

**Instrumental Music Faculty Workshop  
Professional Development**

**Prepared for the Compton Unified School District  
Presented by the Faculty of  
California State University Dominguez Hills**

**Monday August 6, 2011  
String Instruments – Dr. Sylvia Lee Mann**

**“Tips and Tricks for Caring for String Instruments”**

**Agenda:**

Welcome and Introductions

The Hazards of the Strings

Instrument Basics

Your Toolbox

Practical Skills

Conducting “Mini-workshop”

Bonus– pdf reprints of last year’s workshop booklet will be available online soon  
(see website info below)

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\*You and your students are invited to participate in the CSUDH Orchestra!

## **Basic Repair/Maintenance Tools:**

6” millimeter ruler

Toothbrush

Rat tail file

Pencil

Chalk

Peg Dope (wax/compound/lubricant)

Needle Nose pliers

Scissors

## **Additional handy items:**

“fingering tape”,

chin rests, shoulder rests,

chinrest wrench (or huge paperclip) soundpost tool,

soft cloths,

super glue, wax (or soap), hide glue, wood glue, clamps

duct tape, tiny screws.

Bridges, tail pieces, extra fine tuners.

## **Resource book – highly recommended:**

Basic String Maintenance: A Teacher’s Guide, by Harold Turbyfill , American String Teachers Association

## **Bridges**

Warped Bridges are preventable!

Check the students' bridges at each class meeting: look for the proper angles to the top of the instrument, the fingerboards and alignment to the inside notches of the "f" hole.

Use a "pinching method to adjust. Loosen strings if necessary.

Lowest side of bridge = highest string.

If the bridge has become warped it can be straightened. Place in hot boiling water for 30 minutes. Remove from the water, wrap in paper towel, clamp to a table top or place heavy books upon it. Note – this can affect the tonal qualities – but if the budget will not withstand the cost of new bridges, it can fill the gap!

Re: adjustable bass bridges: These sometimes become difficult to move. If this happens, remove the bridge carefully and apply powdered graphite or bar soap to the threads, then replace the bridge.

## **Pegs**

Make certain strings are wound in the right direction (Toward the peg thumbpiece), and pegs are properly fitted. Chalk is a good remedy for slipping pegs, or commercial "peg dope". Soap or commercial peg lubricant works for sticky pegs. Some people use peg drops. I do not recommend them. Sometimes they stop the pegs from slipping – but cause the peg to be completely stuck! Refitting pegs is usually a professional task, I recommend *Morey's Music Store, Inc.* 4834 Woodruff Avenue, Lakewood CA 90713 Telephone: 562.420.9532 or *J Brown Violins* in Claremont, 232 1/2 N Indian Hill Blvd Claremont, CA 91711 (909) 624-0849

## **Fingerboard**

The slope/angle and the concavity (sometimes called "Scoop" or "Relief" are both important. These can be checked with a straight edge. If this is improper, professional repair/planning is needed.

## **Tailgut**

This can be easily replaced by the teacher, using the “Sacconi” or threaded tailgut. It is threaded and uses adjustable screws to fit. Make certain it is not too long. The end of the tailpiece should be right by the saddle on violins and violas.

## **Soundposts**

Made from spruce, must be fitted. **DO NOT PLAY THE INSTRUMENT IF THE SOUNDPOST HAS FALLEN.** It should be located directly behind the high string foot of the bridge, approximately half the thickness of the soundpost. Cellos and basses with laminated tops should have the soundpost slightly beneath the foot of the bridge to avoid damaging the top. (See more specific info later in this document)

## **Strings**

Types include Gut (not metal wound and metal wound); synthetic core (metal wound); steel core (metal wound); steel (not wound). I generally recommend the synthetic core strings if possible – the sound is richer, less harsh. But – sometimes, especially in elementary schools, metal wound steel are the most practical choice for longevity and ease of tuning. Note – if changing all the strings on an instrument – be sure to do it just one at a time. Do not take them all off at once.

