

# Education

## Section Overview

Joseph Schwantner’s orchestral composition *Chasing Light...* is the inspiration and focus of the activities found in this section. Detailed information about the composer and the music can be found in this tool kit or at [www.FordMadeinAmerica.org](http://www.FordMadeinAmerica.org). The object of the curriculum is to engage teachers and students in the creative act of composing music, while also developing performance and listening skills.

Given the strong influence of poetry on Schwantner’s music, the activities approach using poetry as inspiration for creating music, by using haiku or Schwantner’s own poem as a departure point for student work.

There is also an extensive guide on building classroom instruments from found and recycled materials. These instruments, each based on the categories of orchestral instruments (idiophones, aerophones, etc.) are created from a set of flexible “recipes” that learners can follow. Small ensembles can be formed with these instruments and used to improvise and compose music.

These activities can be realized simply and economically, or with great ambition, depending on the amount of time teachers and students can dedicate to the work. There are also audio and visual resources that augment and support the curriculum – most prominently, a hands-on instrument-building demonstration by Schwantner and education advisor John Bertles, included on the DVD and also available online.

The League of American Orchestras and Meet The Composer have developed this curriculum in collaboration with the Ford Made in America consortium of orches-

tras nationwide. It is aligned with national music standards and is designed to be accessible to teachers and students along the K-12 continuum. It may also have applications for university and adult audiences.

Although these lessons are inspired by the terrific poetic imagery in Schwantner's *Chasing Light...*, they are designed to prove valuable beyond the context of this particular work, so that *Ford Made in America* can continue to be a resource to your education program long after the final note of the concert has sounded.

#### **EDUCATION & MARKETING: CULTIVATING THE AUDIENCE OF TOMORROW, TODAY**

This section contains some excellent lesson plans for your education staff and music educators, using *Chasing Light...* as the focal point. Take the next step and make the concert-going experience an integral part of the lesson.

When you distribute the educational materials and finish the lessons, be sure to send the students home with ticket information to share with their families. You could include the information in the

school newsletter, emphasizing the national aspects of this program and how the school is participating. Always include box office information in your correspondence. Group discounts for the school might be appropriate.

Use the educational experience as PR for the performance – a well-placed picture of kids working on *Chasing Light...* lessons in schools is an excellent marketing tool for your concert.

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## Poetry and Composition

Joseph Schwantner's *Chasing Light...* is inspired by the composer's experience of new light in a new place. After his move to New Hampshire, Schwantner was struck by the way light fell upon the mountains of northern New England.

He was moved to create a poem that parallels the creation of his new orchestral work, with each stanza providing a platform for one of the four movements of the piece. The particular relationship of poetry to abstract music in this case is a fascinating one, rich with opportunities for musicians and educators.

Incidentally, the concept of the composer creating his or her own poetry is not without precedent in music history. One of the most notable examples is that of Vivaldi's *Four Seasons*, which took inspiration from four poems penned by the composer.

There are two separate activities. The first, entitled "Using poetry as inspiration," uses the actual Schwantner poem as inspiration for students to create a new musical work. The second activity, "Composing with haiku," uses the ancient form of haiku as a starting point, and incorporates the classroom instruments built from household materials.

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**Reminder:** At least one of these activities is required as a condition of participation in Ford Made in America. The final report form is located in the reporting section of the tool kit. An Educational Consultant is available to assist you. Contact information may be found on p. 80.

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In either case, the lesson plans outline the basic project, which can and should be adapted to fit the circumstances of individual orchestras and schools. These projects could also be undertaken in a community setting or with musical ensembles outside of schools.

## Activity 1: Using poetry as inspiration

Students, teachers and musicians can engage in a project that uses Joseph Schwantner’s poetry as a starting point for creating their own brief musical works. Depending on an orchestra’s goals and programming, this project can be tailored to different kinds of participation for the orchestra and for the educators and students involved. This can range from a one-time, 45-minute session that results in the creation of short, improvised pieces to a longer-term project over multiple sessions. The work can be part of an educator-driven approach with support from the orchestra, or it can be integrated into a presentation the orchestra produces with support from host schools.

<b>Subjects</b>	Literacy, Musical Composition, Musical Performance
<b>Synopsis</b>	Students will read, analyze and discuss Joseph Schwantner’s poem, “Chasing Light...” and use it as a platform for creating their own musical pieces
<b>Goal</b>	To help students gain insight into the compositional process through a hands-on approach to creating their own musical pieces
<b>Time needed</b>	One 45-minute classroom session (or more sessions as desired)
<b>Materials</b>	Copy of the poem “Chasing Light...” by Joseph Schwantner Index cards Room for at least four groups to do musical work Musical instruments (or voices) Recording equipment to document musical work Paper or staff paper for notation (optional)
<b>Teacher prep</b>	Read the poem and create a plan for breaking the class into four groups (or a multiple of four groups)

### Procedure

Read the poem “Chasing Light...” by Joseph Schwantner. Discuss its meaning, its use of imagery, and its potential to inspire or connect to music.

**Chasing Light...**

by Joseph Schwantner

Beneath the sickle moon,  
sunrise ignites daybreak's veil

Calliope's rainbowed song  
cradles heaven's arc

piercing shadowy pines,  
a kaleidoscope blooms

morning's embrace  
confronts the dawn

You will want to pay special attention to the dynamic processes at work in each stanza – for instance, the first stanza depicts an “ignition” which is the action of this section, etc.

Break the class into four groups (or a multiple of four groups).

On an index card, give each group one of the four stanzas of the poem.

Depending on the experience and capability of the group, choose a compositional method below and ask the groups to spend 8-10 minutes creating a musical improvisation that captures the essence of the stanza they have been given:

- Using instruments that the students play (recorders, strings, woodwinds, brass, percussion, etc.), have students invent a short movement that is no longer than 30 seconds, but which possesses at least one musical idea that comes directly from the poem, one artful moment of silence, and one musical surprise.
- Using voices or a combination of voices and instruments, have students invent a short movement that is no longer than 30 seconds, and which uses no words but which possesses at least one musical idea that comes directly from the poem, one artful moment of silence, and one musical surprise.
- Using voices or a combination of voices and instruments, have students create a vocal setting of the words that uses at least one moment of unison singing, one moment of harmony, and one moment of artful silence.

