Yaniv Segal

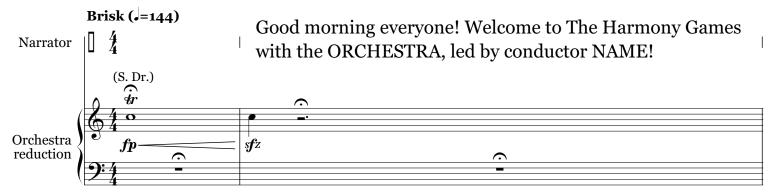
The Harmony Games

The Harmony Games

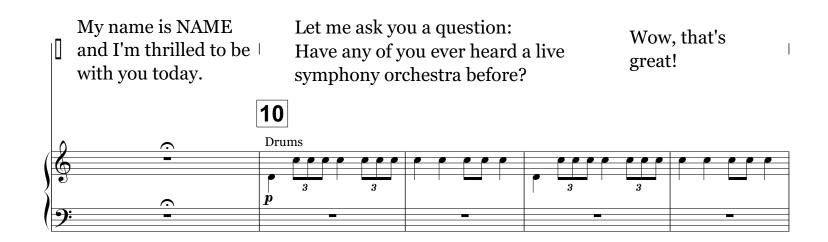
(2021 Revised Version)

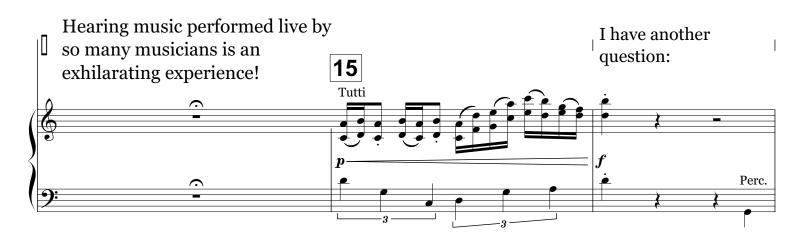
Yaniv Segal

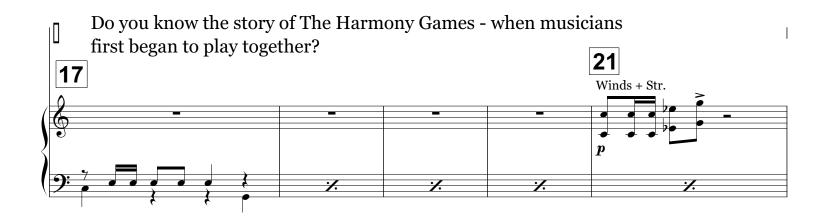
INTRODUCTION

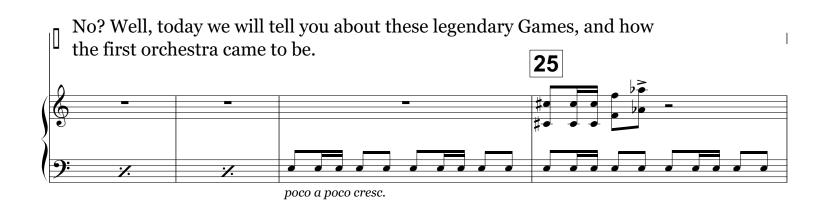








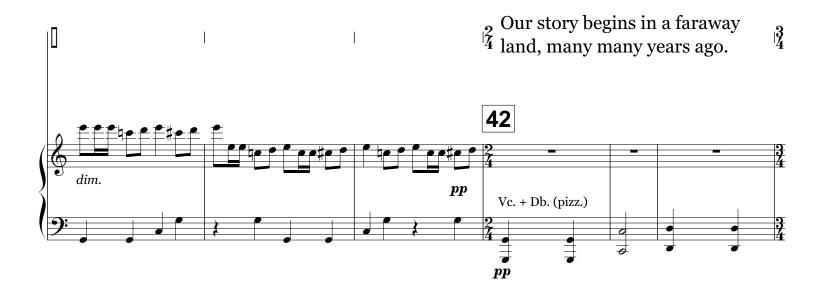


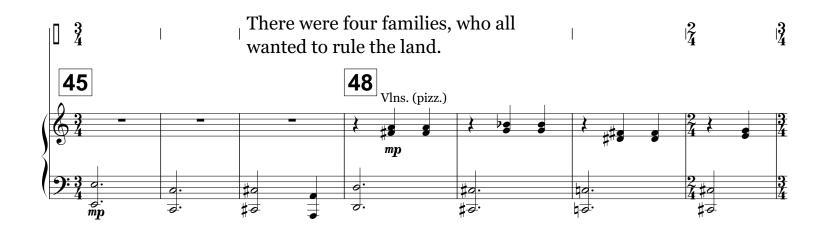




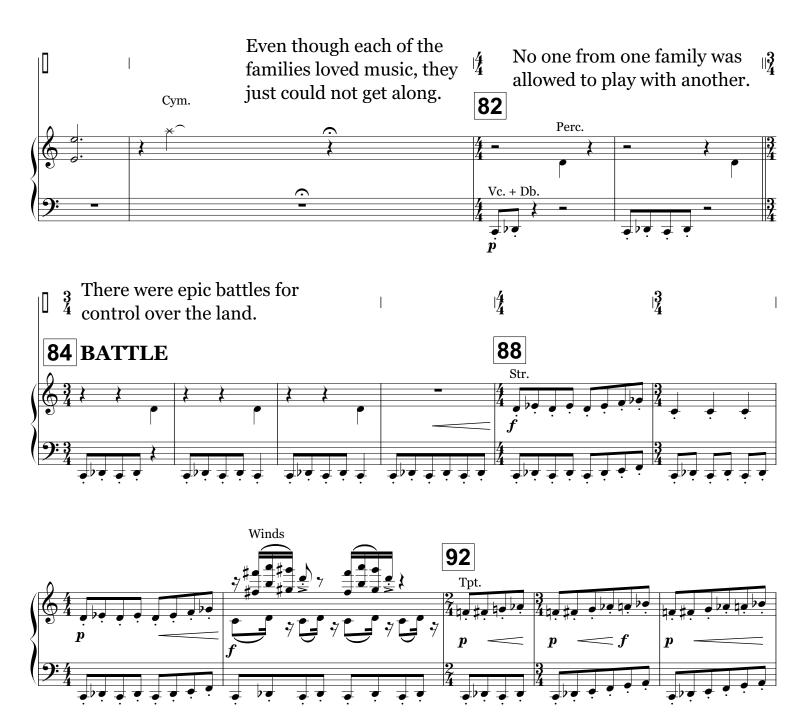


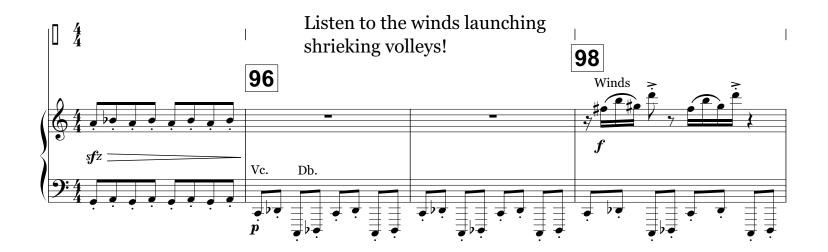




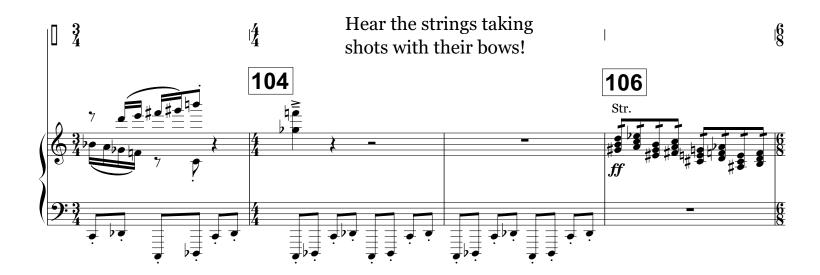






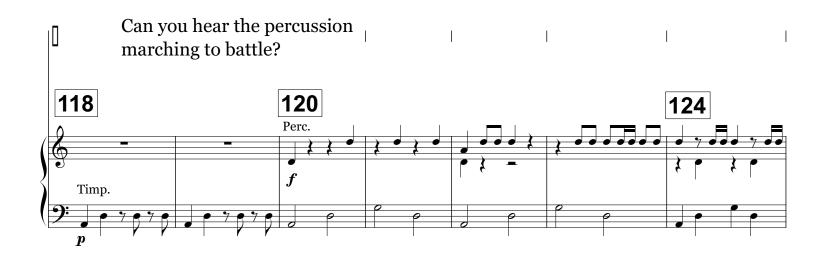




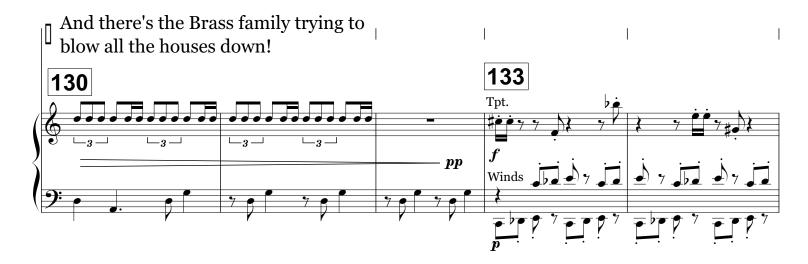


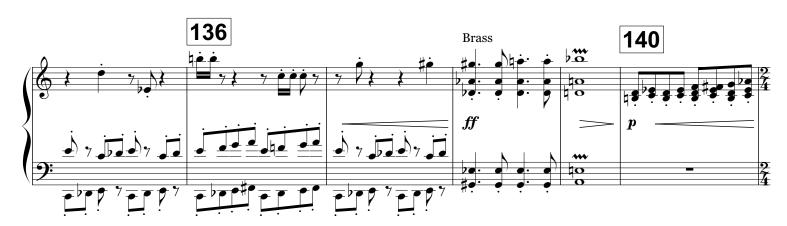






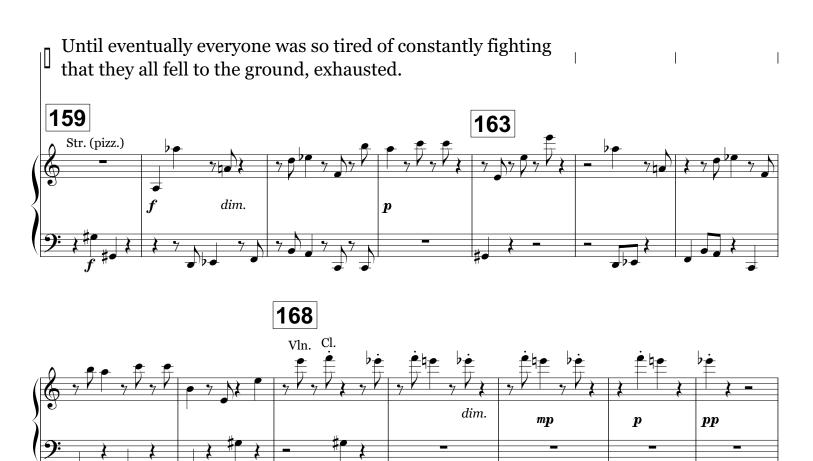


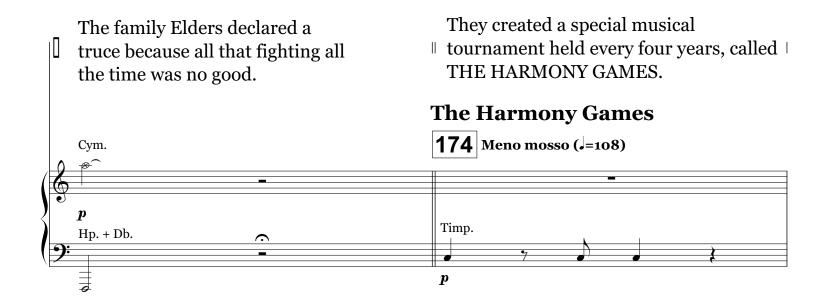


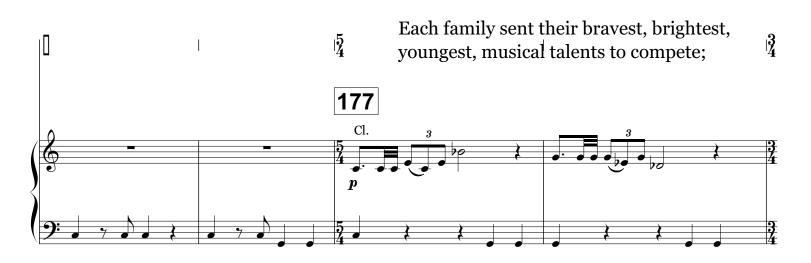


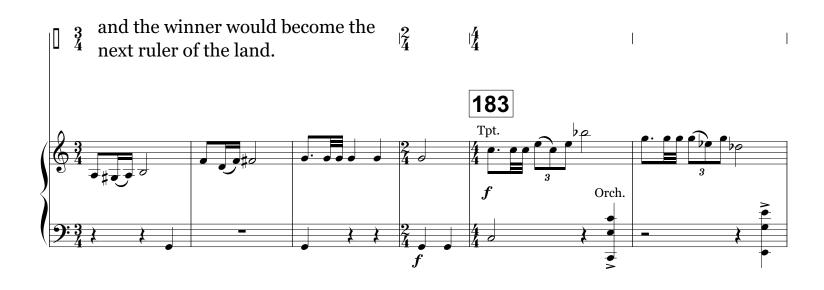




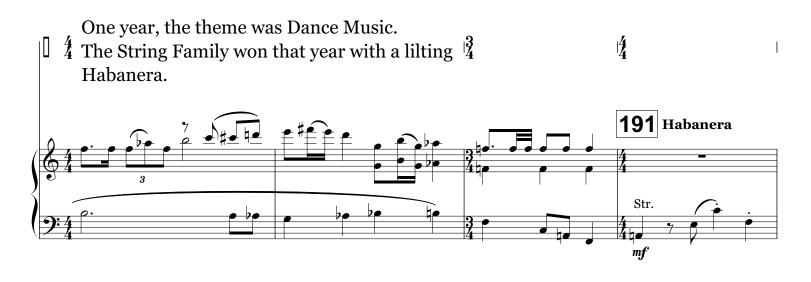








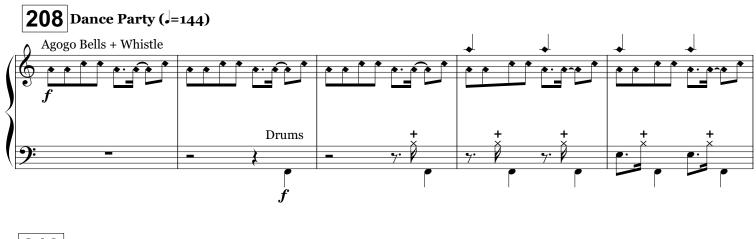










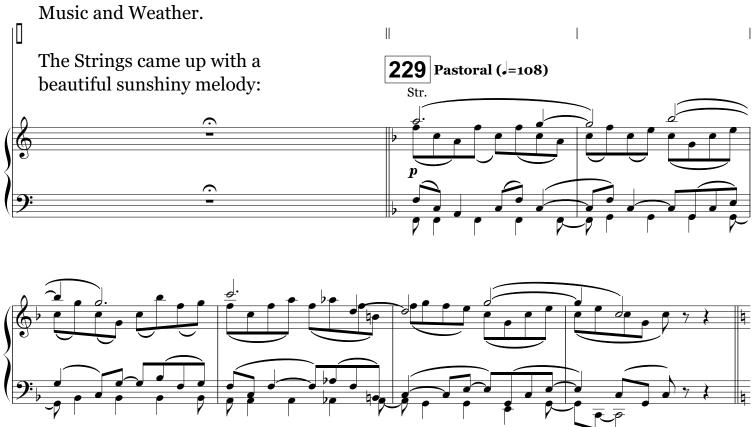