## **Bridge and Nut String Grooves**

Sometimes grooves are too narrow, which can pull a bridge forward, and can cause a string to pull apart. Use large end of a rat tail file (**CAREFUL – NOT TO DEEPEN – JUST WIDEN THE GROOVE!**). When changing strings, rub some graphite from a pencil into the grooves in order to make a smoother surface for the strings. Note: the spaces between the grooves should be equal.

## **Fine Tuner**

These are actually made for use with metal core strings, to make them easier to tune with precision. Sometimes they can become loose and cause irritating buzzing sounds. Check frequently. Highly recommend – good quality tailpieces with built-in fine tuners.

## **Cleaning**

Make certain that students keep a soft cloth in their case and always wipe off the strings and instrument at the end of class. There are various polishes and cleaners available, but an ounce of prevention is worth a lot! If rosin has become caked up – sometime Murphy Oil Soap is a good product to use for removal. **NEVER USE ON THE STRINGS!**

## **Bow Hair**

Generally, rehairing the bow is great if hairs have broken and become dirty. But if there is still a good amount of hair, and the dirty area is (most likely) by the frog, cleaning the hair is much less costly. Mr Turbyfill's book contains complete directions. In general, I recommend getting the bow rehaired if possible.

A rare but important issue to be aware of is Bow Hair Bugs...these usually show up in cases of instruments and bows which have been stored for a very long time. If you know you have them, vacuum the case and treat very lightly with insecticide. Some people use mothballs...

### **Other bow issues:**

Camber (inward curve). Make sure students loosen their bows after playing to prevent loss of camber.

Eyelets: Made of brass, and can wear out. If they do, it's best to go to a repair person, who will probably have a variety of sizes (they are made with variations in thread widths, and are therefore sometimes hard to match! In an emergency case of a stripped eyelet, you can try removing it from the stick, rotating it 180 degrees, and returning it to the stick to try again. Sometime the eyelet simply becomes misaligned, causing a "wobbly" frog – in which case just loosen the bowhair, remove the frog from the stick and realign the eyelet .

Overstretched hair. In an emergency only, cut a small piece of cardboard and insert underneath the hair at the tip.

# Household Remedies for String Instruments

(Contributed by Emily Barkakati, Amelia Giles, and Tea Prokes)

## Cleaning The Instrument



Aside from wiping off your instrument and strings after you play, it is also important to occasionally take further steps to clean your fingerboard and strings. Two household items that can help you do this are rubbing alcohol and steel wool.



There are two steps to safely cleaning your fingerboard and strings with rubbing alcohol. First, cover the top of the instrument with cloth. Rubbing alcohol can damage the varnish on the instrument so it is important to **ONLY** apply the alcohol to the strings and fingerboard area. Second, wipe down the fingerboard and strings lightly with either a cotton pad or swab. Remove any excess alcohol from the fingerboard with a clean, dry cloth.

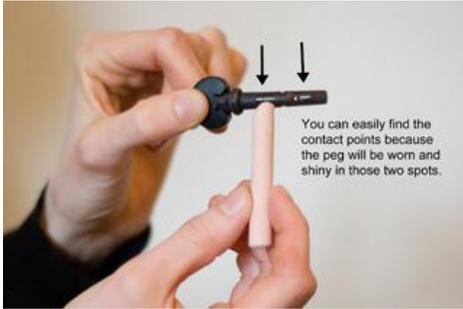


Steel wool is an effective way of removing caked on rosin from the strings. Gently wipe the area two or three times between the bridge and the fingerboard with steel wool. It is recommended to use this method of cleaning sparingly as the steel wool can eventually strip the strings.