Once the creative work is completed, bring the group back together for a performance of all four movements, presented as a suite. Ask students to discuss and identify ways in which they accomplished the assignment and what they observed in the performances.

Listen to selected passages from each of the four movements of *Chasing Light...* by Joseph Schwantner (included on the audio CD in the tool kit, and also available on-

line at [www.FordMadeinAmerica.org](http://www.FordMadeinAmerica.org)). How did the composer respond to his own poetic ideas? How did the creations of the group compare to the kinds of musical processes used by the composer? Did you notice any musical surprises? Any artful silences?

Ask students what they might do if they were to return to their piece to edit or revise it.

### **Assessment**

Ask students what they learned about the process of composing from this exercise. What were the parts of the process they found most challenging? Most interesting? What other approach to composing might they take if they were to compose again?

### **Extensions and variations**

For young students, break the Schwantner poem down into its most basic expressive elements and precede the composition process with a drawing activity – a sunrise, dancing light, shadows through trees, another sunrise, etc. Use the drawings to guide the composing work.

This project affords the opportunity for supporting schools and orchestras in their collaboration. Local composers can provide invaluable help in encouraging students and helping to set parameters so that students and musicians can achieve success in their creative work together. Composers can share aspects of their own creative processes to provide a model for their collaborations, and they can share their music with them as well.

### **ON SCHOOL VISITS FROM ORCHESTRAL MUSICIANS**

If students have created their own pieces at schools you visit, consider including performances of them on your program or during your visit. You could also design an interactive portion of the program by asking students to contribute ideas for a short A-B-A piece that begins and ends with a sunrise as its central image. For instance, responding to questions from your ensemble, students might ask a string quartet to fashion a sunrise from a long, slow tremolo that begins with a dis-

sonant harmony and transforms slowly into a major chord (“A” section). To create a contrasting “B” section, ask students to think of a technique that might work well for a “dance of light.” Students might suggest a pizzicato passage or one with all very high notes. Once you have agreed upon a technique that seems to work well, perform the entire section in A-B-A form as a structured improvisation. Congratulate students on their contribution to the program.

## Activity 2: Composing with haiku and the custom instruments

This activity makes use of the classroom instruments that students build using household materials (described in detail in the next section, “Building Your Own Instruments”). Students can get the most use of these instruments, and get immersed in the concepts of Ford Made in America, by composing music in the same way that Joseph Schwantner did. This lesson plan covers writing simple poetry in the form of haiku, and then composing music based on that poetry.

Haiku is an ancient Japanese poetic form that was formalized in the late 19th century. Haiku takes the form of a three-line poem with a pattern of 5-7-5 sound units (called *on*) that roughly correspond to English syllables. However, while haiku (a word that is both plural and singular) written by American schoolchildren typically follow the syllabic pattern quite strictly, the Japanese classical haiku masters never let themselves be limited to this pattern. Haiku are often linked to a theme having to do with nature or the seasons.

Following is a classic haiku by the Japanese poet Matsuo Basho (1644-1694).

old pond  
a frog jumps into  
the sound of water

Western writers and poets embraced haiku:

Snow in my shoe  
Abandoned  
Sparrow’s nest  
— *Jack Kerouac*

Whitecaps on the bay:  
A broken signboard banging  
In the April wind  
— *Richard Wright*

Joseph Schwantner’s own piece for voice and chamber ensemble, *Sparrows*, is based on a series of haiku by the Japanese master Kobayashi Issa.

## Part 1: Writing haiku poetry

<b>Subjects</b>	Literacy
<b>Synopsis</b>	Students will write poetry in haiku form, using traditional syllabic and content guides
<b>Goal</b>	To create haiku that can be used as inspiration for their musical compositions
<b>Time needed</b>	One 40-minute classroom session; optional homework
<b>Materials</b>	Paper and pencil (not pen) Board space
<b>Teacher prep</b>	Read above to understand more about haiku (remember that “haiku” is both singular and plural). For simplicity’s sake, we are limiting our haiku to the strict 5-7-5 form, but you may choose to relax this rule at your discretion.

### Procedure

Tell students that they are going to write poetry using a specific Japanese poetry form called haiku, and write the following poem by the Japanese master Matsuo Basho on the board:

Temple bells die out.  
The fragrant blossoms remain.  
A perfect evening!

Ask the students to count the number of syllables in each line (5-7-5), and ask the students to comment on the subject of the poem.

Tell the students that the traditional Japanese haiku takes nature as a subject, and often indicates the season. What season is this poem set in?

Write the following poem on the board, by Michael R. Collings:

Freeway overpass—  
Blossoms in graffiti on  
fog-wrapped June mornings

Tell students that haiku are perfectly adaptable to urban settings as well.

Ask students to count the syllables. What season is indicated? How is nature highlighted, even in an urban setting?

Tell students that there is one additional thing necessary to make a traditional haiku – the “twist” or “cutting.” This twist is a somewhat ephemeral change in the subject of the haiku – there is a slight difference in perspective, or in substance, yet both parts of the haiku must relate to each other. This cutting can take place after the first or second line, often indicated with a hyphen or colon or period.

In the above two poems, where does the twist or cutting take place?

Working in pairs, have students write a haiku. Remember, the syllabic form must be 5-7-5, nature must be highlighted, there should be a season indicated, and there should be a twist, or cutting.

Read several poems aloud. Consider writing one or two on the board and examine them for the above criteria.

### **Optional homework assignment**

Write two or three haiku. Consider using a classroom topic as a subject – a social studies or science topic might be appropriate, especially considering the nature theme.

## **Part 2: Creating haiku compositions using the classroom instruments**

<b>Subjects</b>	Literacy and Music
<b>Synopsis</b>	Students will compose short pieces inspired by their haiku, both in form and in subject, performed on their classroom instruments
<b>Goals</b>	Students will understand more about this poetic form, and gain experience in music composition using a strict form Students will make practical use of their classroom instruments
<b>Time needed</b>	One 40-minute classroom session
<b>Materials</b>	Paper and pencil (not pen) Board space Simple classroom instruments
<b>Teacher prep</b>	Read this study guide to understand more about haiku poetry Read the “Building Your Own Instruments” section of this tool kit and watch the corresponding DVD segment

## Procedure

Follow the procedures in Part 1 above to write haiku poetry. Have students choose four or five haiku to become group haiku.

Using the “Building Your Own Instruments” section of this tool kit and the corresponding DVD segment as guides, have students build several instruments from various instrument families (strings, percussion, woodwinds, brass).