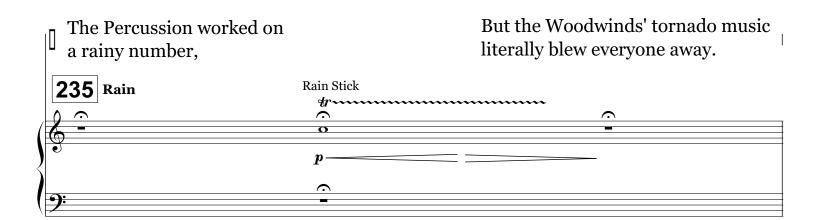


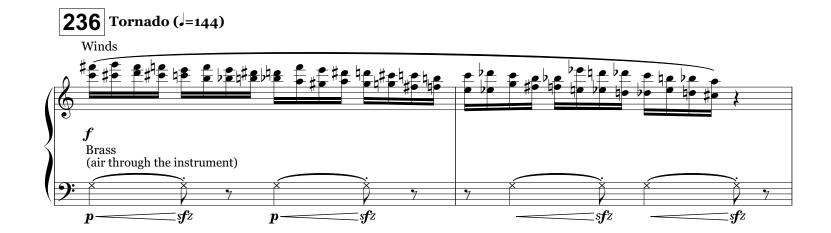




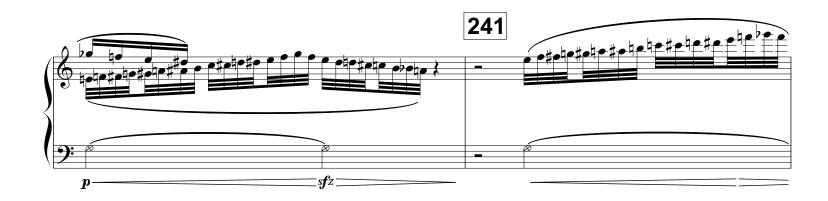
Last Games, the theme was Music and Weather

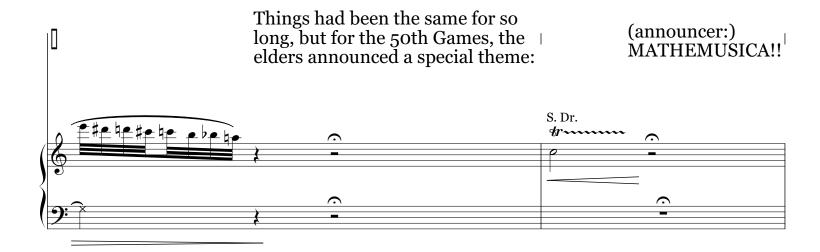


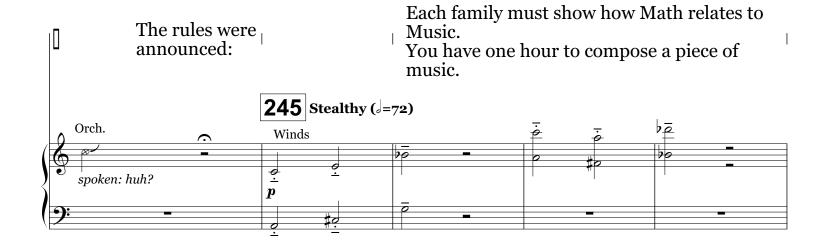


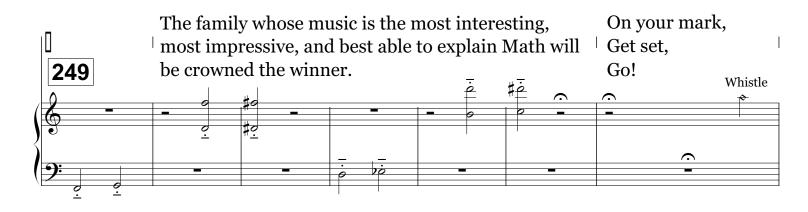






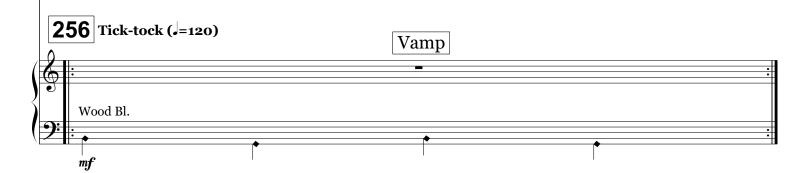




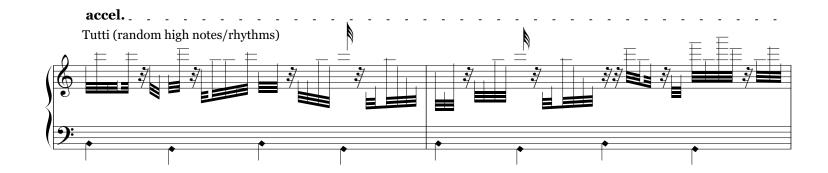


The families were in a panic.

"What does music have to do with Math?" they asked each other.
"Math is Math. Music is Music! What should we do? What should we do?"
Everyone started talking at once!



:||

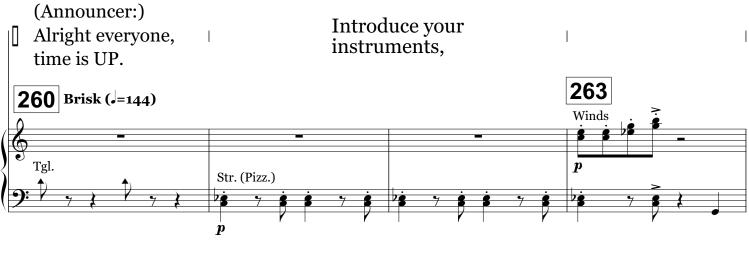


But quickly they settled down to work, focusing on their talents
and unique musical skills, knowing they only had one hour to
create the best piece of mathematical music to win!

Faster (=144)

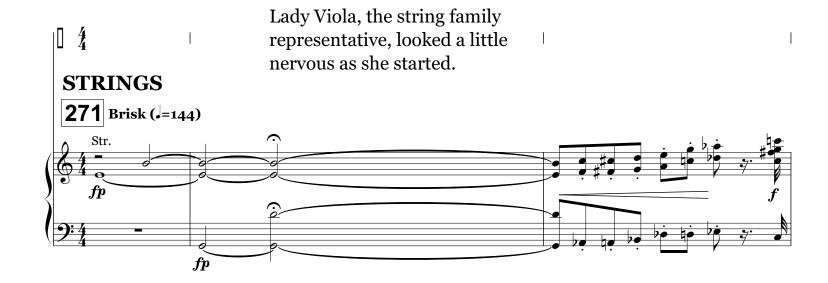
Vamp

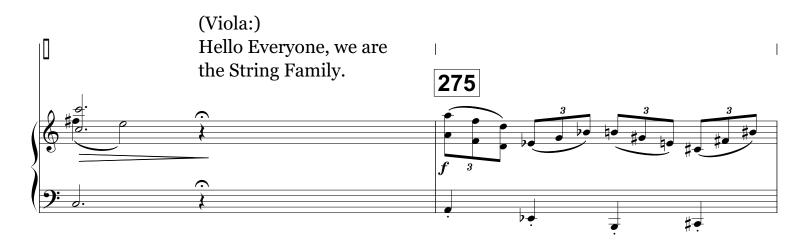
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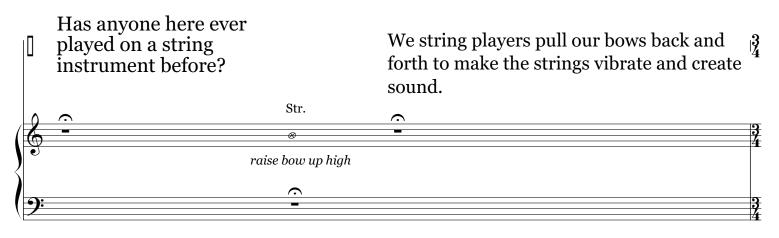