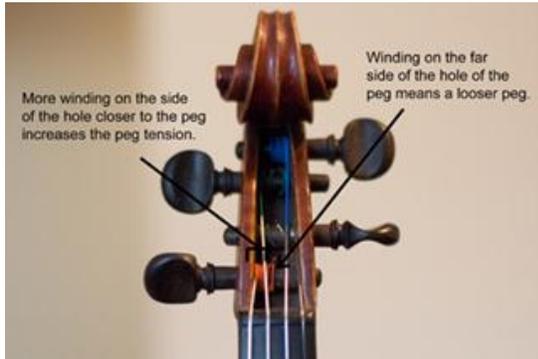


## String and Peg Tips

When changing a string, it is beneficial to rub pencil lead on the bridge and the nut of the fingerboard. The lead acts as a lubricant that can keep the string from cutting into the bridge and nut.



Chalk can help with slippery pegs. After removing the string, take the loose peg out of the peg box. Apply chalk lightly to the two areas where the peg comes in contact with the peg box. For sticky pegs, some musicians will use a black crayon in the same way to lubricate the peg.



How you wind your string can affect the tension of the peg in the peg box. If your peg is too hard to turn or slipping it can help to change the winding to change the tension accordingly. Consult the figure for further explanation.



A newly changed string can take days to stretch and stay in tune.

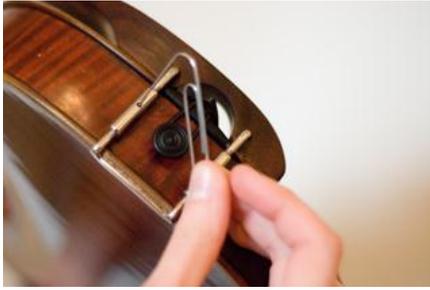
A simple trick to speed up the stretching process is to rub the string up and down between two fingers.

This helps to heat up the string, which in turn helps the string stretch faster.

### Miscellaneous Tricks



If you struggle with a sliding sponge or shoulder rest, a cut piece of drawer liner or non-slip rug pad can be placed between the sponge and the back of the instrument. A rubber band can secure the pad from slipping.



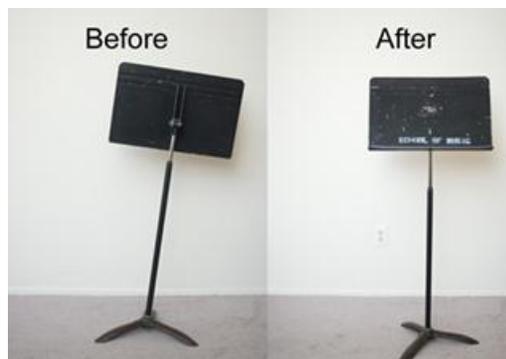
A large paper clip can be used to tighten or loosen your chinrest. If you aren't careful, it is easy to scratch the varnish behind the chinrest, so make sure not to insert the paper clip all the way through.



Some people find it more comfortable to add additional padding to the bow at the frog. While specialty products are available, you can easily slide a pencil grip or rubber tubing onto the stick and place it wherever is comfortable for your hand position.



A wobbly music stand can be easily fixed. Flip the music stand upside-down and tighten the base bolt with a wrench.



# Bridge Setup

## Placement



### Placement from f-hole:

The bridge should be placed in the center of the sound box (between the inside nicks of the f-holes.)

The measurement from the outer edge of the bridge feet to the respective inner edge of the f-holes should be equidistant on both sides. (This distance may vary depending on the design of the instrument)