Working with student groups of approximately six students, compose simple haiku pieces.

Each piece can have 17 sound “events” to represent the 17 syllables of a haiku poem. An event might be as simple as a single strike of a balloon drum, the blowing of the “French hose,” or even a sequence of sounds, such as playing the straw panpipes up and down the scale. In other words, there may be more than 17 actual sounds in each piece – we are being rather relaxed with the concept of sound events so as to include connected motifs such as the playing of the straw panpipes described above.

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**Tip:** If you don’t have enough instruments for all of your students, sound events can also include things like the single hit of a pencil on a desk or a long sung note “laaaaaaa.” A sequence of sounds, such as slow clapping moving to fast clapping, also works nicely.

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The actual haiku poem may be helpful to decide what kinds of sound events are included in the pieces. For example, a poem about snow falling may have sound events that are very soft and ethereal. On the other hand, an interpretation of Basho’s frog-pond poem (see above) might include lots of “ribits” and splashing sounds.

When performing the haiku pieces, make sure to have a student read the original haiku first and then perform the musical interpretation.

## Assessment

After creating the haiku pieces, consider choosing the most successful ones to create a piece that can be performed at a school or community concert. You may even want to have an entire class perform a haiku piece that was written by a group of students.

## Extensions and variations

While repetition in haiku is not part of the poetic form, repetition and motivic variation are intrinsic in music composition. Encourage students to repeat some of their motifs, looking for any particularly memorable ones that can become a “hook.”

It is important to remember that the haiku composition idea should be considered an inspiration springboard for the student works. Experiment with having students compose pieces inspired by other forms of poetry, works of art, or simply purely musical ideas. Have students watch Chapter 5 of the DVD, entitled “Inspiration,” to learn more about what inspires Joseph Schwantner to compose music.

# Building Your Own Instruments

## Introduction

One way to help students to get hands-on experience in music is to have them play a musical instrument. Unfortunately, not all schools have the resources to give their students these kinds of experiences. Instruments and the accoutrements associated with them are expensive, some schools have little to no music instruction and time is often scarce. In addition, the reality of student players performing compositions created by their colleagues is often problematic, given their limited instrumental skills.

Student-built instruments can offer quick and relatively easy solutions to some of the above issues. These instruments are:

- Fun, accessible and hands-on for students
- Inexpensive
- Direct analogs to the four families of the orchestra
- An excellent introduction to the science of acoustics and instrument design
- Surprisingly good sounding (if the principles of good instrument design are followed)
- Perfectly acceptable for student compositions, leading to early experiences in composing, conducting and ensemble technique
- Useable in even the most financially and musical-instruction challenged schools (since they can be used by general education classroom teachers)

Of course, these instruments are no substitute for a dedicated, intensive study of music, instruments and composition. However, designing, playing and composing for these simple instruments can provide some excellent hands-on experience. In addition, a student with experience with these instruments may discover an aptitude and interest in music that will lead to the study of a “real” musical instrument, and possibly to playing with a school band or orchestra.

## How these instruments connect to Ford Made in America

One of the challenges of the arts education component of Ford Made in America is the need for adaptability to the individual needs and resources of the orchestras in the program as well as the needs and resources of the schools affected by the program. There are at least two major ways to connect the simple instruments to this project:

- The simple instruments are kid-friendly versions of the four instrument families of the orchestra.
- The simple instruments can be used as compositional and performance resources for student composition exercises, with the exercises based on inspiration and ideas similar to Joseph Schwantner’s *Chasing Light...* (for example, creating music inspired by poetry, or by compositional form used by the commissioned composer). See “Activity 2: Composing with haiku,” above.

Following are some possible scenarios of how these instruments might be used in conjunction with Ford Made in America:

- The orchestra musicians and/or teaching artists are doing single-session in-school performances for students (either in the classroom or in an auditorium). Musicians build some instruments to use for comparison reasons in these performances, but there is no organized student instrument-building.
- The orchestra musicians and/or teaching artists are doing multiple sessions in classrooms (i.e., each class gets more than one visit). Possible sequence of lessons:
  - Session 1 – introduction to instruments
  - Session 2 – build instruments with students (each student builds at least one)
  - Session 3 – compose “haiku pieces”
  - Session 4 – use instruments to perform haiku pieces
- Music teacher or classroom teacher (if there is no music teacher in the school) builds instruments with students, to be used in single-session performances with orchestra musicians. Orchestra musicians find ways to incorporate the instruments into their performance.
- Music teacher or classroom teacher builds instruments with students, writes haiku, and composes haiku pieces. Orchestra musicians (along with students) perform one or two haiku pieces during single-session in-school performances.

## **The science of sound and musical instruments**

### **Musical instrument classification**

The classification of musical instruments has always been a knotty issue. The ancient Chinese placed their instruments in eight groups depending on the material they were built from: skin, gourd, bamboo, wood, silk, earth/clay, metal and stone. Another ancient system from India, dating around the 1st century B.C.E., classified instruments by what is vibrating: strings, air, metal/wood, and skins (drum heads).

Western orchestral instruments were traditionally divided into the four instrument families still used today: percussion, strings, brass, and woodwinds (although some instruments such as piano and the medieval serpent – a lip-buzzed instrument with tone holes – were somewhat problematic).

By the late 19th century, organology (the study of musical instruments) needed a more specific classification system to deal with the increasing number of instruments from non-European cultures that did not fall neatly into the orchestral families. In 1888, Victor-Charles Mahillon – a Belgian – adopted a system quite similar to the ancient Indian system, by classifying instruments by what is vibrating. This idea was refined later by Erich von Hornbostel and Curt Sachs, and is known as the Sachs-Hornbostel system.

The Sachs-Hornbostel system classified instruments in four main groups (later adding a fifth with the introduction of electronic instruments such as the theremin).

