set clear guidelines if you solicit student input: (1) You prescreen for appropriateness, and (2) if you decide to use a song, *you* decide when and how it will be used.

Because they are so useful, consider buying CDs of

- TV theme songs (such as *TV Guide 50 All-Time Favorite TV Themes*)
- movie themes
- sound effects (watch for post-Halloween sales of spooky sound effects)
- collections of music from specific decades (such as music of the '60s or '80s)
- Olympic music and movie themes by composer John Williams
- "Best of" CDs (best songs of a particular artist, group, type of music, or decade)
- "brain-friendly" music, such as "The Mozart Effect" series (Don Campbell), the "Sound Health" series (Advanced Brain Technologies), and collections of baroque music or New Age music.

Buy used CDs, and watch for closeout CDs of classical, folk, and baroque music. If you want more than 10 songs on a particular CD, it will be more economical to download the entire album for $9.99 and receive all the songs than to buy and download 10 individual songs from the CD.

Check your computer software for ways customize music for your use on your MP3 player. The Mac OS X iTunes software, for example, enables you to select excerpts of music by deciding where to start and stop the music. This is nice when you want to skip a long introduction, for example, or you want only 30 seconds of a song. If you are a Macintosh user, you change the start and/or stop point on a song by clicking on File> Get Info>Options. On the Options screen, type in the points at which you want the song to start and/or stop. You can determine these by playing the song and noting the time at the points you want.

Considerations in Selecting Music

- **How and when will the music be used?** Plan your music ahead of time. For what purpose will it be used? At what point in class? Will you start at the beginning of a song, or do you need only an excerpt?
- **Appropriateness.** Avoid music with lyrics that are sexist, racist, promote violence, or condone alcohol, and so forth. Heavy metal music is stressful to the heart. (Also, talk with students about the damage to their hearing that can result from using ear buds with MP3 players or having music too loud in the car.)

- **Beats per Minute: How fast or slow?**
    - Beats per minute (BPM) affect heart rate and breathing. Those, in turn, affect state, mood, and feelings.
    - The human heart beats at an average of 60 BPM. Baroque music, with its steady tempo in the 50-70 or 60-75 BPM range, parallels the brain's wavelength when it is in a state of relaxed alertness (alpha brain-wave pattern). A state of relaxed alertness is optimal for learning. Baroque music appeals both to emotion and the intellect, so processing it involves both the limbic system and the neocortex.
    - Music to calm should be 30-50 BPM.
    - Music to energize should be 80-90+ BPM.
    - There isn't precise agreement on these ranges, but these are typical of what is recommended.
- **With or without lyrics?** Lyrics can be used to make a comment (including a funny one); they can be used instructionally. Avoid lyrics, though, when music is used as background.
- **Familiar or unfamiliar to students?** Most of today's college students were born after the mid-1980s. Other than some oldies "classics," pop songs that are familiar to you may be unfamiliar to them. This is an advantage: Rock 'n roll, country, and other pop songs that are at least a decade old feel comfortably familiar to students, yet don't trigger specific associations in students that send them off on distracting mental flights.

Organizing Your Music

Organizing your music properly takes time on the front end, but it's well worth the effort.

Once you have loaded songs onto your computer from CDs or purchased songs from music download sites into your music "library," you can set up "playlists," folders that contain groups of songs sequenced any way you like. You can put the same song in as many playlists as you like. For example, the same song might appear in a "Movies" and "Relaxing Music" playlists.

You can label your playlists with names such as "class openers," "background," "transitions," "stretching/relaxing," "breaks," "energizing," "cooperative learning," "instruction" (for tunes you set new lyrics to), and "end-of-class." You can group songs more than one way, so you might also want to create playlists with labels such as "movie themes," "TV themes," "sound effects," "humorous songs," "New Age," "rock 'n roll", "instrumental," and "baroque" music. Some people find it helpful to group or code music according to the tempo: slow, medium, or fast.

The last step is to download the music to an MP3 player. Every MP3 player software application has its own particular menu options and wording.

If you prefer to use CDs in class rather than an MP3 player, you can still organize songs on your computer and burn your own compilations onto blank CDs. You can create and print out a jewel box insert that lists the songs in order. If you find it helpful, include an indication of each song's tempo by using numbers (1, 2, 3), asterisks (*, **, ***), or three different color dots.

Although you do need to think about it beforehand, it's not necessary to plan in detail the music for each class session. If you've organized your music, you only need a few seconds to locate an appropriate song or a particular song.