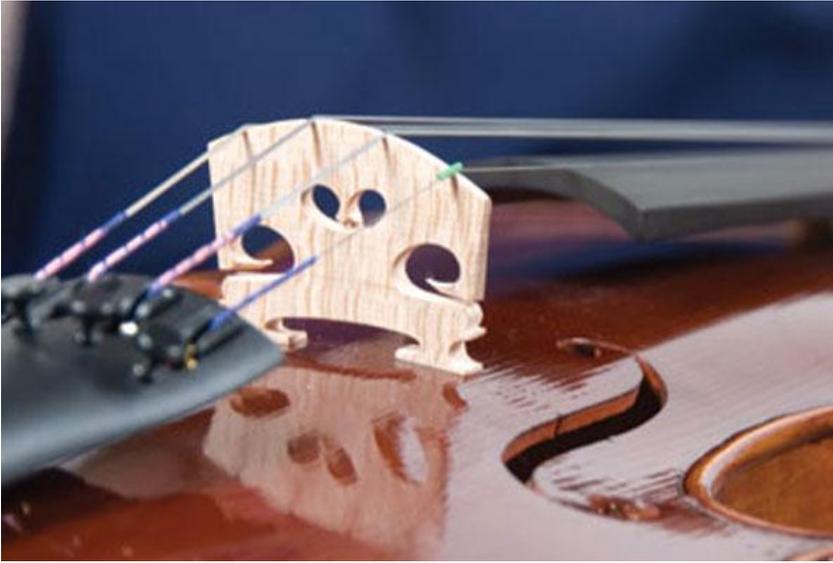
Placement from shoulder of top plate:

The distance from the shoulder of the top plate to the bridge is specific and should also be equidistant.

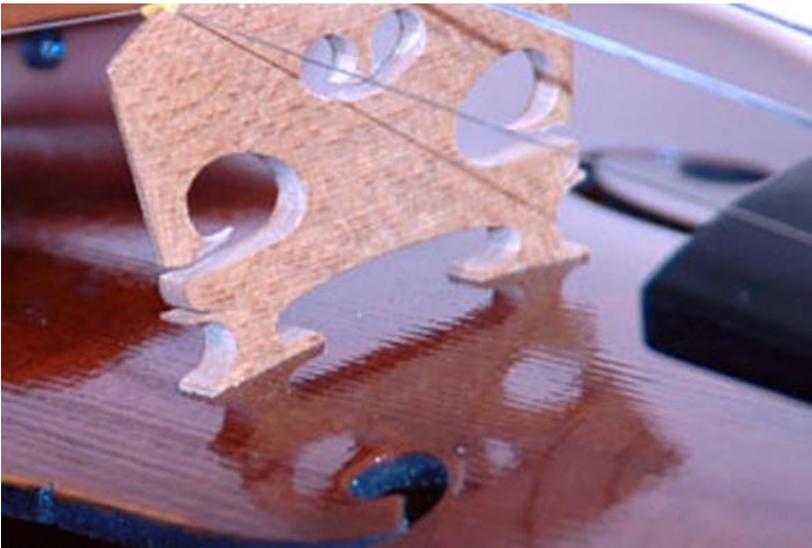
**Distance from Shoulder to Bridge (4/4 Size)**

<b>Instrument</b>	<b>Measurement</b>
Violin	193 - 196mm
Viola	220 - 222mm
Cello	400 - 403mm

## Proper Fitting



The arch of the crown and the fit of the feet must be perfect for ease of playability and good tone.



To achieve the correct string heights the crown of the bridge must conform to the shape of the radius of the fingerboard. (String heights determine the playability and response of the instrument.)

The bridge feet must conform perfectly to the top plate of the instrument to maximize tonal quality.

# Fingerboard Setup

## Horizontal Angle



The horizontal and vertical angles of the fingerboard are largely determined by the neck angle.



These angles are crucial to the playability and tonal qualities of stringed instruments.

The horizontal angle is measured by using two steel rulers held firmly against the neck. If the bridge is perfectly centered between the f-holes, the angle is correct.

## Vertical Angle

One way to measure the vertical angle is with two rulers. This measurement is referred to as the projection point.



If the vertical angle or projection point is too low, the bridge and strings will be too low. As a result, the sound will be small and lack projection caused by too little tension on the bridge.

### Correct Measurements (Size 4/4)

Violin	26 - 28mm
Viola	31 - 33mm
Cello	79 - 81mm



The vertical angle may also be measured at the highest point of the belly and at the end of the fingerboard. If the vertical angle is too high, the bridge and strings will be too high. Thus, the sound will be harsh and shrill caused by too much tension on the strings.