- Idiophones – where the entire instrument vibrates (such as xylophones, maracas, cymbals, etc.)
- Membranophones – which produce sound by vibrating membranes (drums, kazoos)
- Chordophones – vibrating strings
- Aerophones – where air vibrates
- Electrophones – vibrations produced by electronic means

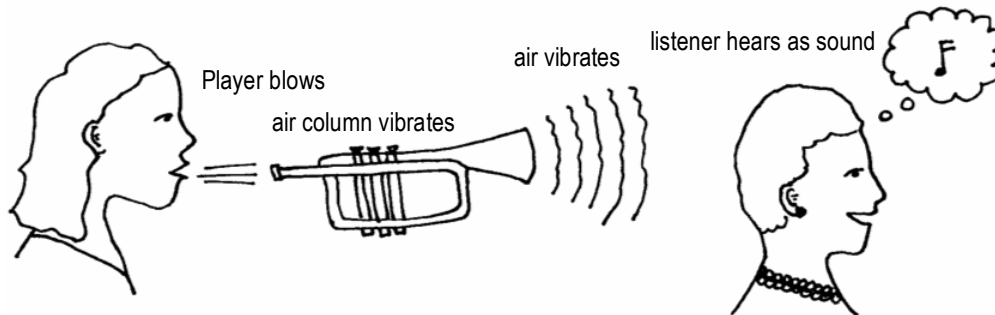
While this classification system is widely in use among organologists and ethnomusicologists, most orchestras still use the traditional four families, or possibly combine brass and woodwinds into a single “wind” family.

For the purposes of our simple instruments, we’ll stick with the orchestral system of:

- Brass – lip-buzzed instruments
- Woodwinds – flutes and reeds
- Strings
- Percussion

### The science of instruments

Whenever you hear a musical instrument, a complex sequence of events takes place – but so close together that one tends to hear it as a single event:



- Something initiates the sound (the player hits the drum; bows the violin; blows the trumpet)
- The energy of the initiation makes something vibrate on the instrument (the drumhead vibrates; the violin string vibrates; the air column inside the trumpet vibrates)
- The vibrations from the instrument cause the air (or other medium) around it to vibrate
- The vibrations wash across the listener’s ear; various mechanisms in the ear translate the information to the brain, which interprets it as sound

For the instrument builder, the most important thing is the second bullet point – the “something” vibrating on the instrument. Here, the construction of a musical instrument can dramatically affect the way that instrument sounds. As instrument builders, there are several things we must pay attention to:

- How is the instrument activated? (struck, scraped, shaken, bowed, plucked, blown, etc.)
- What is it that vibrates? (drum head, string, air column, etc.)
- How can we get the sound louder by changing the instrument design?
- How can we get different pitches by changing the instrument design?

### **Getting it louder**

There are two main ways of getting instruments louder: 1) add more energy to the system (hit, blow, bow harder, etc.); and 2) use the science of acoustics to modify instrument design. We will be entirely focused on the latter. Following are the three main ways to get instruments louder by using design:

- General resonators – a mass of stuff that vibrates along with the material that originates the sound, usually a thin flexible dense material with air on both sides (like the box of a guitar or violin)
- Resonators – usually containers of air that vibrate in sympathy with a specific pitch – like the tubes of various lengths underneath a xylophone - but strings can also be made to serve as resonators
- Put a funnel at the end (primarily wind instruments)

### **Instrument pitches**

Instruments can be made to sound different pitches (high and low) by three main strategies (and a few minor ones). Here are the main strategies:

- Longer and Shorter – finger holes on a flute; a slide on a trombone; keys on a xylophone; strings on a piano; putting fingers down on a violin string
- Tighter and Looser (tension) – tightening or loosening the string on a guitar, or pushing on a drumhead while playing it
- Density – The harder a material is, the higher it sounds. For example, with equal sized blocks of oak (hardwood) and maple (softwood), the denser oak would sound higher

## **The instruments**

### **Introduction**

In each family there is at least one extremely simple instrument and some more complex versions. Choose which are more appropriate for your situation.

A bit of advice – **make yourself one first!** It is absolutely essential that you build a test instrument yourself before you have your students try. You will quickly find that the instruments are truly simple to build, but somewhat more complicated to explain how to build, at least using text and illustrations. Descriptions in the following text that seem complicated and difficult actually in most cases are really, really simple and

intuitive once you physically try them out. When you are working with your students to build the instruments, use a lot of demonstration – actually build an instrument in front of them. They will very quickly grasp the ideas and concepts behind them.

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**Tip:** The instrument-building instructions described in this section are demonstrated in the “Build Your Own Instrument” segment of the DVD, hosted by education advisor John Bertles and composer Joseph Schwanter. Viewing this segment is highly recommended!

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## **Safety issues**

Your safety and that of your students is paramount. We have gone to great lengths to create instruments that are extremely safe to build and play. However, some instruments do require an adult to do some of the construction work, especially as related to cutting wood or using certain tools.

As you run through the building process of the instruments, you will find that the steps where adult assistance or supervision is required are clearly marked. You might consider bringing in some tool-comfortable parents to help out, if you wish to build these instruments in the classroom. Or if you assign students to build instruments at home, please make sure that you alert the parents or guardians to the need for parental supervision.

If you follow the construction steps carefully and ensure that common sense prevails in all cases, you and your students will have a safe and sane construction process; but here are some general observations:

- This guide is not focused towards a particular age of children, but rather toward the teacher, teaching artist or musician. Some may choose to have all students build instruments; others may decide to build one or two examples themselves and use them as demonstration instruments. The classroom teachers know their class and students and the school culture in which they are teaching.
- Pick and choose the instruments and exercises appropriate for the situation. Do not, for example, assign kindergarten kids woodworking-type instruments unless you intend to use serious parental supervision – choose some of the simpler instruments instead.
- Follow all safety standards obsessively. Check with the schools to see what their policy is.
- Use safety goggles even for the simplest operations.
- None of the instruments require power tools, just a few simple items like a coping saw and a knife.

## Strings

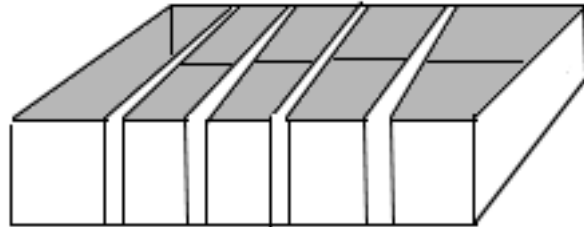
There are two kinds of string instruments in the orchestra – those that are bowed or plucked or struck (violin, viola, cello and bass), and those that are plucked only (harp). Our simple instruments will probably mostly be plucked or struck, since it is really difficult to build a simple bow. For overachievers, however, bow instructions are included.