Other Possibilities: Non-music Sounds, Sound Effects, New Words to Familiar Songs, Raps, and Chants

Besides music, simple non-music sounds and sound effects can enliven class. They're fun ways to announce a new topic or to signal that there are two minutes left to finish up an activity. For example, use ***train whistles, chimes, clackers, bells, toy cell phone, a gong, or tingshas***. (A toy cell phone is great for "wake-up calls" or to signal "dial-a-friend" when a stumped student needs help.) Purchase them at party supply stores, toy stores, and online sources such as www.trainerswarehouse.com. Try ***recorded sound effects***, from harp arpeggios to a rooster crowing. There are also ***handheld devices***, such as toy microphones and presenter tools such as those offered by Trainer's Warehouse, that produce sounds when you press a button. For example, their Sound F/X puts six sounds (*introducing, think time, right, wrong, hooray,* and *all done*) at your fingertips. An inexpensive option is the Sound Machine. Although only about the size of a deck of cards, it produces 16 different sounds (including applause, laughter, a scream, and breaking glass). It's available from PrankPlace.com and other online sources. Finally, you can learn to ***create your own effects***; *Mouth Sounds* by Fred Newman teaches you how. (See bibliography for source information.) You should also vary the tone, pitch, and loudness of your own speaking voice. There's a reason there are hundreds of jokes about professors who drone on in a monotone!

Put ***new lyrics put to familiar tunes.*** The new lyrics might be instructional material students need to remember, or they might pertain to classroom procedures. Use tunes such as "Twinkle, Twinkle, Little Star," "Pop Goes the Weasel," "Three Blind Mice," "Frere Jacques," "Battle Hymn of the Republic," "When the Saints Go Marching In," "She'll Be Comin' Round the Mountain," "Row, Row, Row Your Boat," and "O, Susanna." This strategy capitalizes on combining left-brain activity (processing words) and right-brain (music) activity. As Lenn Millbower (*Training with a Beat: The Teaching Power of Music*) so aptly puts it, students will leave class "singing your 'phrases.'"

Information students need to learn can be taught in the form of ***a rap or a drill instructor "call back."*** You can download an example from a "Run with the Cadence" CD so that students understand what call-backs are and what they are to do. Display the new words on a screen. (When students call back the lines to you, have them do it standing up: It gets oxygen to the brain. For the complete effect, wear a drill instructor's cap and some mirrored sunglasses.) You can invite students to make up raps for material they need to remember.

Some Additional Points

First, don't hesitate to explain to students that music is brain-friendly and that information set to music promotes recall. Most of them will acknowledge that they remember learning "The Alphabet Song" and other such songs, or even learning their home telephone number when they were young by singing it to a familiar tune. Let me add that *the purpose of using music is NOT to entertain students*. It's not to play the same music they listen to all day, every day. Further, music that may be "old hat" to you may be music they've never heard before and that they'll thoroughly enjoy.

Second, keep in mind that not everyone hears music the same. Also, some people are very sensitive to sounds. Constant environmental noise from nearby airports, train tracks, freeways, and the steady buzz of overhead lights and machinery, such as air conditioning, take a toll. They increase stress levels and impair learning. A background of white noise with environmental

sounds or classical music with nature sounds may actually *help* ADHD students because it acts as a filter.

Third, have fun with the music. Students don't mind in the least if a song is one from a different era or if it isn't one they know. *You can even get away with kids' songs and silly songs (students love them, but won't always admit it!), as long as you handle it with a light touch.* They'll take their cue from your attitude. Again, remind them of the reason for using music: It makes learning easier and more memorable.

Fourth, sample a range of music. You're not restricted to classical, folk, jazz, rock 'n roll, pop, country-and-western, and New Age. Try R&B, soul, hip-hop, rap, reggae, children's music, and electronic music. Explore music from other places and cultures, such as Greece, Scotland, Hawaii, China, Latin America, or Eastern Europe.

Fifth, start small. You can begin by using music only when students are entering and leaving class. As you gain experience and confidence, you can branch out.

Last, and most important: ***Use music sparingly. A little music goes a long way.*** If you overuse music, you spoil what would otherwise be a wonderful asset. I limited my use of music to no more than 10-15% of instructional time. Although I always used music as students were entering and leaving class, I often did not use it during the class session. Depending on what was happening in class on any given day, I might use a short bit of music while students were moving into small groups, to have students stand up and stretch, or as a low background while they were working in groups. When the occasion lent itself, I used music instructionally. (Some specific ways to use music in reading, writing, and math classes are described later.)