### Correct Measurements (Size 4/4)

Violin	19 - 22mm
Viola	22 - 24mm
Cello	62 - 64mm

## Relief & Radius

### *Relief*



The highest points on the fingerboard are at each end. The amount of dip between these points is referred to as relief.

Relief allows the strings to vibrate freely, thus contributing to good projection and playability.

Relief along the E string is less than that along the A, D or G. The relief along the G string is the greatest respectively.

### *Radius*



The radius of the fingerboard must be symmetrical, uniform in thickness, and equidistant from the top plate.

Bridge crown measurements are taken from the radius of the fingerboard. If the radius is incorrect the bridge will be incorrect.

# Scroll Pegs Setup

## Fitting the Pegs



Professionally installed pegs (ebony, rosewood or boxwood) should move evenly, easily, and stay in tune.



To check if pegs move evenly and easily, gently put pegs into peg holes (do not push hard). If they are well fitted, the pegs cannot be jiggled and will turn smoothly.



Pegs need to be properly lubricated from time to time for proper movement. We use Hill Peg Compound.

### **Professionally Fitted Pegs**



**All pegs need to be professionally fitted.**

For a perfect contact, the taper of the peg reamer and the taper of the peg shaper must match perfectly.



For a perfect contact, the taper of the peg reamer and the taper of the peg shaper must match perfectly.



To achieve a perfect fit, the bulk of the wood removed must be taken from the peg, not the peg box. A peg shaper is used to remove this wood.

# Soundpost Setup

## Placement



There are two crucial distances in the placement of the spruce sound post.

The first is the relationship of the soundpost to the bass bar. The soundpost and bass bar are usually equidistant from the respective edge of bridge foot. This measurement can be made with a cut business card.

The balance of the strings is affected by this distance.

If the post is moved to the right, the E-string becomes strong. When moved to the left, the G-string becomes strong leaving the E-string weak.

The second measurement is the distance of the soundpost from the backside of the bridge foot.

This distance is usually  $\frac{1}{2}$  the width of the bridge foot , or,  $\frac{1}{2}$  the width of the soundpost.

**Distance between edge of foot and bass bar (4/4size)**

Violin            1.0 - 1.5mm

Viola             1.5 - 2.0mm

Cello             3.5 - 5.0mm



This second measurement greatly influences tonal qualities.

When the post is positioned close to the bridge, the sound becomes bright and stiff. When placed further from the bridge, the sound becomes softer and darker.

**Distance of back of bridge to soundpost (4/4 size)**

Violin            2.0 - 2.5mm

Viola             3.0 - 3.5mm

Cello             5.0 - 6.0mm

**These measurements are the traditional beginning place for tonal adjustment.**

## Cutting and Setting the Soundpost

- Humidity, seasonal changes, or a poorly cut soundpost can affect the fit, or tension.
- If the post is too long or tight, the sound will be choked, harsh and stiff.
- If it is too short or loose, the sound will be muffled and shallow.



The angle, contact, fit and grain of the soundpost are critical to the full transference of sound and tonal qualities of the instrument.



The post must stand straight and be cut to have full surface contact with both top and bottom plates.



The soundpost grains must run perpendicular to the grains of the top plate.

# String Setup

## Heights



String heights are the distance between the strings and the top of the fingerboard measured at the end.

String heights are crucial to playability and projection.

Strings that are too low can buzz, while strings that are too high can be difficult to play.

### **Correct Standard String Heights (4/4 size, gut/standard)**

Violin (E) 3.2 - 3.5mm (G) 5.0 - 5.5mm

Viola (A) 4.2 - 5.5mm (C) 6.0 - 6.5mm

Cello (A) 5.0 - 5.5mm (C) 8.0 - 8.5mm

## Distance



Usually the distance from the center of the bridge to the fret of the tailpiece (after length) is  $\frac{1}{6}$  that of the length of the strings measured from the center of the bridge to the fret of the fingerboard (effective string length).