### Rubber band box guitar

**Materials** Sturdy shoebox-sized box (styrofoam or corrugated cardboard is best, but a shoebox will work just fine)  
Rubber bands

#### Procedure

Wrap your rubber bands around the box (make sure the top is off). Be careful not to wrap so many bands around the box that the box collapses.

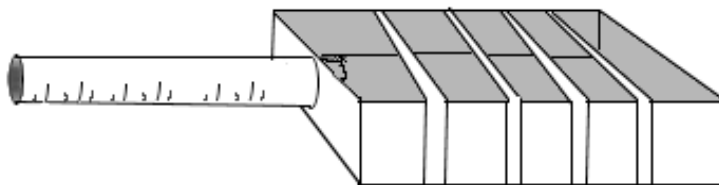


To tune your strings, stretch the rubber bands tighter or looser over the open top of the box.

#### Variations

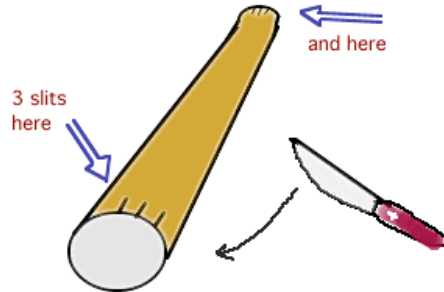
Most children want to attach a tube to their box guitars to give it the appearance of a guitar neck. While it doesn't in any way affect the sound, it does seem to make the instrument look "cooler."

Either cut a hole in the end of the box of slightly smaller diameter than the tube and force the tube into the hole OR tape the tube onto the box. The former is sturdier, while the taping method is faster but prone to tape failure.



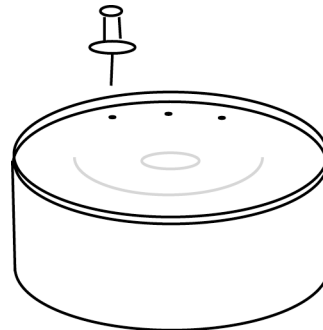
## Tubeolin (or tubeola)

- Materials**
- A sturdy cardboard tube anywhere from 18” to 30” long. Each tube should have three slits cut into both ends (see illustration)
  - 1 clean empty 5.5 oz. dog food or cat food can (small flattish ones)
  - A thumbtack
  - 3 lengths of fishing line (the thicker the fishing line, the better the sound – 40-60 pound test line works best) about 6-10 inches longer than the cardboard tube

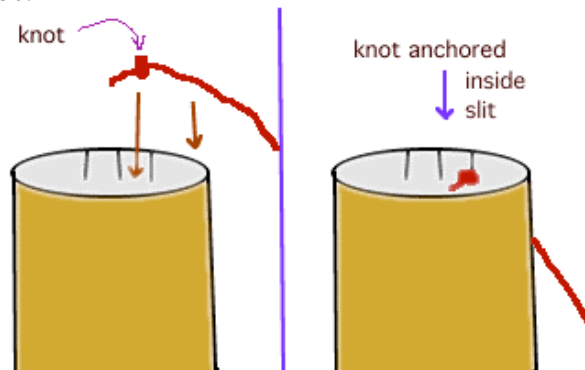


### Procedure

Use the thumbtack to poke three holes in the bottom of the can. The holes should be pretty close together and all in a line. Holes should be big enough to allow the strings to go through them.



Tie a double knot at one end of one string. Slide this knot into one of the slits on the tube, with the knot on the interior of the tube.



Push the string through one of the holes on the can, and tie a double knot at the unattached end of the string. Make sure this knot is close to where it will fit into the slit at the other end of the tube.

Slide the knot into the slit (make sure it corresponds with the slit at the other end of the tube or your strings will all be crossed).

Slide the can along the string toward the end of the tube. The string should be nice and tight and make a nice sound. If it is too loose, pull the knot out of the slit and tie another knot to make it tighter.

Repeat the process for the other strings, trying to make each string either tighter or looser so that you get three different pitches.

To increase the stability of the can resonator, you may want to slightly bend the side of the can to fit the curve of the tube.

### Bottle-bass

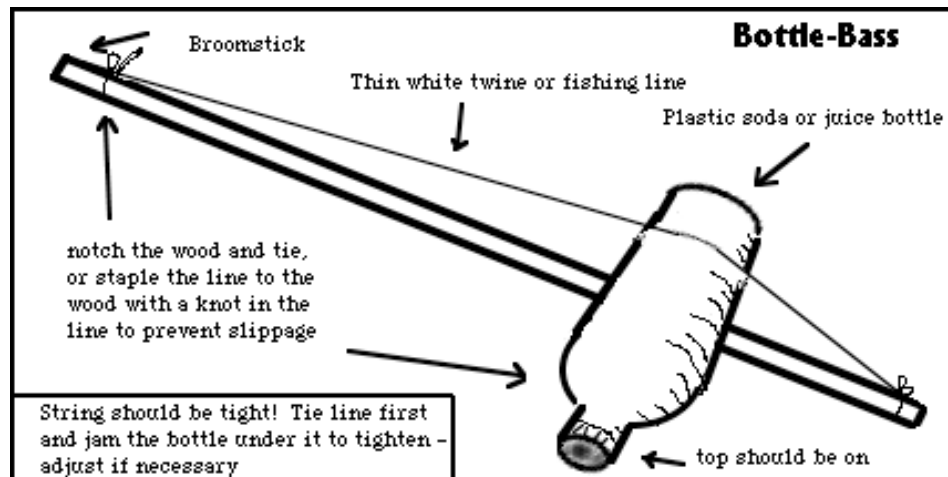
- Materials**
- Broomstick
  - Thin white twine or fishing line
  - Plastic soda or juice bottle

### Procedure

On the broomstick, make two notches, one at each end of the stick.

Tie the twine or fishing line to the stick, stapling it at each end with a knot to prevent slippage. The string should be tight.

Insert the bottle between the string and the stick, about two-thirds of the way down. Be sure that the top of the bottle is on. Adjust the string if necessary.



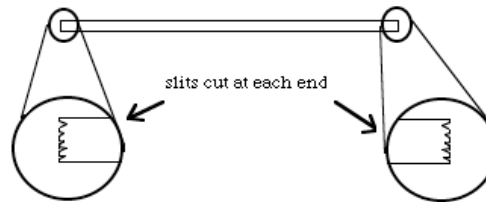
## Bow

**Materials**      Wooden paint stirrer  
                         Fishing line  
                         Small block of wood  
                         2 twist-ties

**Tools**            Coping saw

### Procedure

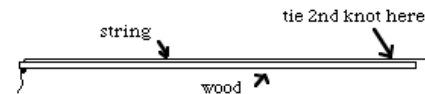
Using the coping saw, cut small notches on one end of the stirrer and a corresponding number on the other end.