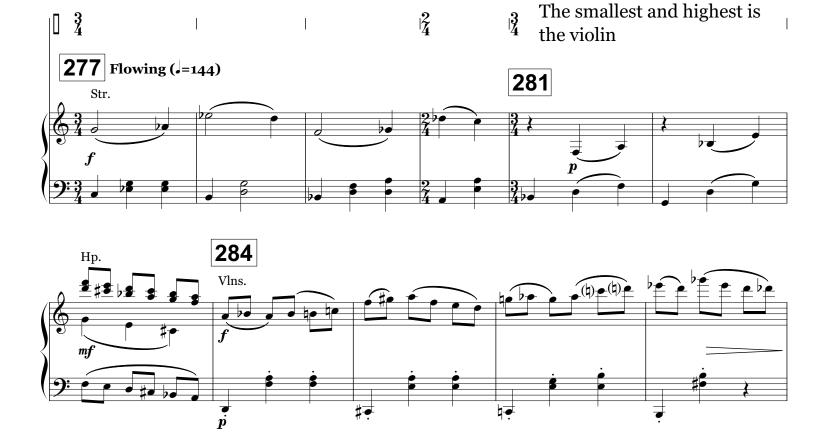


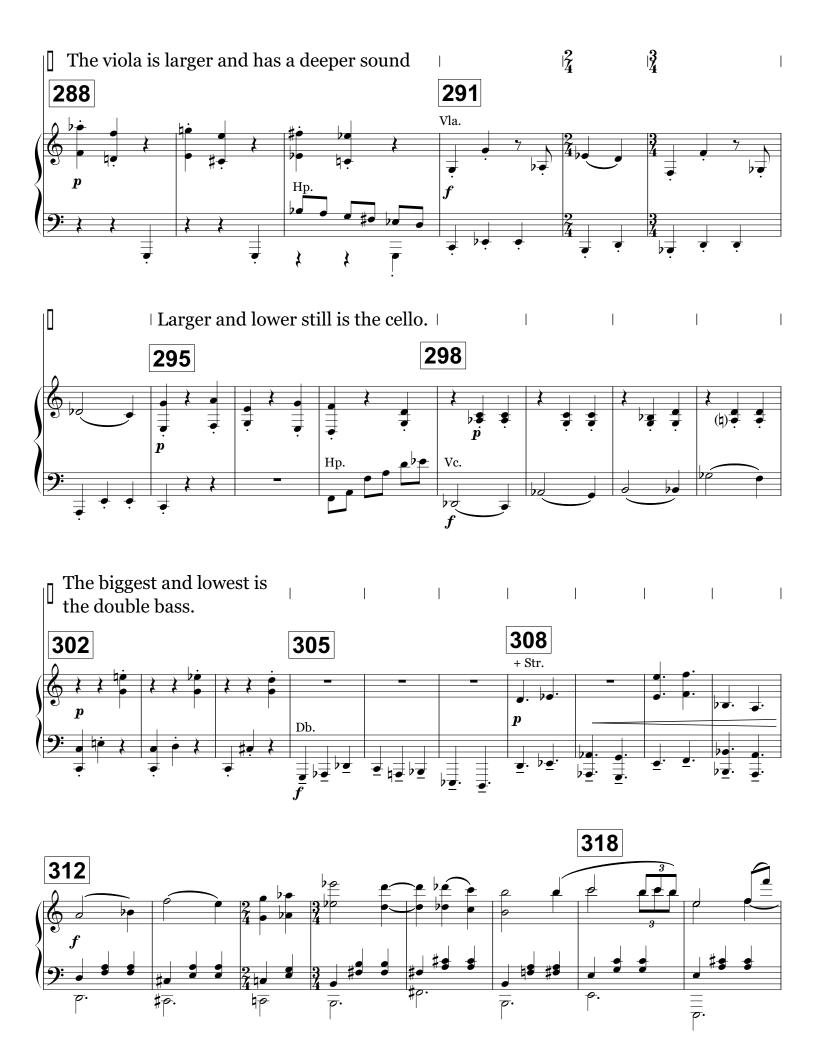


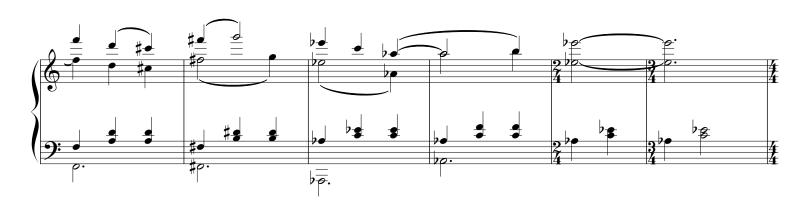


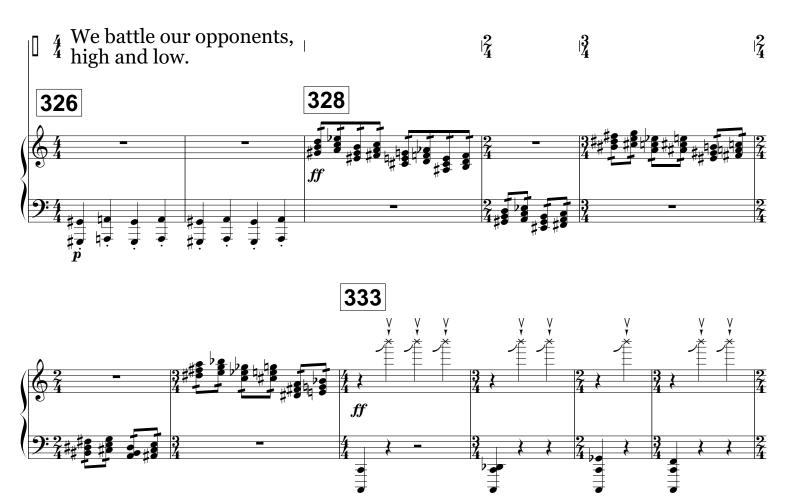
Oh goody, I see some hands, that makes me feel a lot less nervous.

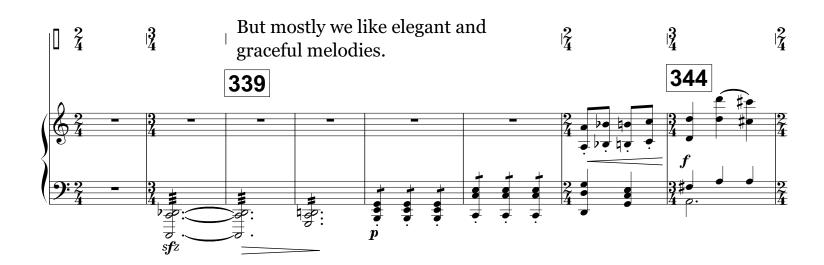








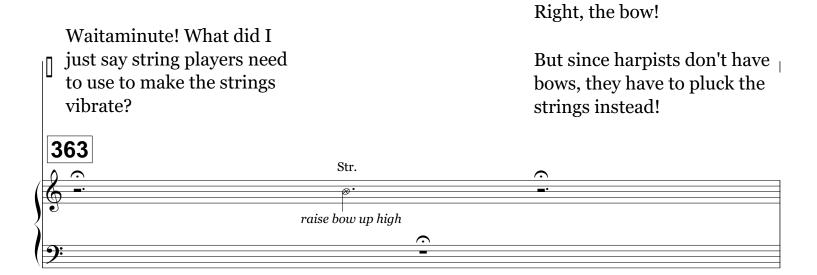


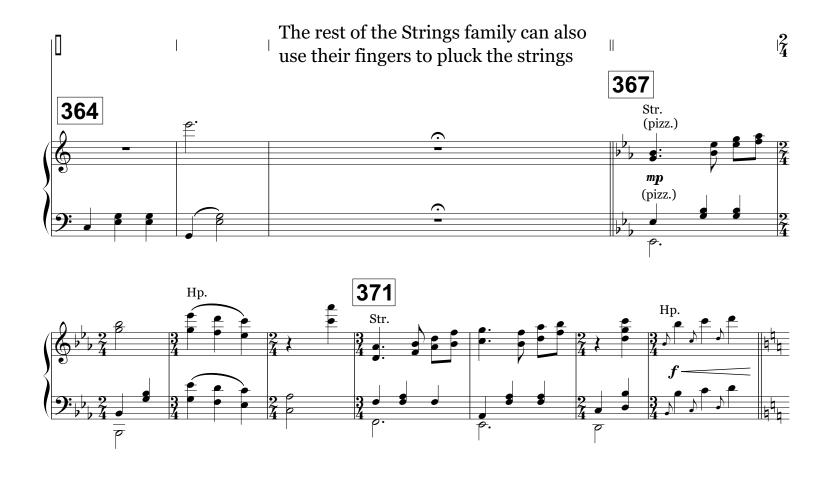


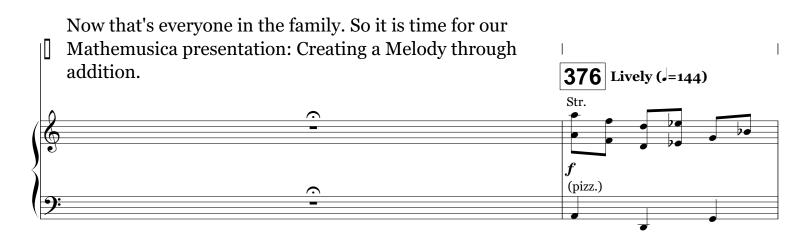


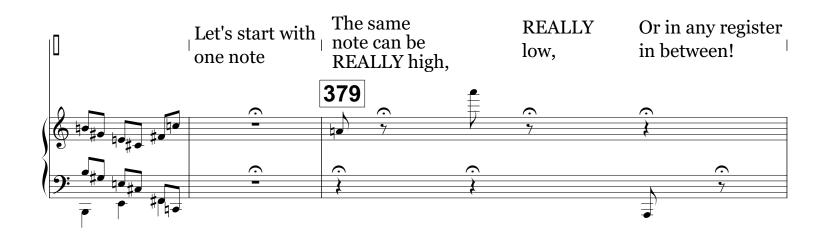
Did I introduce everyone in the String family?



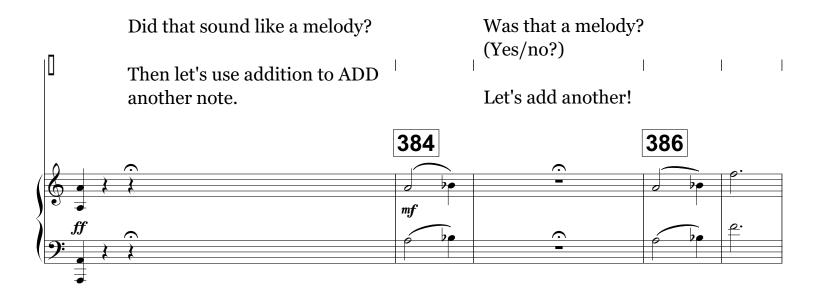


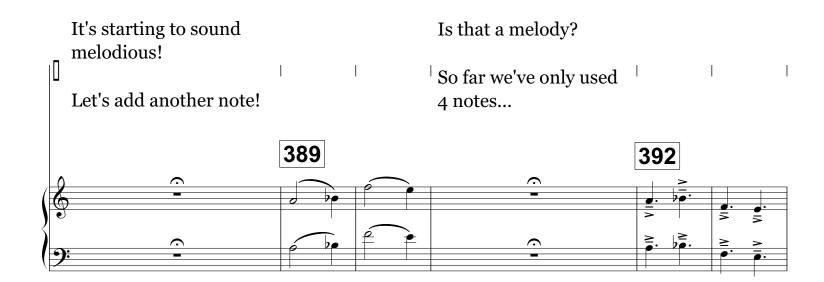








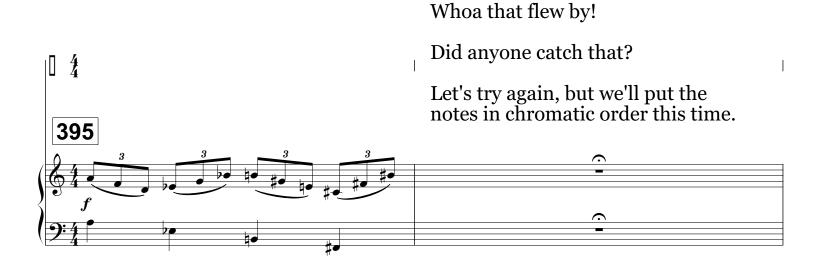


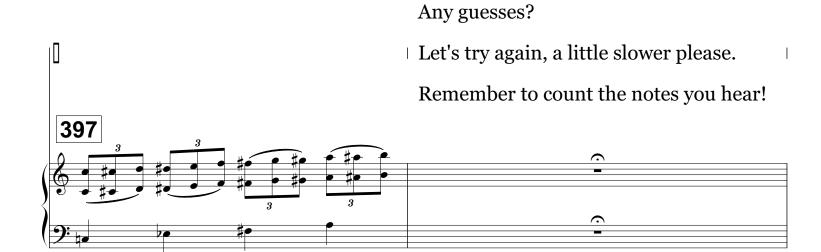


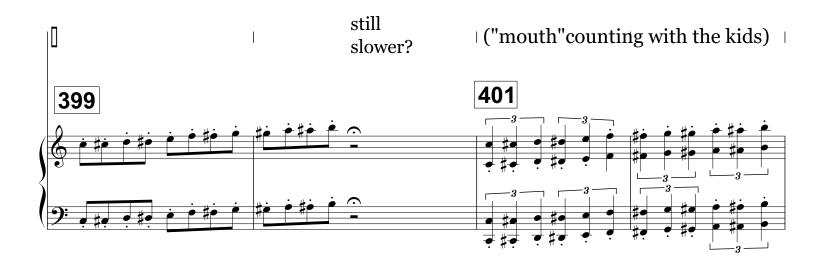
We'd like to keep adding more...