Class Times When Music Is Appropriate

In the classroom, music can make a powerful contribution at many points and in many ways. Some of these uses are listed below, along with suggested songs. Listen to samples of songs at MP3 sites to see which ones might work for you. Song lyrics can also be used to make a funny comment or add brain-friendly humor to the classroom.

1. As students are ***entering class***. Choose upbeat, uplifting music, or music that pertains in some way to the course or topic that day. Songs with humor also start the class on the right foot. "Star Wars," "Summon the Heroes" and other John Williams' Olympic music, "Megamix" (Gloria Estefan), "Peter Gunn" (TV theme), "Life Is Beautiful" (movie theme), "Superman" (John Williams), "Raiders of the Lost Ark" (John Williams), "E.T.—Flying Theme" (John Williams), "Mystery Movie Theme" (Henry Mancini), "20th Century Fox Fanfare" (Cincinnati Pops), "The Tonight Show Starring Johnny Carson" (TV theme), "Cheers" (TV theme), "Baby Elephant Walk" (Henry Mancini), "This Little Light of Mine" (Gospel Dream), "Zip-a-Dee Doo Dah" (from "Singin' in the Rain" CD, Maria Muldaur), "Adiemus" (from "The Journey: The Best of Adiemus" CD, Karl Jenkins), "Your Life Is Now" (John Mellencamp), and songs whose words fit the occasion, such as "Walk Right In" (Rooftop Singers), "Thanks for Coming" and "Hello, Welcome to the Meeting" ("Laughable Lyrics" CD), and "The More We Get Together" (Raffi).

2. To ***welcome students back after a weekend or holiday break***. "Back in the Saddle Again," "Welcome Back, Kotter" (TV theme), "Hi-Ho, Hi-Ho, It's Off to Work We Go!", "Rawhide" (TV theme), "The Flintstones" ("Yabba Dabba Do" TV theme, Aron Apping), "Monday, Monday" (Mamas and Papas), "Reveille" bugle call ("Authentic Sound Effects, Vol. 3").

3. To ***comment on the weather as students are entering class***. On a rainy day, the humor of song such as these can boost a class's spirits immeasurably: "Raindrops Keep Falling on My Head" (B.J. Thomas), "Here Comes That Rainy Day Feeling Again" (The Fortunes), "Come Clean" (Hilary Duff), "Have You Ever Seen the Rain?" (Creedence Clearwater), and "Baby, the Rain Must Fall" (Glenn Yarbrough). For gorgeous, sunshiny days, try "Lazy Day" (Spanky and Our Gang), "It's a Beautiful Morning" (The Rascals), "Good Day Sunshine" (The Tremeloes), or "Walking on Sunshine" (Katrina and The Waves).

4. ***To get students on their feet.*** Students need a change after 15-20 minutes of sitting. Use any of these when you want to have them stand up to stretch, change where they are sitting, or move for some other reason. "Get on Your Feet" (Gloria Estefan), "Line Up" (Aerosmith), "Stand Up!" (David Lee Roth), "1-2-3-4" (Ataris), "Up!" (Shania Twain), "Get Up Offa That Thing" (James Brown), "Baby Elephant Walk" (Henry Mancini), "Come and Get It" (Bad Finger; perfect when students need to come pick up a handout), "Arkansas Traveler" ("Smokey Mountain Hits" CD)

5. As ***students are moving into collaborative groups.*** Students appreciate the humor and support of these songs, and the music facilitates movement. "Help," (Beatles), "We Can Work It Out," (Beatles), "You've Got a Friend" (Carol King), "Lean on Me" (Bill Withers), "Reach Out" (The Four Tops), "I'm into Something Good" (Herman's Hermits), "Call Me" (Blondie), "You Can Make It if You Try" (James Brown), "I Got You, I Feel Good" (James Brown), "I Heard It Through the Grapevine" (Marvin Gaye), "Think Outside the Box" and "Part of the Team" ("Laughable Lyrics" CD), "Match Game" (TV theme song), "That's What Friends Are For" (Dionne Warwick), "I'll Be There for You" (The Rembrandts; theme for "Friends" TV show), "We're All in This Together" (from "High School Musical"), "It's Arithmetic, Baby" (Tom Paxton). Because my rule was that "Everyone in a group must be able to explain the group's answer," I sometimes used "Nowhere to Run, No Where to Hide" as a fun reminder. (I like the versions by The Commitments and the Isley Brothers.)