The distance of the tailpiece from the bridge influences the sound of an instrument.

If the tailpiece is too close to the bridge, the instrument will sound soft and weak; too far and the sound will be stiff and harsh. The tail gut is used to make this adjustment; never the bridge.

The weight of the tailpiece also affects the sound.

A lighter weight tailpiece usually allows an instrument to vibrate more freely. Thus the instrument will project more and have a more open, resonant tone.

## String Care and Installation



Both the placement of peg holes in the peg box and placement of string holes in the pegs are important for string performance and longevity.

There must be proper bottom clearance between the back of the peg box and the extra string length when wound on the peg.

Improperly placed string peg holes will make tuning very difficult.



Before installing new strings, rub nut grooves with a #2 pencil. This allows strings to slide easily and prevents breakage.

Replace strings one at a time. This keeps the bridge in place, avoids drastic changes to the top of the instrument and eliminates the possibility of the soundpost falling or moving.

Install string in tailpiece, then place string in the peg string hole.

Wind the string toward the peg cup. Strings will last longer if they do not rub against the peg box.

# **Extras**

**10 tips every orchestra director needs**

**Instrument Sizing Guide**

**Class Handout Sheet**

## Top 10 Things Every First-Year Orchestra Director Needs to Know

1. **Know the instrument repair basics, and be proficient enough to change a string or set a bridge quickly.** Have chalk, wax, and peg lubricant handy for troublesome pegs and making fine tuners work better.
2. **Be able to tune instruments quickly.** Nothing will eat up your rehearsal time faster than slow instrument tuning!
3. **Insist that instruments are quiet while you're tuning or rehearsing.**
4. **Anticipate problems in the music for a more efficient rehearsal.** Extract difficult rhythms and create an exercise away from the music before trying it within the parts.
5. **Set *attainable* goals for each rehearsal.** The students will feel a sense of accomplishment, and you'll be less stressed.
6. **Teach your students *how* to practice.** Just saying "go home and practice this" will not give you the results you want. Give them techniques and suggestions for creative and time-saving practice routines.
7. **Know the scores!** If your eyes are on the score constantly and not on your students, you're simply not prepared. Students know this in an instant. If you're not prepared, not only will the music suffer, but you'll lose the respect of your students.
8. **Strive for excellence, and don't settle for less.** Students will meet your expectations if they know that you're passionate about what you do, so keep them high.
9. **Establish an identity for the orchestra.** Little things make a difference! For example, if you share a room with the band, be sure to call the room the instrumental music room, not the band room. Have an orchestra bulletin board.
10. **Get to know and be on good terms with the maintenance staff.** Orchestras require a lot of equipment and often the use of many areas of the school. You'll find that the maintenance staff will assist you at critical times if you've established a good working relationship.

*by NAfME member Joyce Prichard, Director of Music and Fine Arts Chair  
Villa Maria Academy High School, Malvern, PA*

## Instrument Sizing



This section is intended to give you a rough idea of the size of instrument your child will require. Please note that this is a rough guide only..

### **Sizing Violins**

**Directions for Measuring:** With your child's arm fully extended and parallel to the floor, measure in centimeters from the neck to the middle of the palm.

#### **Size of Violin Measurement Average Age of Child**

1/16	35-38 cm	3-4
1/10	39-42 cm	4-5
1/8	43-46 cm	5-6
1/4	47-51 cm	6-7
1/2	52-56 cm	7-8
3/4	57-60 cm	9-11
4/4	> 60 cm	11-13+

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### **Sizing Violas**

**Directions for Measuring:** With your child's arm fully extended and parallel to the floor, measure in centimetres from the neck to the middle of the palm.