Does anyone know how many notes there are for us to use?

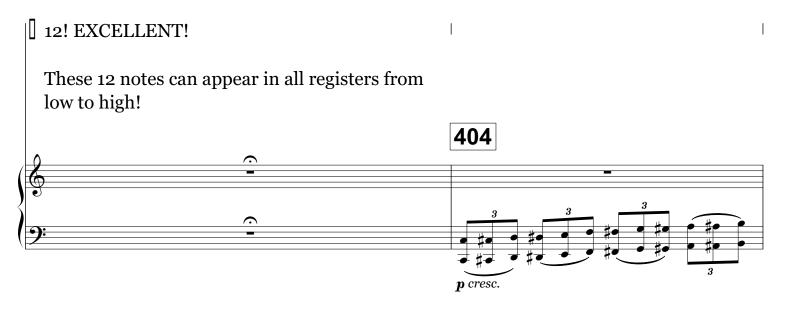
Listen closely and see if you can count how many notes you hear!

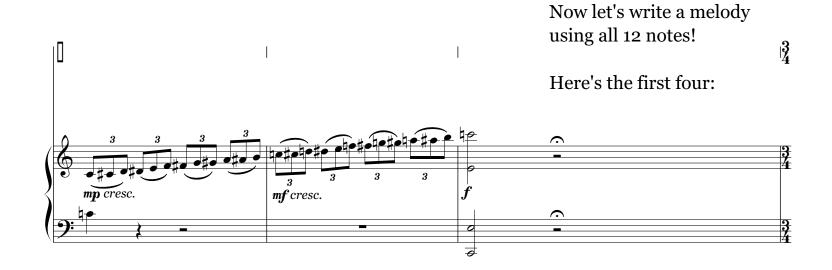


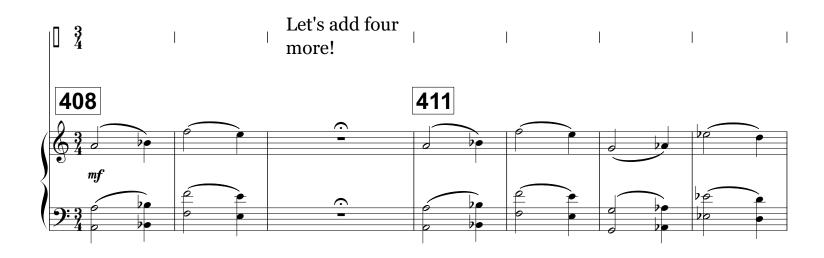




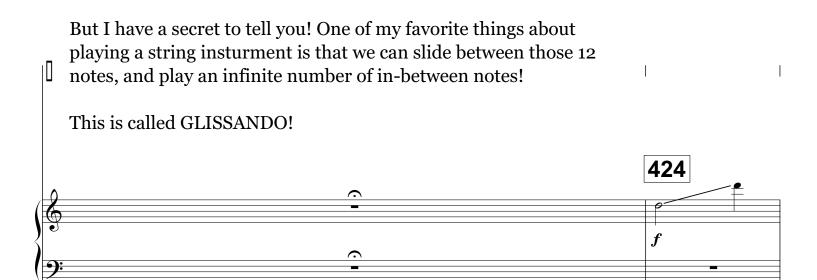
(If necessary: "How many notes did you hear?")

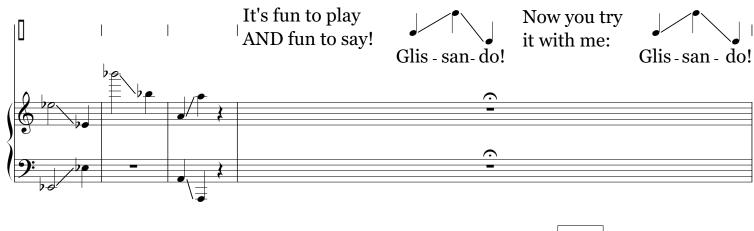


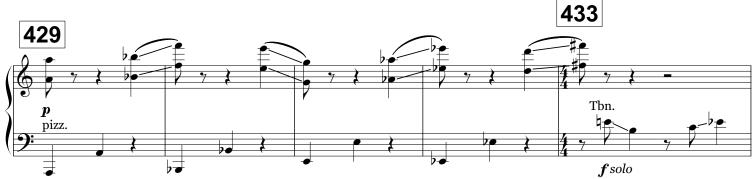




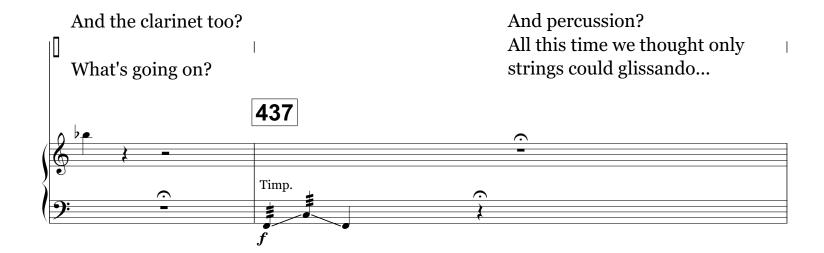


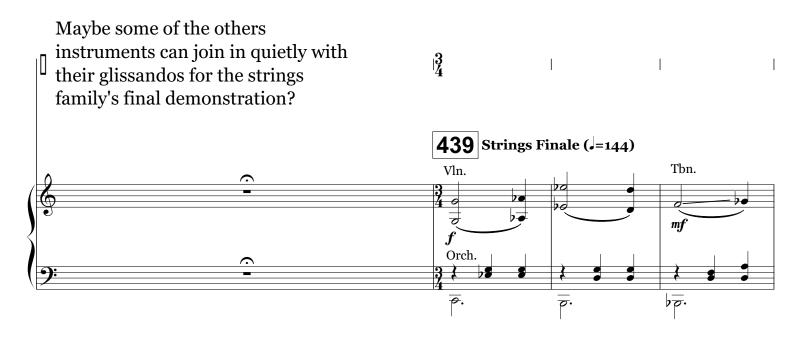


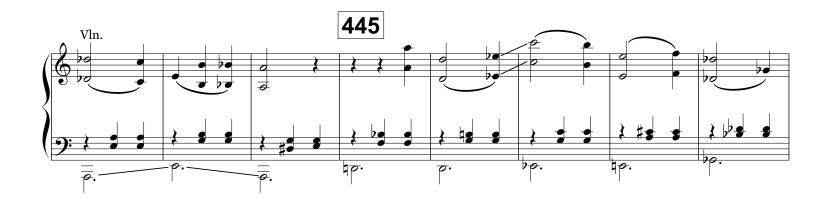


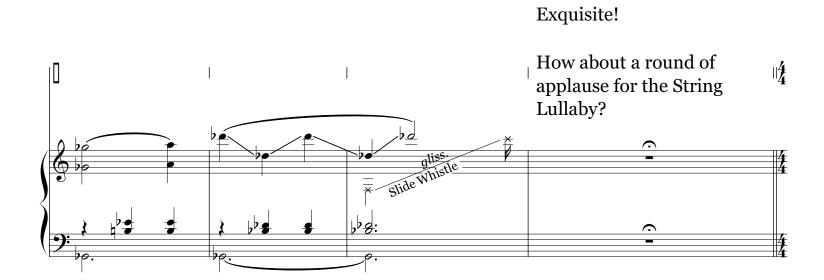










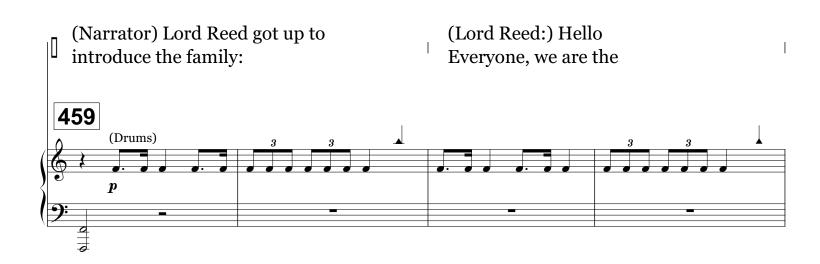


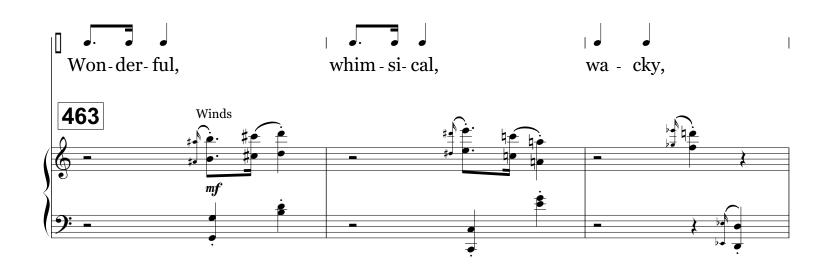
(Narrator:) The Elders were not pleased that other instruments joined in with the Strings, but at least no lasting harm seemed to be done...

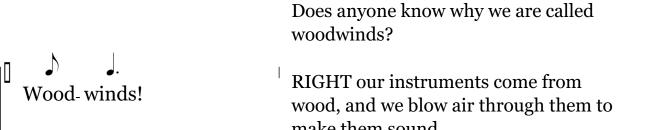
(Announcer:) Next up in the Harmony Games Mathematica Edition is the Woodwind Family!