6. As low ***background music*** when students are working in small groups, in pairs, or individually, or when they are taking a test. The volume should be low enough that you could speak at a conversational level without raising your voice. The music should act as a filter for unwanted noise and help create a relaxed, mentally alert state. If *any* student objects to background music, you should not use it. However, if the entire class likes background music, try to play the same baroque music during the test that was used during the original presentation of the material: it acts as an auditory memory cue. In general, choose baroque music, such as "Water Music Suite" (Handel), "Brandenberg Concertos" (Bach), "Eine Kleine Nachtmusik" (Mozart), and music by Telemann, Vivaldi, or Corelli in a major key. Soft piano or violin concertos with orchestral accompaniments work well. For a more contemporary sound, try these CDs: "Breezin'" (George Benson), "Music for Accelerated Learning" (Steve Halpern), or "Natural States" (Speer). There should be no lyrics. Beats per minute can vary widely; choose recordings with a

moderate 60-75 BPM. In addition to being good as background, this type of music enhances problem solving and creativity, both of which require sustained alertness.

7. ***After a pair-share review.*** Students make the immediate connection between these songs and having to recall/review material: "Thanks for the Memories" (Bob Hope and Shirley Ross), "Always Something There to Remind Me" (Naked Eyes), "Unforgettable" (Peggy Lee)

8. To use music to ***create positive stress or add drama.*** "James Bond Suite" (Henry Rabinowitz and the RCA Orchestra), "Alfred Hitchcock Presents" (TV theme; same as "Funeral Song of a Marionette"), "Law and Order" (TV theme), "Peter Gunn" (TV theme), "Jeopardy" (TV theme); "Mission Impossible" (TV theme); "Mission Theme" (John Williams, NBC News theme); "Jaws" (movie theme, John Williams), "Zorba the Greek" (movie theme), "G.E. College Bowl" (TV theme), "Family Feud" (TV theme), "Gonna Fly Now" ("Rocky" theme, Bill Conti), "In the Hall of the Mountain King" (from "Peer Gynt" by Grieg)

9. To ***energize students*** or have them ***physically move*** (for example, to pick up a handout, to change where they're sitting, to find a partner or to form groups). Select highly rhythmic music in a major key. "Shake It Up" (The Cars), "Fun, Fun, Fun" (Beach Boys), "Bonanza" (TV theme), "Listen to the Music" (Doobie Brothers), "We Got the Beat" (Go-Gos), "Anchors Away," "1-2-3-4" (Ataris), "Come and Get It" (Bad Finger; perfect when students need to come get a handout), "Hoe-Down" (Copland; Dorati/Detroit Symphony), "Rough Riders March," "U.S. Air Force March," or any upbeat music or song. BPM should be 70-140.

10. To ***relax or calm*** students, to ***use for stretching,*** or ***activities such as reflection, journaling,*** and ***visualization.*** Also great before a test or when students need a five-minute brain break. "The Lake House" (movie theme; Rachel Portman), "Chariots of Fire" (Vangelis), "The Reivers" (movie theme), "Peaceful, Easy Feeling" (Eagles); New Age music by composers such as Enya, George Winston, Yanni, Paul Speer, and Ray Lynch; and environmental sounds (for example, ocean waves). BPM should be 40-60.

11. To ***celebrate successes or to honor students.*** "Olympic Fanfare" (John Williams), "In the Zone" (David Banner), "I Just Want to Celebrate" (Rare Earth), "Celebrate" (Three Dog Night), "Celebration" (Kool and the Gang), "We Are the Champions" (Queen), "The Best" (Tina Turner), "Never Be Here Again" (Hoobastank), "Holiday" (Madonna), "You Ain't Seen Nothing Yet" (Bachman-Turner), "We Are Family" (Sly and the Family Stone), "We May Never Pass This Way Again" (Seals and Croft), "Shout" (Isley Brothers), "20th Century Fox Fanfare," "Baby, I'm a Star" (Prince), "Every 1's a Winner" (Hot Chocolate), "2001: A Space Odyssey" (movie theme; *Also Sprach Zarathustra*, Richard Strauss), "Grand March" (from *Aida*, Verdi), "We Will Rock You" (Queen), "1812 Overture" (Tchaikovsky), the "Hallelujah Chorus" (Handel's *Messiah*), "A-You're Adorable" (from John Lithgow's "Singin' in the Bathtub" CD; a fun way to honor a student!)