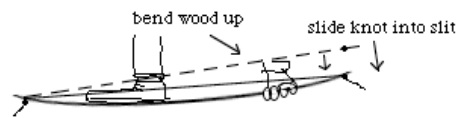
Cut a length of fishing line slightly longer than the paint stirrer, and tie a knot at the end of the length of line. Slip the knot into one of the notches and pull it tight.



Stretching the line along the paint stirrer, tie another knot slightly shorter than the stirrer.

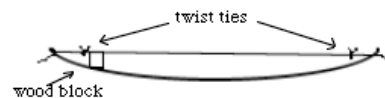


Bending the stirrer slightly, slip the other knot into a notch at the other end of the stirrer. The bow should look kind of like a toy bow to shoot arrows.



Knot more lengths of fishing line and slip the knots in the notches as before, being careful to keep the original tension on the bow.

Gather the lines together at either end using the twist-ties. Slip a piece of wood between the lines and the wood to give additional structural strength.



Consider rubbing the line with something to make it sticky, such as rubbing it with pencil eraser (if you have real bow rosin that definitely works best).

## Percussion

### Coffee can drum, shaker and scraper

**Materials** Coffee can with lid  
A small handful of rice or beans  
Pencil

#### Procedure

Put the rice or beans inside the can and close the lid.

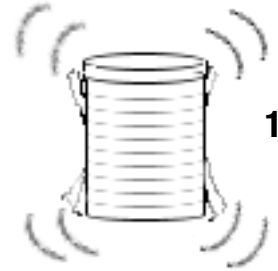
#### To play

Shake it (1) – it’s a Maraca (idiophone).

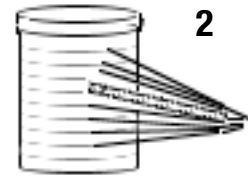
Scrape the ridges on the sides of the can with a pencil (2) – it’s a Guiro (idiophone).

Hit the plastic lid with the pencil (3) – it’s a Drum (membranophone).

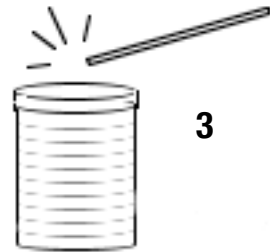
Hit the metal bottom with the pencil (4) – it’s a Steel Drum (idiophone).



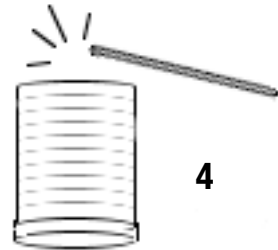
1



2



3



4

### Can drum set

**Materials** Tin cans of different sizes  
Tape or rubber bands  
Pencil

#### Procedure

Tape or rubber band the cans together with the metal bottoms facing up.

#### To play

Hit the metal bottoms with the pencil (5).

#### Variation: Marching drums

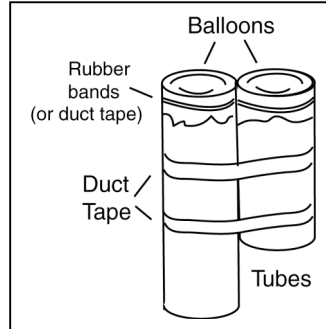
Tape or tie some string to the sides of the can drum set so that student can wear the drums around his/her neck and march around with them.



5

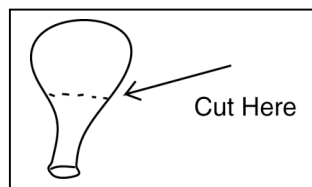
## Balloon drums

- Materials**
- Two sturdy cardboard tubes, approx. 2.5” – 4” across the top. The tubes should be longer than 6”; different lengths are best
  - Two 10”-12” balloons
  - Sharp scissors
  - Duct tape
  - Rubber Bands (or you can use duct tape instead)

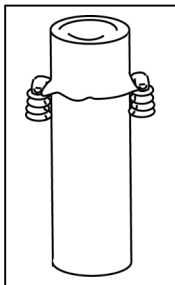
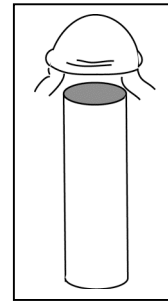


### Procedure

Cut the balloons as shown and discard the valve.

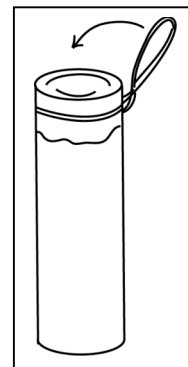


Stretch the “cap” of the balloon over the open end of the tube:



Pull the balloon as hard as you can down the tube. The tighter you stretch the balloon, the higher the pitch, and vice versa.

Wrap a rubber band tightly around the balloon to prevent it from slipping (you can use duct tape instead).



Wrap duct tape around the tubes to hold them together as shown in the first illustration (two lengths of duct tape ensures better stability).

When playing the tubes drums, hold them between your legs for better sound. Lightly tap on the balloons with your fingers (don’t use a pencil or stick). For a louder sound you can pinch a bit of balloon and pluck it.

## Woodwinds

There are two main kinds of woodwinds in the orchestra – flutes and reeds. In our version of flutes, the bottles and straws are used to make panpipes. Transverse flutes are very difficult to build since they require drilling holes – tough in metal, downright dangerous in PVC plastic because of the toxicity of the shavings. In our version of reeds we will be using straws to make double reeds – like oboes (single reeds are quite difficult to make, requiring very fine crafted mouthpieces).

### Bottle flutes

**Materials**      Tape  
                         Several plastic soda bottles  
                         of different sizes



### Procedure

Tape the bottles together in a row from smallest to largest with the open mouths facing up. Try to have the mouths on an even plane for ease of blowing.

### To play

With your bottom lip lightly touching the rim closest to you, blow over the mouth of the bottle so that some air goes into the bottle and some over it – this may take some practice!



Try to split the airstream with the farther rim of the bottle

### Variation

Turn the set of bottle flutes over and hit them on the bottoms with a pencil. They become a nice drum set.