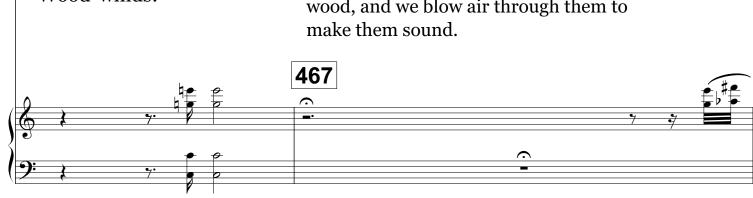
WINDS

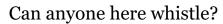


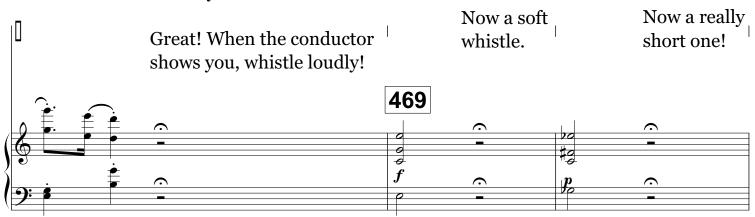




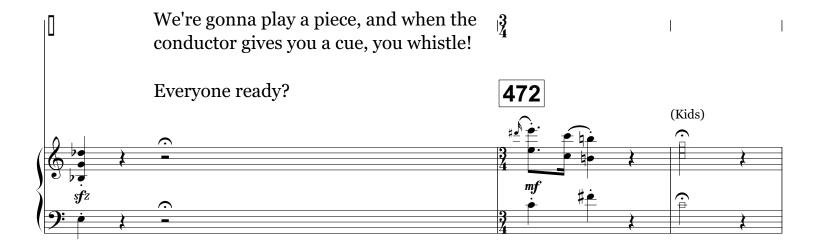




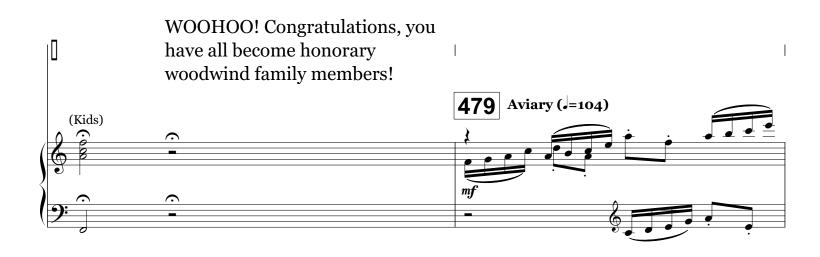




I think you are ready to join the Woodwind family...



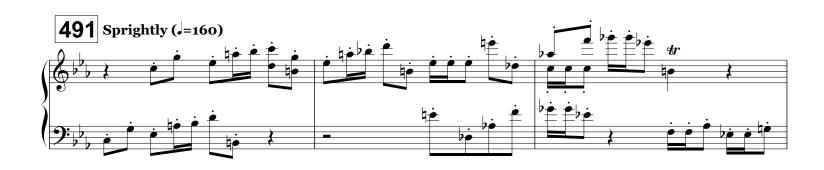




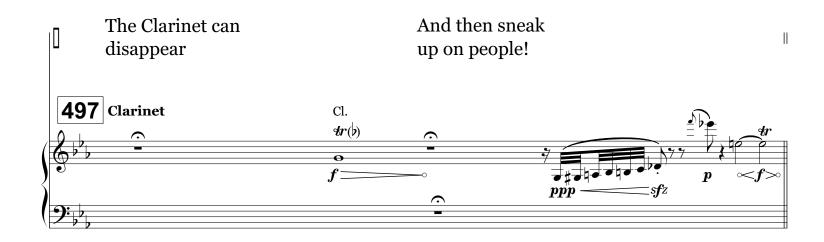


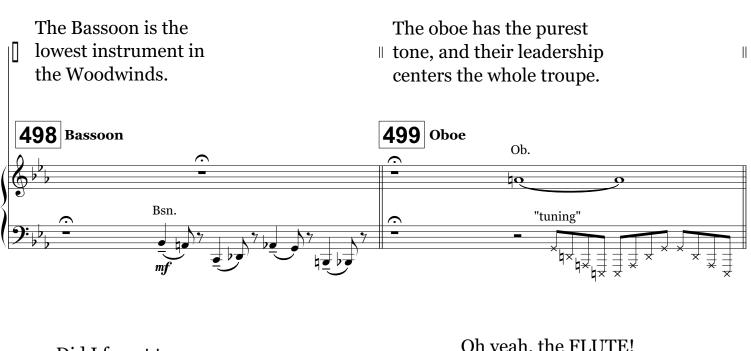


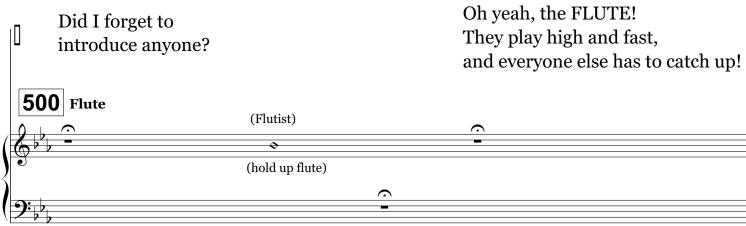


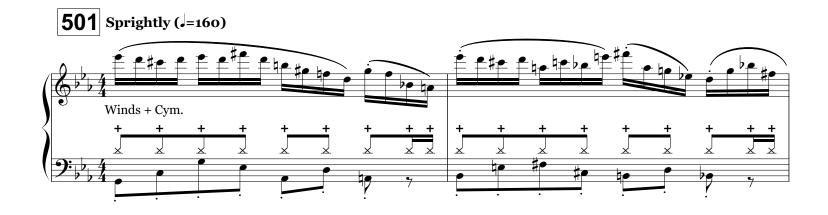


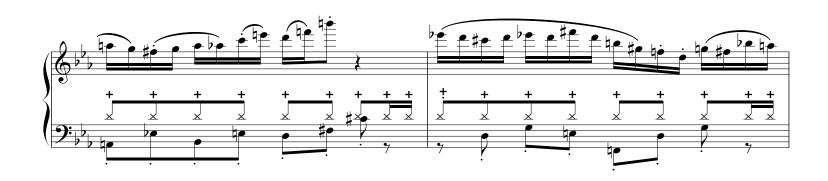




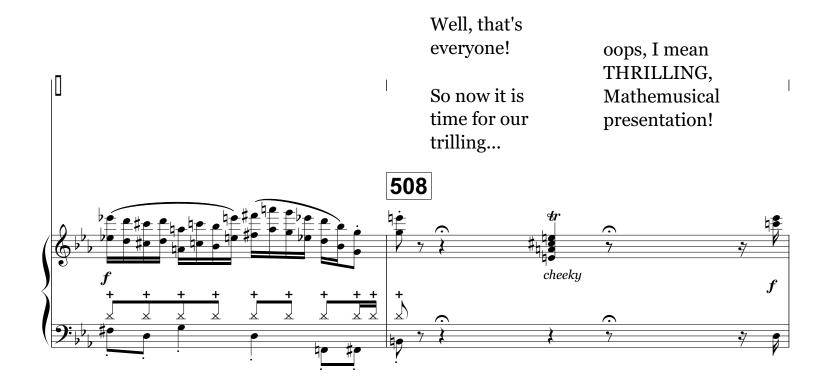




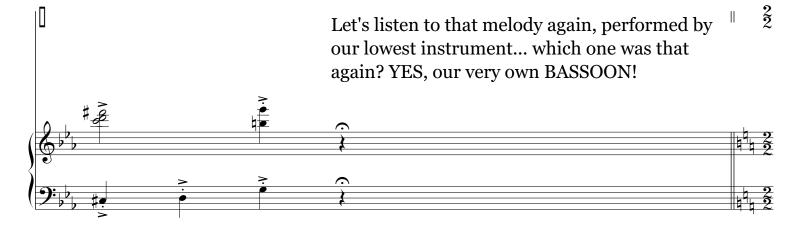




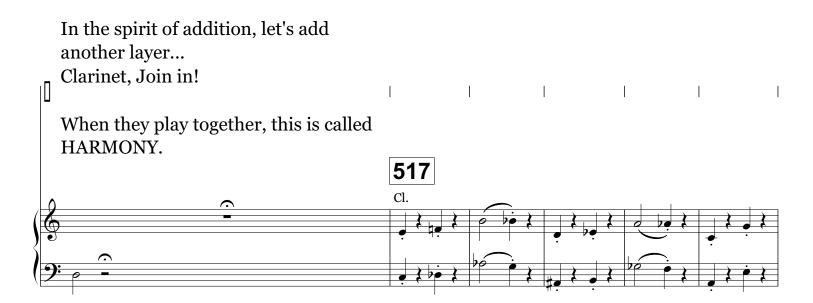


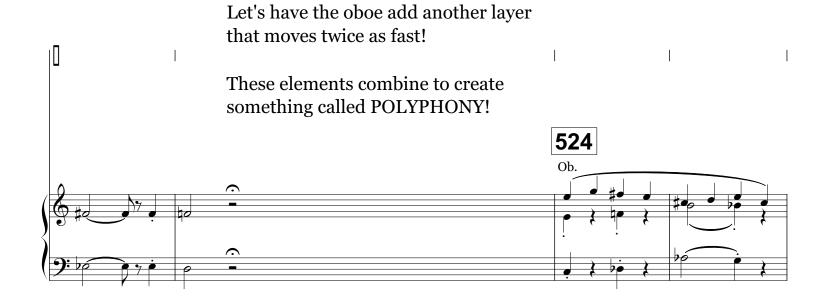


We all heard how the strings created a melody by adding 12 notes in sequence.



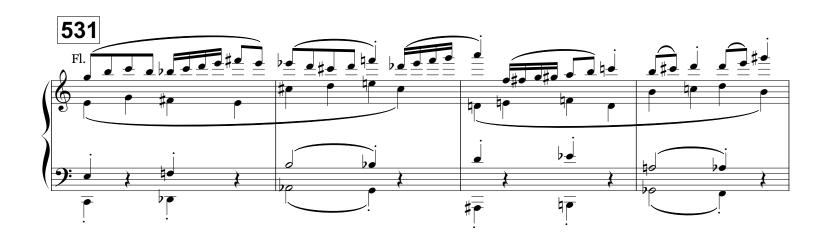






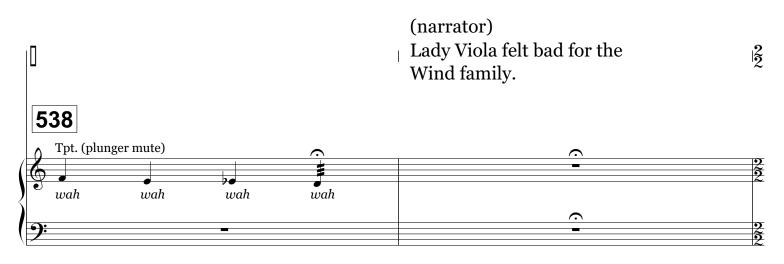
Now, how about some multiplication?

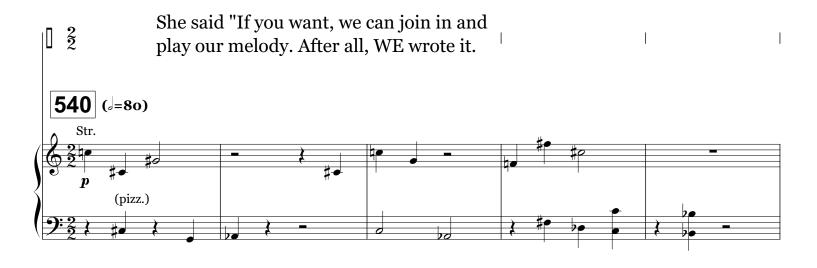




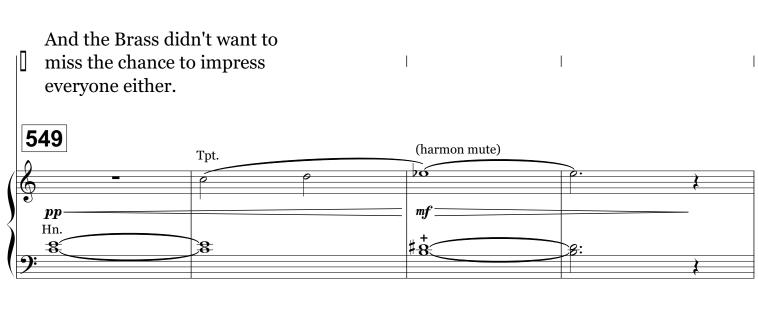
I love adding all these layers and speeds but, wait...