12. ***For other specific purposes.*** Depending on the circumstances, you might use songs such as these:

- *Beginning of class:* "Brain Warm-ups" theme (Brain Warm-ups), "Getting to Know You" (from John Lithgow's "The Sunny Side of the Street" CD; fun for class introductions); "Raise the Brain" (Miz B), "Shake Your Brain" (Red Grammer)
- *Encouragement, motivation, support:* "Unstoppable" (Rascal Flatts), "Move Along" (All-American Rejects), "100%" (Mariah Carey), "Can't Box Me In" (Honor Society), "You Can Make It If You Try" (Sly and the Family Stone), "You Can Make It If You Try" (James Brown and Yvonne Fair), "Rise Up" (Green River Ordinance), and "Pick Yourself Up" (from John Lithgow's "The Sunny Side of the Street" CD; a good choice when students are struggling with challenging material), "Keep Holding On" (Avril Lavigne), "Don't Worry, Be Happy" (Bobby McFerrin)

- *These are self-evident:* "Turn Off Cell Phone," "Keep an Open Mind," and "Excuses" ("Laughable Lyrics" CD), "Shake Your Brain" (Red Grammer; when the class is having an off day), "Hallelujah—Lunchtime!" ("Laughable Lyrics"), "Time Won't Let Me" (Captain Cardiac and the Coronaries), "20th Century Fox Fanfare" (when you introduce an important new topic), "U Can't Touch This" (MC Hammer), "You Talk Too Much" (Run-DMC), "Pomp and Circumstance" (Elgar; can graduation be far away?), "Thanks for the Memories" (can be used other ways besides after a pair-share), "Make Your Own Kind of Music" (Mamas and Papas; being an individual, doing your own thinking), "Hallelujah Chorus" (Handel's *Messiah,* when students complete a difficult chapter or assignment)

- *Funny, and therefore stress-reducing, when announcing a test or major project or assignment:* "Taps" (bugle), "Funeral March" ("Authentic Sound Effects, Vol. 3"), "Mission Impossible," "Jaws"

13. To ***end class as students are leaving.*** Choose upbeat, fun, or funny music; lyrics may pertain to leaving. "Never Can Say Goodbye" (Gloria Gaynor), "So Long, Farewell" (from "The Sound of Music"), "Who Let the Dogs Out" (Baja Men), "Happy Trails" (Roy Rogers/Dale Evans), "Hey, Hey, Goodbye" (Steam), "Goodbye" ("Laughable Lyrics") "Goodbye Yellow Brick Road" (Elton John), "Goodbye" (Spice Girls), "Goodbye" (Air Supply), "Goodbye!" (from "The Producers"; Matthew Broderick, Nathan Lane), "That's What Friends Are For" (Dionne Warwick), "Honey Don't" (Steve Earle and Joe Walsh), and "Can't Let Go" (Lucinda Williams). Other possible goodbye/end-of-semester songs: "Breaking Up Is Hard to Do" (Neil Sedaka), "I Can't Let Go" (The Hollies), and "Hit the Road, Jack" (Ray Charles; obviously tongue-in-cheek)

Specific Suggestions for Reading, Writing and Math Classrooms

Reading:

- Use song lyrics for ***figurative language*** practice. The "Maverick" theme song (old TV show) contains several figures of speech. Country and western songs are a particularly good choice for figurative language.

- Use music without lyrics to introduce the concept of ***tone***. While tone can be difficult to understand in written material, it's easy to hear in music. Choose samples of music with very different tones; play 15-30 seconds of a song, and ask students for words that

describe the tone of the music. Examples: “Out of Africa” (movie theme), “Schindler’s List,” “Sex and the City,” “The Piano” (movie theme), “Ladies in Lavender” (movie theme; Joshua Bell), “Leave It to Beaver” (TV theme), “The Yellow Rose of Texas” (Mitch Miller), “Hoe-Down” (Copland), and “US Air Force March.”

- Use song lyrics to provide practice in ***making inferences*****:** “Tie a Yellow Ribbon ‘Round the Old Oak Tree,” and many country and western songs work well.
- Use music that ***complements the particular subject matter*** that day.
- In Adult Basic Ed classes and extremely low-level classes, use printed lyrics of songs students know, and have students follow along. Most lyrics are available at www.songlyrics.com.

- Jack Grunsky’s “I Can Read” is a delightful, catchy children’s song that even college students will smile at…and continue to hum or hear in their head the rest of the day. (There’s actually a term for a song or tune that repeats over and over inside a person’s head: “earworm.”)