## Diatonic (major scale) straw panpipes

<b>Materials</b>	Straws
	Scissors
	Rulers
	Modeling clay (such as Sculpey)
	Duct tape (or masking tape)
	Chopsticks (or popsicle sticks, tongue depressors, etc.)

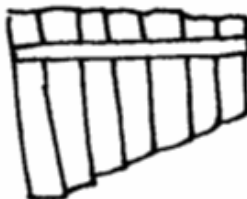
### Procedure

Cut a piece of straw, block off the bottom with your finger and blow over the top (optional – check the resulting pitch on a piano and trim the straw to the desired pitch).

Close the bottom of the cut straw with the modeling clay. [Alternative methods: Use a hot glue gun to close off the straws; or leave the straw longer than you need, fold the straw at the desired length, and use the duct tape to keep the straw folded.] Note that the pitch may change slightly as your clay [or glue] stops up the bottom.

Cut other straws by using the whole-step/half-step ratio to get the correct pitches for a diatonic scale. Following are possible straw lengths to create a straw panpipe (all lengths are approximate):

- 5 inches (12.8cm)
- 4 and 4/16ths (11 cm)
- 3 and 14/16ths (9.8 cm)
- 3 and 10/16ths (9.1 cm)
- 3 and 3/16ths (8.1 cm)
- 2 and 13/16ths (7.2 cm)
- 2 and 8/16ths (6.5 cm)
- 2 and 5/16ths (6 cm)



Lay a long strip of duct tape, sticky side up, on the table. Place the straws on the duct tape in size order, with the open ends even and the closed ends staggered. You may wish to separate the straws slightly as you lay them on the tape to make it easier to blow a single pitch.

Place the chopstick (or other stick) across the straws and wrap the tape around it. The stick acts as a stiffener.

Building this instrument is a math exercise in itself. The process of measuring the straws gives students more experience in working with rulers and precise measurements. The structure of a major scale in whole steps and half steps can shed some light on the nature of musical scales. For more advanced students, they can begin to find ratios in measurement by starting with longer or shorter straws (e.g., what would the measurements be if you started with the first straw being 7 inches long? 3 inches long?).

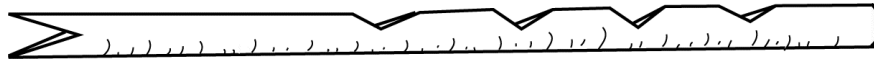
Remember, the intervallic structure of a major scale is:

- fundamental** (lowest pitch)  
Whole step to the
- second**  
Whole step to the
- third**  
Half step to the
- fourth**  
Whole step to the
- fifth**  
Whole step to the
- sixth**  
Whole step to the
- seventh**  
Half step to the
- octave**

These whole and half steps correspond to the keys of the piano, with the half steps being those where the keys are adjacent to each other; whole steps always skip a key.

### Straw oboe

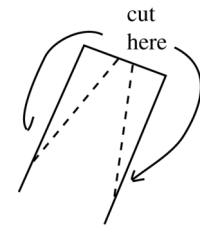
- Materials**
- Plastic straw
  - Scissors



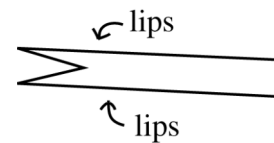
### Procedure

Flatten one end of the straw between your fingers. Using the scissors, cut the corners of the flattened end of the straw.

Put your lips on the straw with the open parts to the side. Bite down with your lips a little bit and blow. You should hear a buzzing sound. If not, try: moving your lips a bit up or down the straw; tightening or loosening your lips; re-cutting the straw at a slightly different angle.



When you have gotten a good steady sound, cut some tone holes (four holes is about right). Using the scissors, make a cut in the middle of the straw at an angle, and then from the other side until a diamond-shaped hole appears.



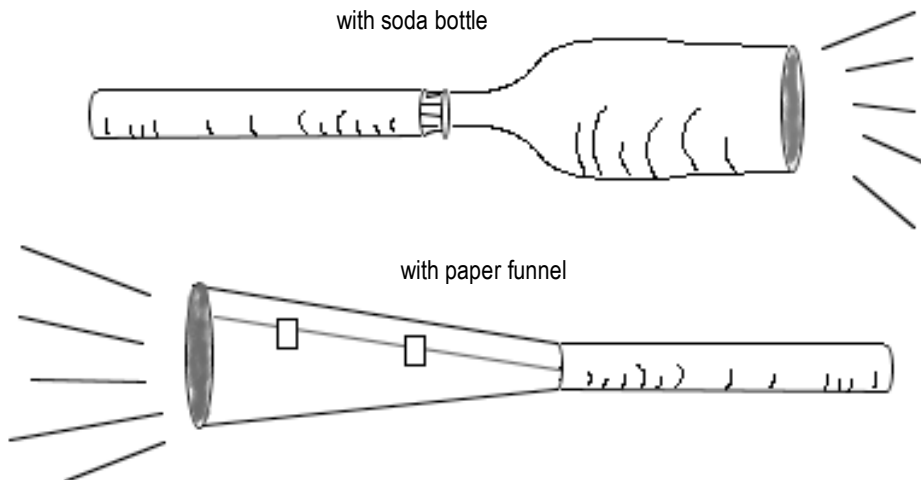
## Brass

All brass instruments are played by buzzing lips and blowing into a tube. How the tube is constructed determines the kind of sound that results. The length of the tube affects pitch. The width of the tube, and its shape (cylindrical; conical) affects the timbre. As we build our instruments, this is important to keep in mind.

Brass instruments can get different pitches in two main ways – natural overblowing using the harmonic series (bugle, hunting horns) and changing the length of the tube (valves, slides). The same works with our instruments, with some limitations. Only quite long cardboard tubes are going to be capable of overblowing even a single pitch beyond the fundamental. Most others will get only a single note really well. As for slides, it can be hard to find cardboard tubes that nest just right so that they move freely and are relatively airtight, but it is worth it for the wonderful pitch changes that they produce.