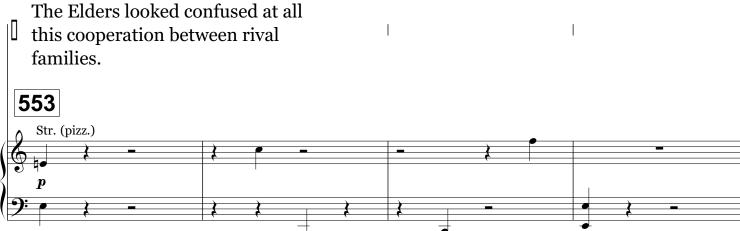


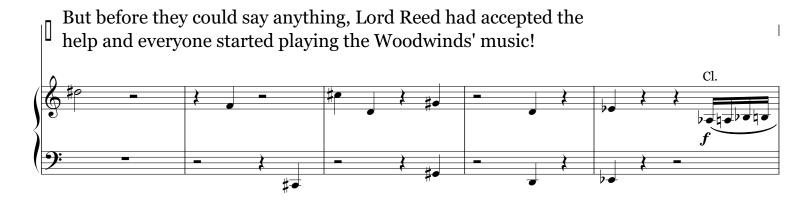


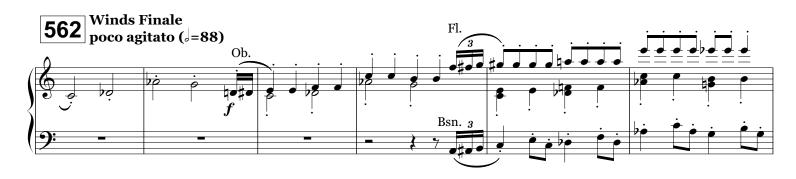






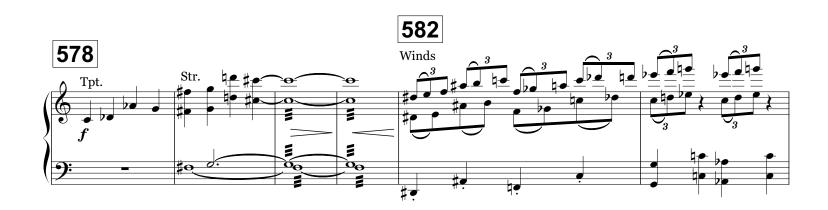






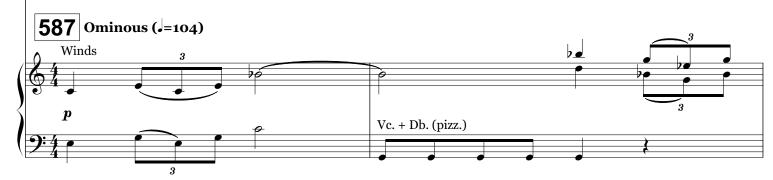








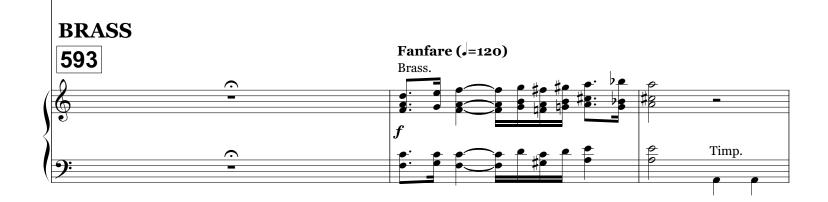
While the Woodwinds were congratulating themselves, the Elders were getting more and more flustered.





Good day everyone! I am Kween

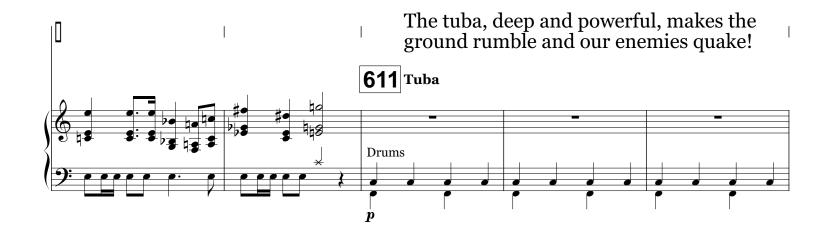
Kornet, and I'd like to begin with
a Fabulous Fanfare!



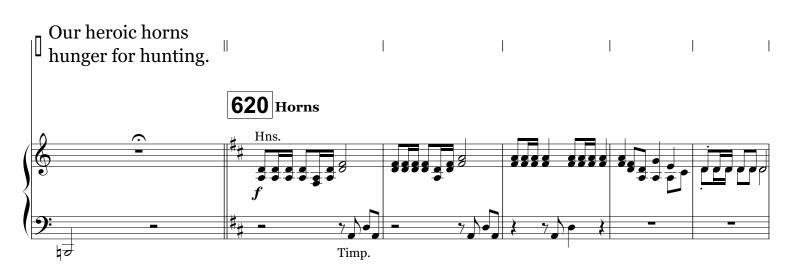


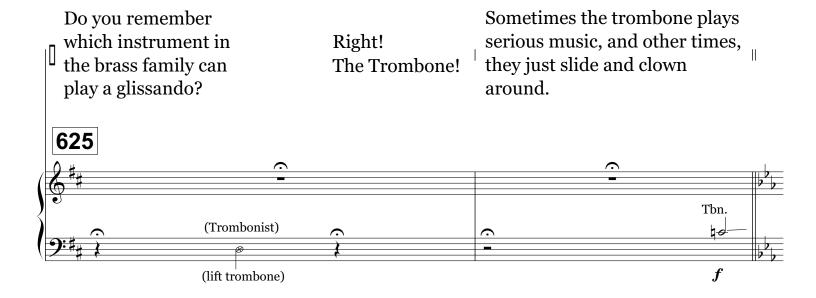


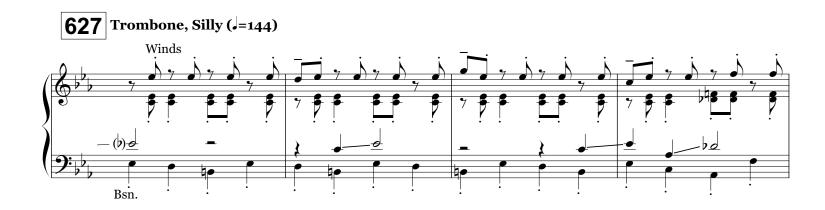


















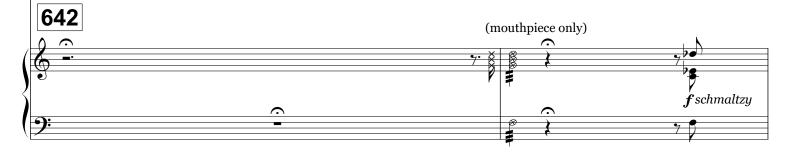
How do we make our instruments sound beautiful?

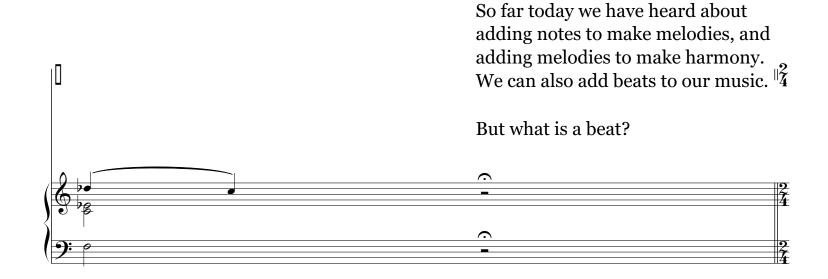
Lake the Woodwinds, we use air, but we don't blow it through the instruments, we have to buzz our lips on our mouthpieces.

Can we all buzz our lips together?

(mouthpiece only)

Awesome, clearly you are all meant to be brass players when you grow up.

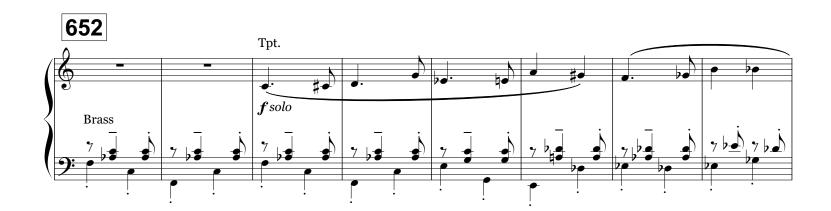


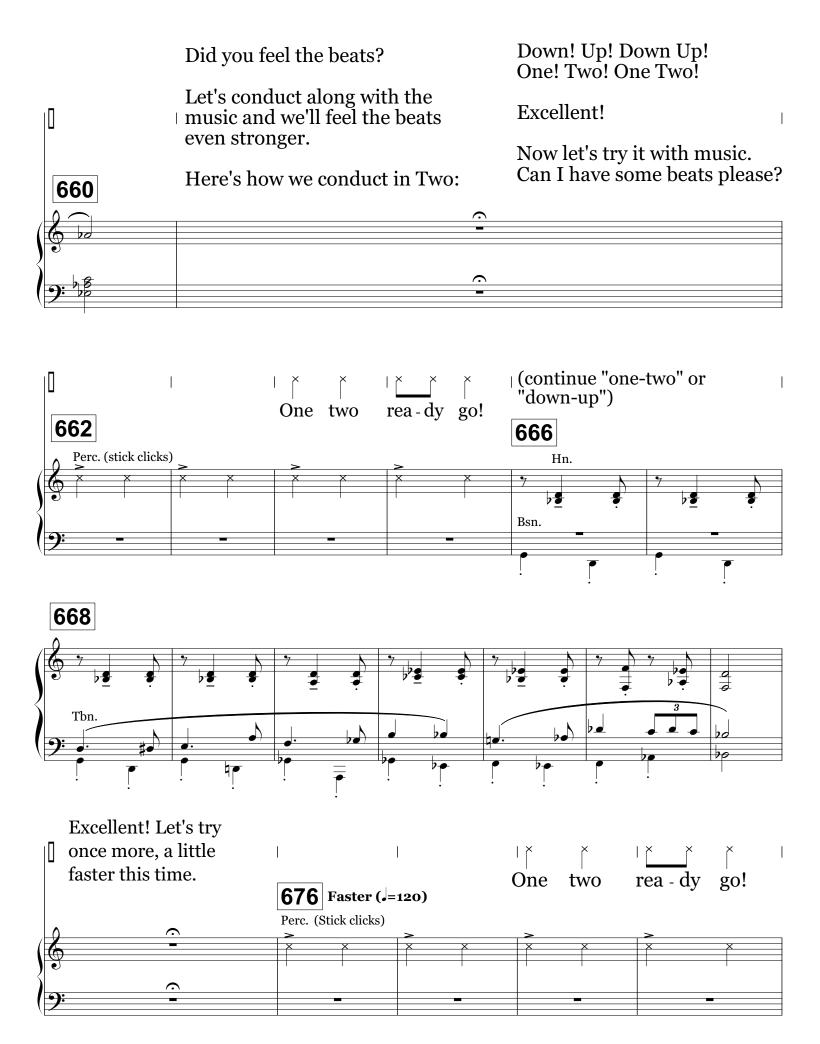


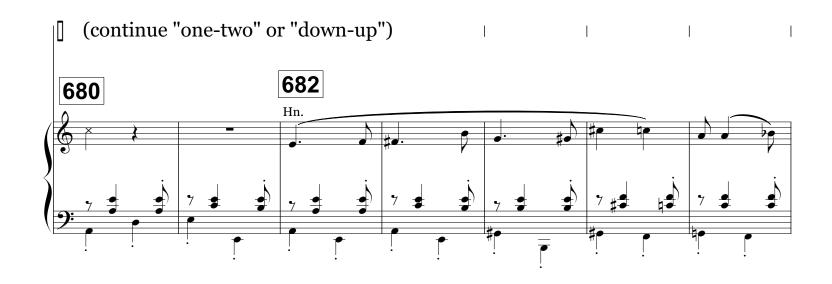
A beat is a rhythmic pulse, just like your heartbeat.