#### **Size of Viola Measurement**

12"	53-55 cm
13"	55-59 cm
14"	59-63 cm
15"	63-65 cm
15 1/2"	65-67 cm
16"	> 67 cm

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## Sizing Cellos

Sizing cellos is slightly more complicated than sizing violins and violas. The student should be sitting at the edge of a chair such that the knees are bent at a ninety degree angle. The upper edge of the instrument should rest in the centre of the chest (on the sternum) and the C peg should be slightly behind the left ear. The knees should lightly grip the lower bouts ensuring that the corners do not dig into the side of legs. (Corners should be slightly above the inside of the knees). The student should be able to reach both ends of the fingerboard with ease.

The chart below shows approximate sizing by age. Please note that there are two separate sizing systems for Cellos. The Suzuki sizing system is approximately equivalent to one size below the traditional European sizing system.

### European Sizing Suzuki Sizing Age of Child

--	1/10	3-4
1/10	1/8	4-5
1/8	1/4	5-6
1/4	1/2	6-8
1/2	--	8-10
3/4	--	10-12
4/4	--	12-13+

*Note: 7/8 size cellos are sometimes available as well. This can be a useful transitional size or a more comfortable option for those adults who prefer a slightly smaller instrument.*

## Sizing Basses

The 3/4 size bass is the standard size for adults. 7/8 size basses and 4/4 sizes basses are made but they are less commonly used. Occasionally we have 7/8 size basses available for rent. There are also smaller sizes available for younger students.

As a rough guideline, when both the bass and the player are standing upright, the bridge should be approximately at the same height as the large knuckles of the student's right hand. The most important issue is that the instrument is comfortable and that the student can reach the higher registers of the fingerboard without difficulty.

The chart below shows approximate sizing by age:

### Size of Bass Age of Child

1/8	5-7
1/4	7-9
1/2	9-13
3/4	13+

## **Class Handout: Care & Repair of Stringed Instruments**

Care & Repair of Stringed Instruments. **Below are several general rules stressed in class. These are rules that your child should follow at home.**

- Keep instruments dry and away from extreme hot or cold temperatures, including storage in a car. Since your instrument is made of wood, it could crack, warp, or the varnish could melt.
- Always store your instrument in a closed case when not in use. Your instrument is either in your hands or in your case!
- Keep instruments away from little brothers, sisters, friends or neighbors. Stringed instruments are extremely fragile and can be broken easily. *Your instrument is personal and should only be used by you or your orchestra teachers.*
- Label your instrument case with your name and address.
- Your case should only be opened when it is sitting flat on the floor at home or in class.
- If you have a soft cello or bass case, be sure to take the bow out first and then the cello/bass. When you are done playing, put the cello/bass in first and then the bow. Also, return the endpin to its closed position before returning your instrument to its case.
- Tighten your bow before playing by gently turning the tension screw. Avoid making the bow hairs too taut. The separation between the bow stick and hair should be about the width of a pencil.
- Always loosen the bow hair before storing it in the case.
- To avoid broken strings, the tuning pegs should only be turned by your orchestra teachers.
- If your bridge should fall down or you come across another problem with your instrument, please show it to your teacher as soon as possible and do not try any repairs on your own. Your teacher may be able to correct the problem and will notify you if the instrument needs the attention of a professional repair person.
- Rosin your bow hair once a week at home during your practice time.
- Do not touch the bow hair with your hands or allow it to make contact with your face or neck. The oils in your skin stick to the horsehair and make it unplayable.
- After playing, gently clean it with a soft cloth to remove rosin build-up on the strings.
- Polish is rarely needed, and when necessary, only a commercial instrument polish should be used. Cleaning your instrument with furniture polish could damage the varnish and acoustics of the instrument.
- Please do not attempt any repairs yourself and never glue any part of your bow or instrument.

Please inform your orchestra teachers of any instrument problems promptly. We are sometimes able to do some repairs in our classrooms, saving you time and money, but we are not able to do it during instruction time.