Literature/Writing:

- Use music as a ***writing prompt*** by having students respond to the images and ideas elicited by the music. Good choices are excerpts from “Pictures at an Exhibition” (Moussorgsky), “Clouds” (Debussy), “Tintagel” (Bax, Symphony No. 7), “The Lark Ascending” (Vaughan Williams), “Pines of Rome” (Respighi). Environmental sounds (thunderstorm, ocean waves, forest, jungle) can also work well. More contemporary music without lyrics, such as “Deep Breakfast” (Ray Lynch), can be evocative.

- Depending on the number of syllables in a formula or phrase, or the number of letters in a difficult to spell word, teach students to sing the information to one of these tunes:
  5 syllables: “You Are My Sunshine”
  6 syllables: “Happy Birthday to You”
  7 syllables: “Twinkle, Twinkle, Little Star”

- http://www.littunes.com Created by a college professor, LitTunes is a collaborative online community that provides “a centralized source of materials and support for using music in the classroom.” Among other things, it includes specific suggested pairings of contemporary songs with classic literary works, and invites teachers and students to contribute their own song-literature pairings.

- Dethier, B. (2003). *From Dylan to Donne: Bridging English and music.* Portsmouth NH: Boynton/Cook.

Math:

- “It’s Arithmetic, Baby” (Tom Paxton) is a children’s song, but is perfect for moving students into collaborative learning groups. Students will get a bang out of it.

- See lyrics at “Songs for Teaching,” http://www.songsforteaching.com/mathsongs.htm. Click on “Math.” Some songs are aimed at lower-level students, but the middle- and high

school ones are appropriate for developmental students. (Handle them with a light touch and students will be fine with even silly songs. Remind students that the sillier a song is, the easier it is to remember.) The lyrics are printed; sound clips are available for many of the songs (click on "Listen to this song").

- Assoc Prof. Larry Lesser of the University of Texas at El Paso is a self-proclaimed "mathemusician" who is widely known for "***adapting popular lyrics towards math topics*** such as infinity, pi, problem solving, graphing functions, as well as even more worldly applications such as whether to play the lottery." His website is http://www.math.utep.edu/Faculty/lesser/Mathemusician.html. Teachers do not need permission to use the lyrics listed on his website when they use them in their own classroom, as long as they include the statement "Lyrics copyright Lawrence Mark Lesser. All rights reserved". "We Will Rock You" becomes "We Will Graph You"; "Home on the Range" becomes "Domain and Range"; "Fifty Ways to Leave Your Lover" becomes "Fifty Ways to Work a Problem." What fun!

- At www.YouTube.com, there are many parodies of Don McLean's "American Pie" (http://www.youtube.com/watch?v=aOZSj4xsyZo&mode=related&search=; the original, performed by McLean). Type "Pi" in the search box. Check out this high school student performance of Larry Lesser's lyrics: http://www.youtube.com/watch?v=Ll_45NomcFk; "Mathematical Pi" (shows words on screen; listen to all of it first before using it); "American Pi" (http://www.youtube.com/watch?v=1_vwPmsDyyQ&mode=related&search=; written and sung by a high school physics teacher great lyrics, but ouch! The guy can't carry a tune in a bucket.)

- Also, see "Math and Music: A Primer" (http://members.cox.net/mathmistakes/music.htm); Online Math Applications (http://library.thinkquest.org/4116/Music/time.htm; this is simple and non-technical); check out the article, "Where Match Meets Music" (http://www.musicmasterworks.com/WhereMathMeetsMusic.html; the author uses wave patterns to explain why note some combinations are pleasing while others are not).

- "Music and Math" at Connexions (http://cnx.org/content/m11638/latest; aimed at grades 3-7, but you may be able to adapt some of the ideas for developmental math students struggling with fractions, ratios, powers, roots, etc.).

- Although not connected with music directly, developmental math instructors may enjoy *Twenty Years Before the Blackboard: The Lessons and Humor of a Mathematics Teacher*, by Michael Stueben (Washington, D.C.: Mathematical Association of America, 1998). In addition to containing mathematical and academic humor, it contains mnemonics. Experiment with setting some of those mnemonics to music.

Resources

Allen, R. (2004). *The ultimate book of music for learning.* www.educationillustrated.com. Click on "music." $25

Campbell, L., B. Campbell, and D. Dickinson. *Teaching and learning through multiple intelligences*, 2d ed. Boston: Allyn and Bacon.