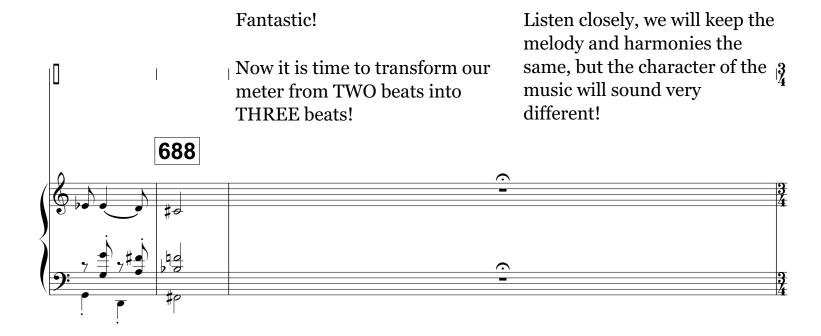
When there are beats in music, they are grouped together in something called a Meter.

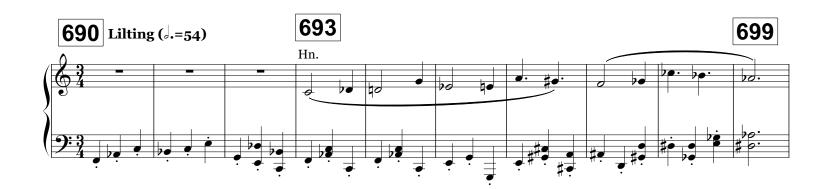
Here is some music that has a meter of 2 beats.

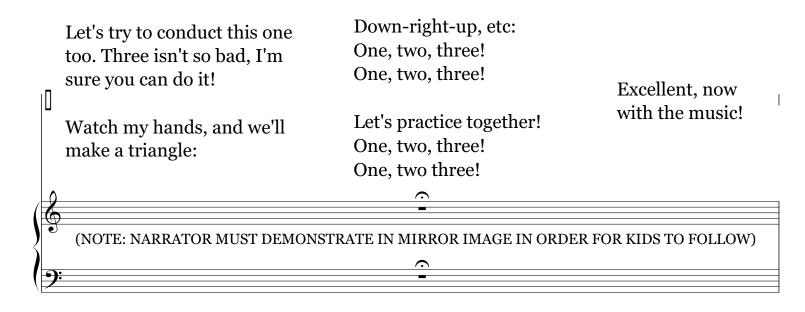


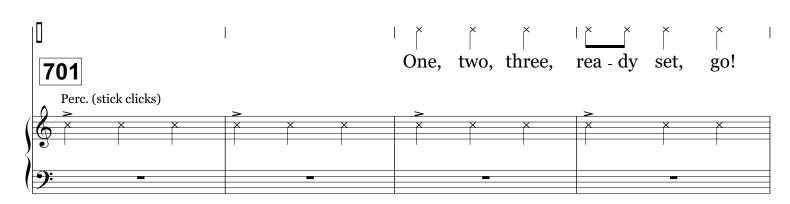


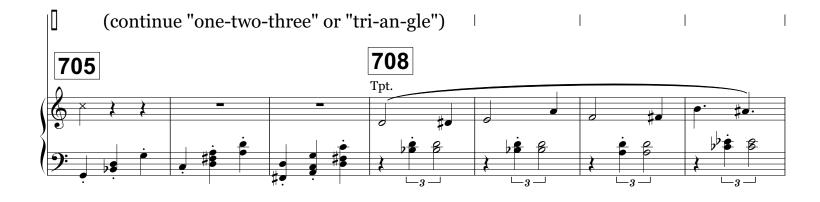


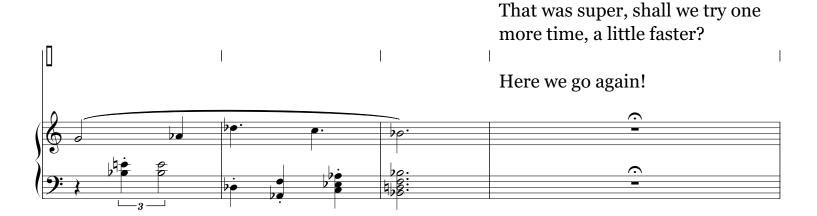


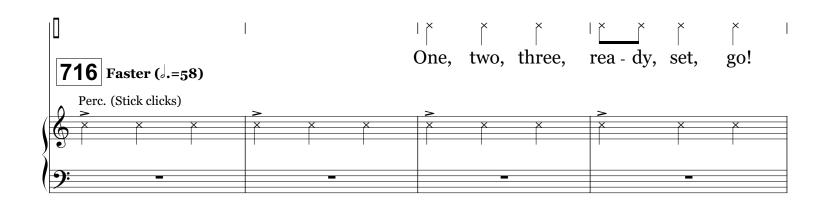


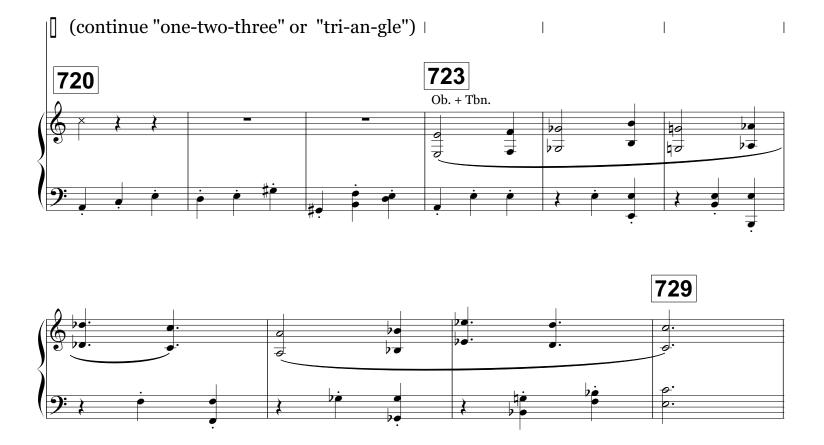


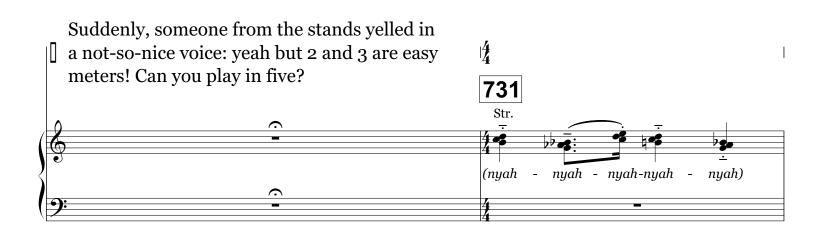












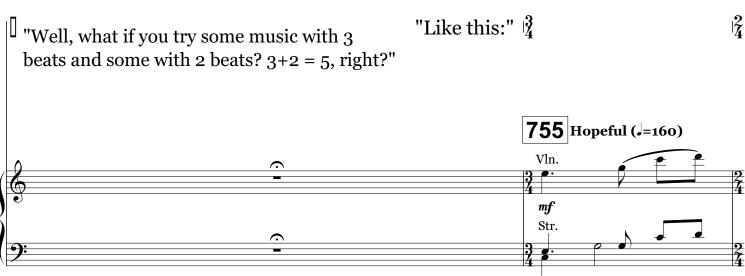


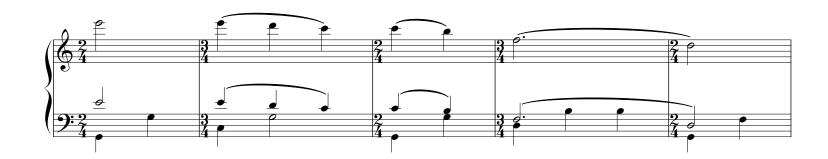
Suddenly, the other
families started feeling bad for the Brass.

It was a competition after all, and in good spirit, the other families wanted everyone to compete at their best.



Lady Viola spoke up:





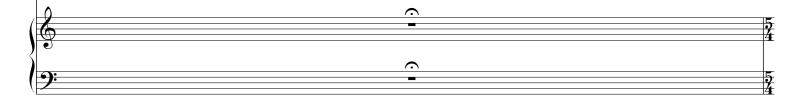
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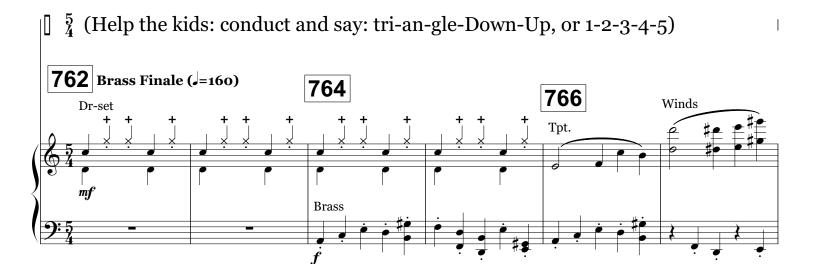
Wow, that's neat... but seems complicated!

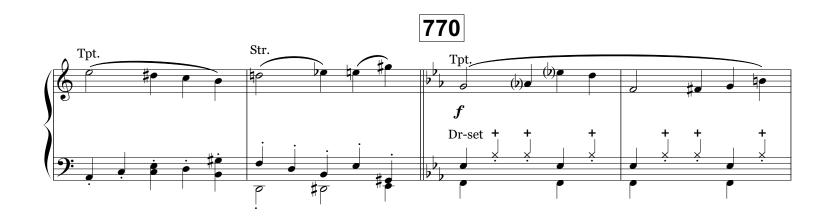
Maybe it would help if everyone conducted with us? First we need three beats, which is a triangle, right? And then we need two beats, which is down up.

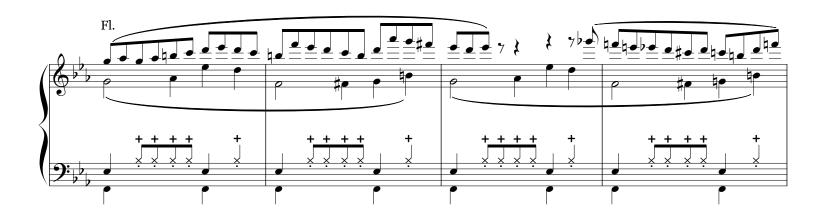
Let's try together slowly: One, Two, Three, Down, Up! One, Two, Three, Down, Up! Tri-an-gle-down-up, Tri-an-gle-down-up!

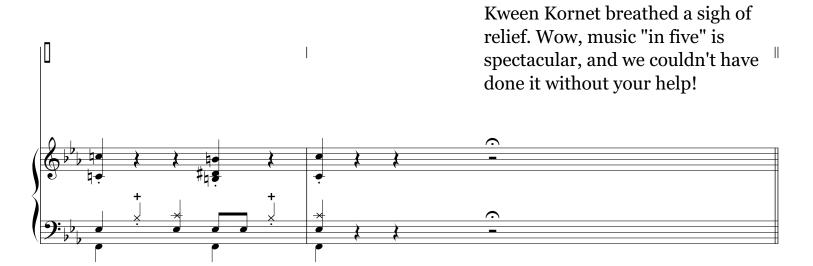
Excellent, let's lead the Brass in their final presentation: music in FIVE! Ready, Set, GO!







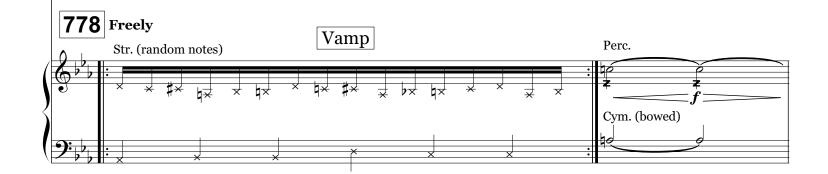




(Narrator:)

The Elders were getting annoyed.

They couldn't understand this WACKY music and couldn't understand why families were helping each other in a competition.