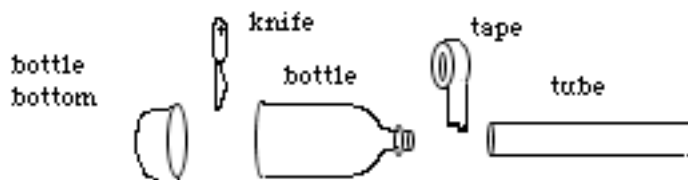
### Tube horns

**Materials** Cardboard tube - paper towel, wrapping paper, etc.  
 “Bell” (the funnel-shaped thing at the end of a horn) – either a soda bottle or construction paper (or file folder) and tape

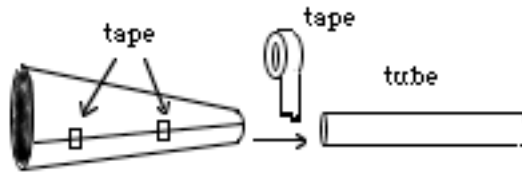


### Procedure

If you use a soda bottle: Cut off the bottom end of the soda bottle with a sharp knife and tape it on to the end of the tube. Make sure the bottle top is off!



If you use construction paper or file folder: Shape the construction paper into a cone so that the small end will slip over the end of the tube. Tape it into place.

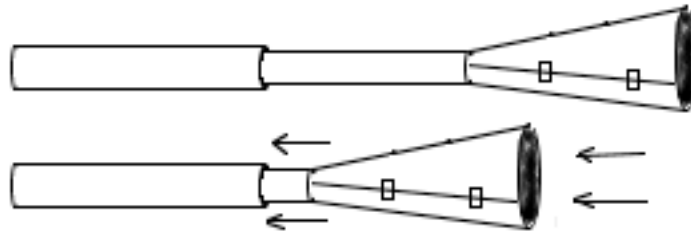


### To play

Buzz your lips into the tube. The cone of the bottle or the paper should make it louder.

### Variation

If you have another tube that fits snugly inside the other but still slides freely, then you have a Tube Trombone!



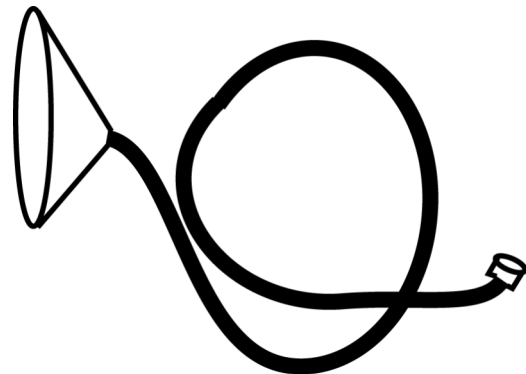
### French hose

- Materials**
- Length of garden hose, preferably 5/8" – 3/4" width (if it is smaller, then it must have the screw-end "mouthpiece")
  - Duct tape
  - File folder, or soda bottle with bottom cut off (as used above in the tube horns)

### Procedure

Shape file folder into a cone (or use a bottle) and attach to non-mouthpiece end of the hose using the duct tape.

If the hose is long enough, you should be able to get several overblowing tones like a bugle.



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## Additional Resources

### Assessment tips

An orchestra may be interested in finding out how its various constituencies respond to the Ford Made in America educational activities it chooses to offer. Assessment efforts can help orchestras improve their educational offerings and help them create deeper connections to the communities they serve.

#### Simple surveys

Most of the respondents you will deal with will have limited time and investment in giving you detailed feedback; a simple survey can offer them the chance to let you know their thoughts and feelings in an economical fashion. Below are three questions which could stimulate thoughtful answers and which have proven useful in educational settings:

1. What did you learn?
2. What else could have improved your experience?
3. What else would you like to learn about?

Arranged on one page, with ample space for responses and customized for the particular program or event, this survey may well provide your staff and musicians with valuable feedback.

#### Focus groups

Orchestras interested in learning more about their audience's experiences may wish to conduct a focus group directly following a series of educational interactions. This group could be facilitated by staff or by an independent consultant. The questions used in the simple survey provide an outline for the discussion, with the obvious advantage of being able to follow up on responses and pursue subjects as they arise in the discussion. If it is possible, a videotape of the session can prove invaluable to the orchestra as it reflects on its work.

#### An outside eye

Perhaps the most sophisticated form of assessment involves hiring an outside consultant to observe an orchestra's educational programming and provide critical feedback to the orchestra. (Important to note: the consultant may encourage the use of both surveys and focus groups, so it might not be a substitute for other forms of assessment!) Crucial to such an undertaking is the ability to plan extensively with the consultant to ensure familiarity with the orchestra's goals and objectives. Outside consultants should only be hired in instances when a genuine exchange is anticipated, and the expectation is that the findings will be used to improve the orchestra's educational offerings.

### NOT JUST FOR FUNDERS

Assessment is often undertaken to satisfy funders or to meet the requirements of a grant. But good assessment is present in any healthy teaching and learning situation. As orchestras strive to become bet-

ter educators in the communities they serve, they can also learn to reflect on their own practice in increasingly meaningful ways.

## Sharing your experiences

It is now easier than ever to share the work that you do with the rest of the Ford Made in America consortium and your community. If you take video or photographs of these educational activities, please go to [www.FordMadeinAmerica.org](http://www.FordMadeinAmerica.org) for instructions on how to send these to our web site team. We will post your documentation on the Ford Made in America YouTube and Picasa pages for the entire world to enjoy!

## Common musical terms

***a cappella*** – music that is sung without accompaniment

**augmentation** – the repetition or imitation of a theme in notes of longer time value

**composer** – a musician who creates music to be performed

**development** – the process of varying and/or elaborating a musical idea

**diminution** – the repetition or imitation of a theme in notes of shorter time value

**improvisation** – the spontaneous act of creation

**legato** – playing in a smooth, even manner; connecting the notes as they are played

**melody** – a sequence of pitches, recognizable as a phrase and with a distinct rhythm

**ostinato** – a short musical phrase or melody that is repeated over and over

**staccato** – playing in a choppy, clipped, or separated manner

**timbre** – the character or quality of a musical sound or voice as distinct from its pitch and intensity

**variation** – the repetition of a musical theme with modifications of melody, rhythm, or harmony

## National Standards for Music Education

1. Singing, alone and with others, a varied repertoire of music
2. Performing on instruments, alone and with others, a varied repertoire of music
3. Improvising melodies, variations, and accompaniments
4. Composing and arranging music within specified guidelines
5. Reading and notating music
6. Listening to, analyzing, and describing music
7. Evaluating music and music performances
8. Understanding relationships between music, the other arts, and disciplines outside the arts
9. Understanding music in relation to history and culture