Green, J. (2002). *The green book of songs by subject: The thematic guide to popular music,* 5th ed. Nashville, TN: Professional Desk References, Inc. An invaluable resource, this reference book lists songs and album tracks by themes and concepts, representing all genres and eras; listings include titles, artists, discographies, and labels. Paperback edition is much less expensive; paperback "seconds" ($36) may be available. Check their website, www.greenbookofsongs.com. The book is also available through www.educationillustrated.

Jensen, E. (2000). *Music with the brain in mind.* San Diego, CA: The Brain Store.

Jensen, E. (2005). *Top tunes for teaching.* San Diego, CA: The Brain Store.

Levitin, D. (2006). *This is your brain on music.* New York: Dutton. The author was a successful rock musician and studio producer who subsequently obtained a Ph.D. in neuroscience. He specializes in how the brain interprets music.

Millbower, L. (2000). *Training with a beat: The teaching power of music.* Sterling, VA: Stylus Publishing. The author is a college professor and president of Offbeat Training, Inc. An excellent, readable resource, this book covers the why, what and how of using music. $23 at www.offbeattraniing.com.

Rose, C. and M. Nicholl. (1997). *Accelerated learning for the 21st century.* New York: Dell.

Sacks, O. (2007). *Musicophilia: Tales of Music and the Brain.* New York: Knopf. A neurologist and well-known writer, Oliver Sacks focuses on unusual cases having to do with music's effects on the mind.

Sousa, D. (2001). *How the brain learns*, 2d ed. Thousand Oaks, CA: Corwin Press.

Wolfe, Patricia. (2001). *Brain matters: Translating research into classroom practice*. Alexandria, VA: Association for Supervision and Curriculum Development.

www.educationilustrated.com Click on "music"; some collections of CDS, as well as books related to using music in the classroom.

www.everythingaboutlearning.com Books on music in the classroom, as well as some CDs

www.ez-tracks.com Music downloads; 30,000 titles; free, legal site

www.iTunes.com Apple's online music store

www.jlcbrain.com Sponsored by Jensen Learning Corp. Click on Products, and then music downloads or CDs.

www.mozarteffect.com Don Campbell's website. Contains more than 500 links related to research and resources grouped by category, including one for music and the brain; online store for Mozart effect CDs.

www.songlyrics.com Lyrics to almost any song are available at this site.

http://songsforteaching.com/richallen/rock.htm Rich Allen (*Impact Teaching)* lists "Suggested Songs for the Classroom: 50s and 60s Rock."

http://www.ted.com/index.php/talks/view/id/199 Arthur Benjamin: Lightning Calculation and Other "Mathemagic." Not music-related, but this video will amaze students. Benjamin combines his love of math and magic in "mathemagics."

www.classical.net Classical music learning resource for non-musicians. Basic repertoire list, classical CD buying guide, recommended classical CDs, composers' works and dates, classical music links

www.cduniverse.com One of the myriad websites for CDs of all genres

www.trainerswarehouse.com *Laughable lyrics for meetings and training.* This is a CD with hilarious, energizing songs that work as well in the classroom as in corporate training. Topics include such things as being part of the team, thinking outside the box, and turning off the cell phones. They also offer other CDs, such as "Tunes for Trainers" and "Everybody Dance," and mechanical sound effect devices, such as chimes and gongs, and SoundF/X, a pushbutton handheld device that gives you six sound effects at your fingertips.

www.advancedbrain.com Advanced Brain Technologies (ABT). Offers a collection of classical music CDs $16 each, or $99 for all 8) that support thinking, learning, concentration (all three are Baroque music; 50-60 BPM), productivity (70-130 BPM), motivation (120-140 BPM), relaxation (30-60 BPM), etc. You can listen to samples of any of them. The music has been rearranged and recorded to eliminate the drama and changes in mood and tempo that capture listeners' attention in live performances. BPMs have been taken into consideration.

Kenyon, T. *Ambient support for learning, working, and creating.* This CD is designed to provide a "soothing psychoacoustic environment to help you increase productivity and decrease stress." Headphones are not required. Kenyon, a musician, researcher, author, therapist, and founder of Acoustic Brain Research (in 1983), says the CD's BioPulse technology puts listeners "in a mid-alpha brainwave state, the range that research has identified with improved learning, mental clarity, and relaxed alertness. *Ambient Support* also features subliminal suggestions to reduce stress, increase motivation, and improve your memory." You can listen to a sample and/or order it at http://store.soundstrue.com, buy it at Borders, or through several other sources.

Halpern, S. *Music for accelerated learning.* CD produced by Inner Peace Music, 1999. Listen to samples of any track at Amazon.com.

Popular music download sites include www.apple.com/itunes/store (iTunes; iPod users must purchase from this source), www.napster.com, www.music.yahoo.com, and www.rhapsody.com.

For Those Who Are Interested…

What Happens as the Brain Listens to Music

Sound waves enter the ear. In the cochlea, they are converted into nerve impulses. Those impulses are transmitted to the auditory cortex of the brain, which is located in the temporal

lobe. Specialized regions, particularly in the right hemisphere, analyze the pitch and timbre (quality of a sound). Next, the frontal lobe links the sound of the music with thought and stimulates emotions and memories. (Based on David Sousa, *How the Brain Learns,* 2d ed.)

Experiencing music is by its nature a whole-brain process: Both sides of the brain are involved. The brain accesses different areas for singing, listening, playing instruments, recalling familiar tunes, and predicting what will come next melodically in unfamiliar music. The left brain responds to the rhythm and sound (patterns), while the right brain relates to the textures of the sounds. (Don Campbell, *Rhythms of Learning*) Listening to background music activates the right hemisphere to a greater degree. In contrast, concentrating on lyrics activates the left hemisphere.

Familiar music activates Broca's area, the area of speech and language production located in the left hemisphere). Rhythm activates Broca's area, but also the cerebellum, which measures beats. The melody of music creates activity in both sides of the brain, but more so the right, while harmony activates more areas in the left brain.

Research has yielded several other interesting findings. (1) Early music training increases the corpus callosum, the bridge of tissue that connects the hemispheres and allows them to communicate. (2) The neural firing patterns are basically the same for music appreciation and abstract reasoning. (3) The brain responds differently according to whether a person is learning music by hearing it, playing it, reading it, being told about it, visualizing a score, or recalling a concert. (4) The brains' left hemisphere and amygdala are more activated in professional musicians than they are in novice listeners. Novices' right hemispheres are more activated because they're listening to the music as entertainment.

Math, Reading, and Music

Music is inherently mathematical: It relies on fractions (tempo, note lengths, octaves, chord intervals), and involves patterns and sequences, counting, ratios, and proportions. It appears to be linked with enhanced spatial-temporal reasoning (visualizing a problem and solution), and it appears to enhance conceptual understanding of a problem. Einstein, who played the violin from age 6 and loved music, turned to it whenever he became stalled out on a physics problem. He reported that the answer would often come to him once the music had put him in a peaceful state of mind.

Math and logic are handled in the same areas of the left frontal lobe that are activated by playing an instrument or singing. Influenced by composer Zoltan Kodaly, Hungarian "singing schools" incorporate singing daily. From a young age, children learn by doing, by singing songs, clapping and moving to the music, and playing musical games and by learning musical elements in a sequential order. (The critical period for developing sensitivity to sound and pitch seems to be 4-6 years of age.) Many Hungarian students excel in math and science, and the early consistent musical training appears to lay the foundation for subsequent development of musical ability. It is reported that virtually all of the students are able to sing on pitch by the end of third grade.

Music majors are often excellent readers. Music training correlates with learning to read. Neither of these comes as a surprise given that in English, reading is based on symbols that represent sounds and that sensitivity to patterns plays a key role.

Quotes about Music

- "Music is the art of thinking without words." --Jules Combarie
- "When words leave off, music begins." --Heinrich Heine
- "Music is the way our memories sing to us across time." --Lance Morrow
- "Music is the shorthand of emotion." --Leo Tolstoy

Make someone's heart sing, including your own…

Please visit The Literacy Site at www.theliteracysite.com, if for no other reason than to click on "Click Here to Give—It's FREE" button. Each day, approximately 70,000 people worldwide do exactly that. As a result, more than 55 million visitors have helped provide more than *a million books* to children who need them most. The Literacy Site has wonderful items in its online store, perfect gifts for teachers and friends who love to read and who support literacy efforts. From providing books to building schools, The Literacy Site provides opportunities to give directly to causes that support literacy in this country and around the world. For example, a $25 donation buys 25 books for children in Nepal through the Room to Read Program. A $40 donation pays a rural Afghan teacher's salary for a month; $20 provides school uniforms and a year's school supplies for two Afghan girls; $100 will heat a classroom for the winter. There is no overhead: all donations are tax-deductible and distributed directly to recipients by the Central Asia Institute. This is the only "ad" on my website, and I thank you for considering this.