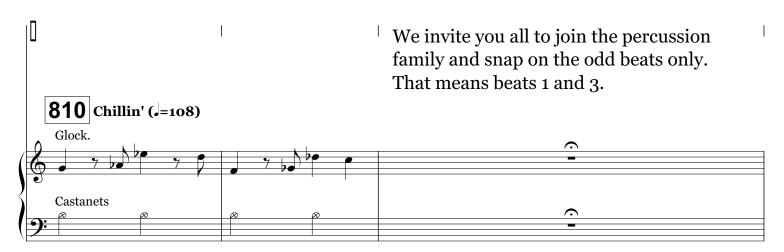


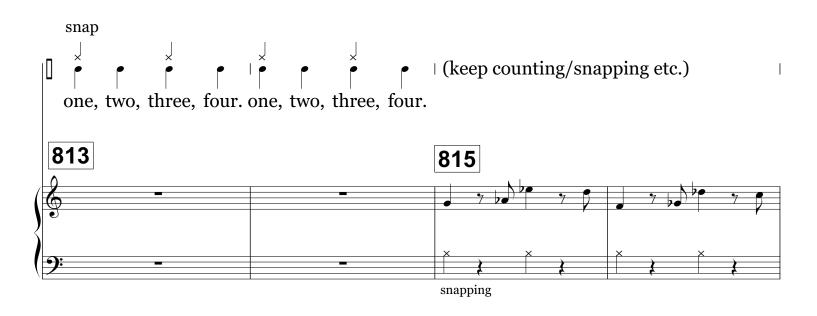
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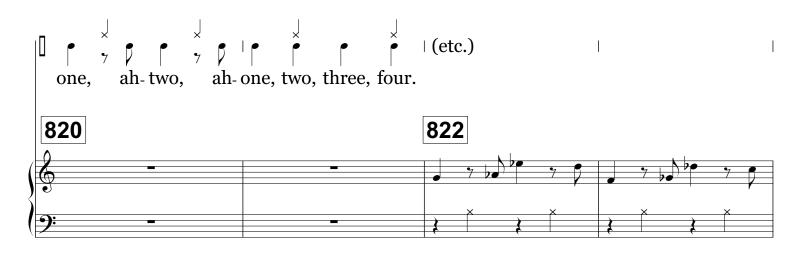


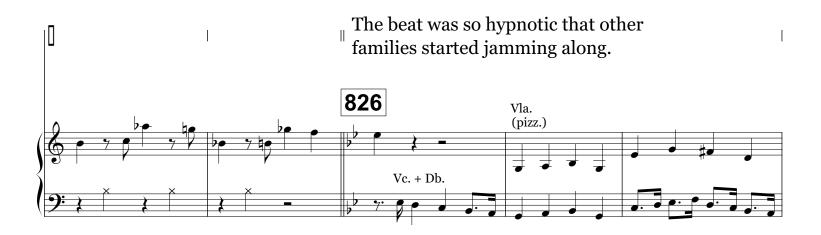
It has four beats to the bar.



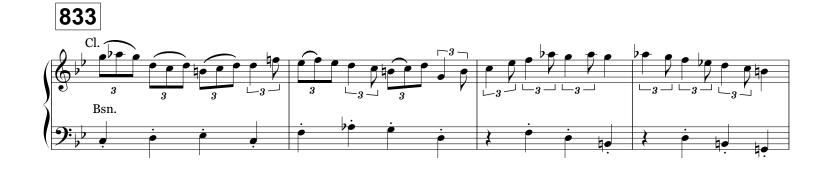




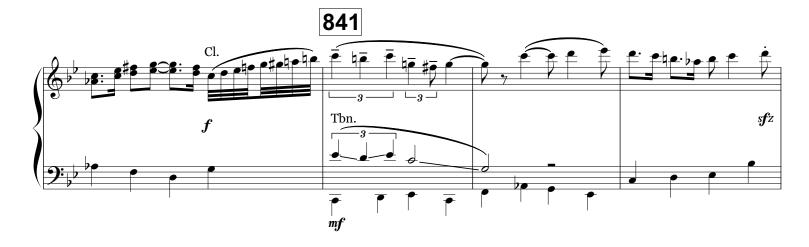






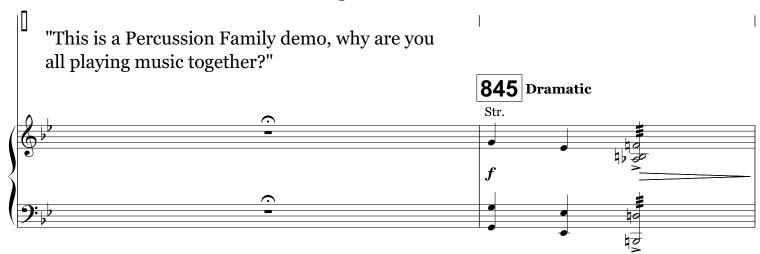


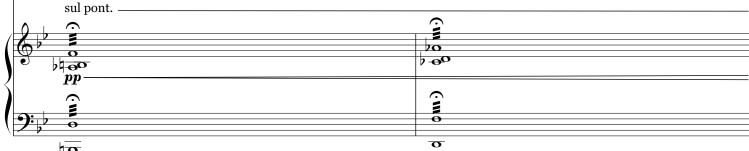




(interrupting)

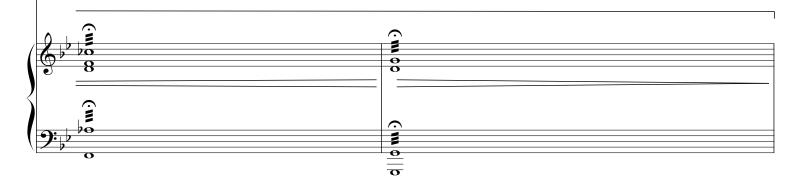
WAITAMINUTE, the Elders interrupted!





"Percussion, please continue, you only have two minutes left and we expect more from you."

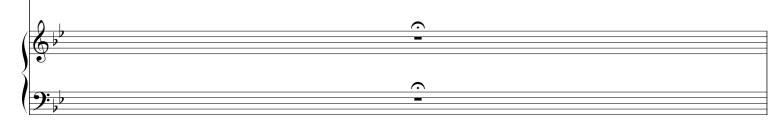
Quickly, the percussion family glanced at their notes, and decided they had time for one last Mathemusica demonstration.

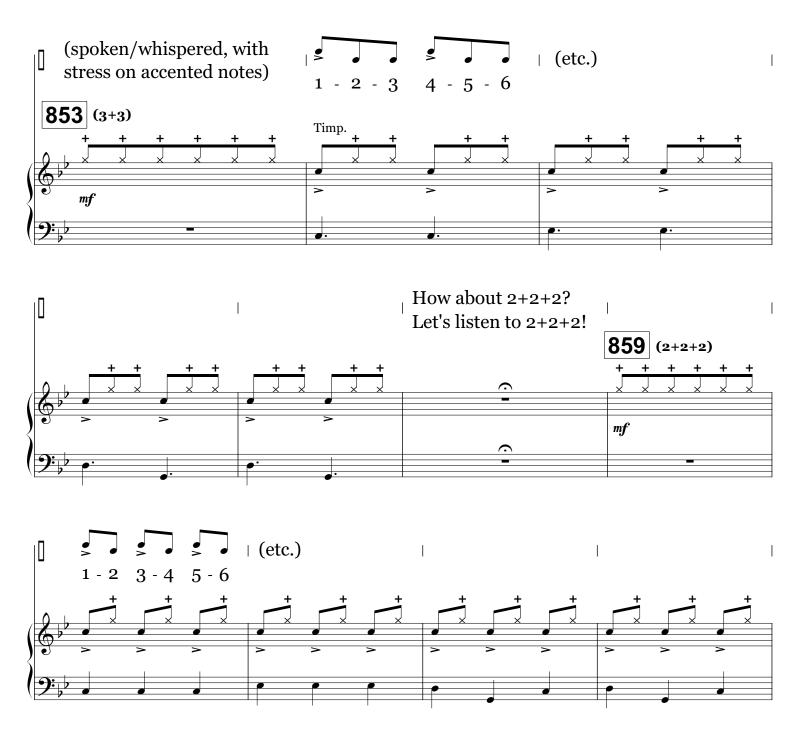


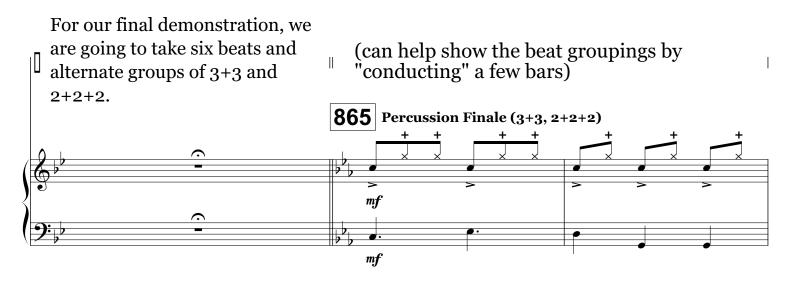
What are some of the ways we can group these six notes?

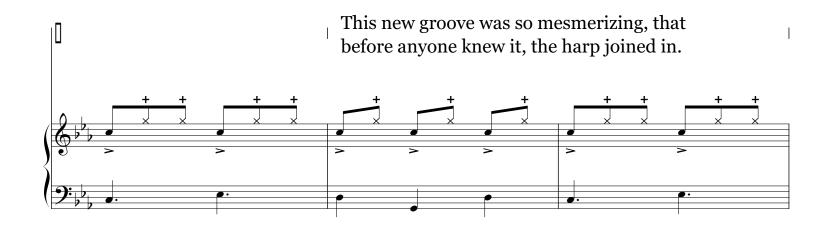
(Call on kids, or help out with suggestions: 1+5, 2+4, 3+3, 4+2, 5+1. The goal is to get someone to suggest 3+3)

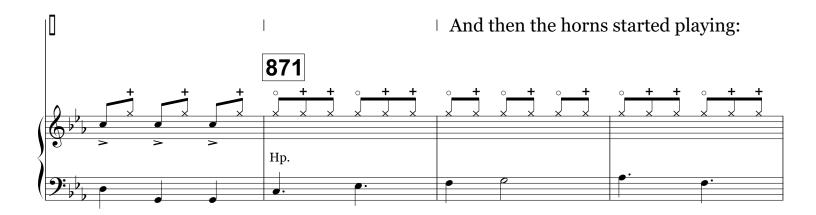
What does grouping six notes as 3+3 sound like?

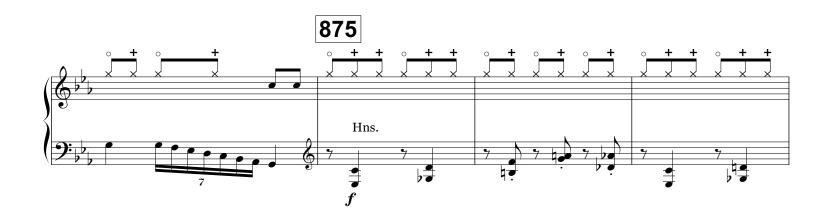


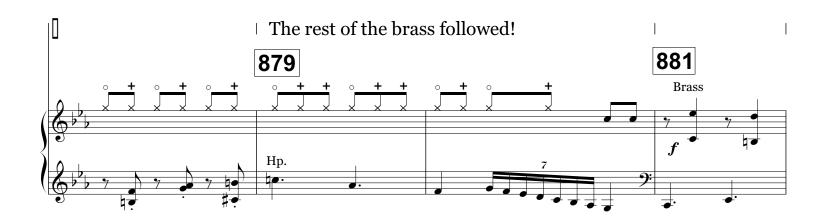






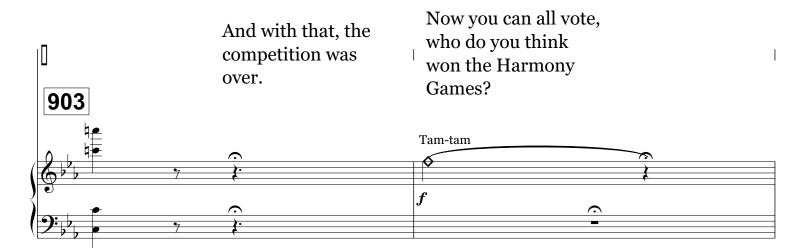


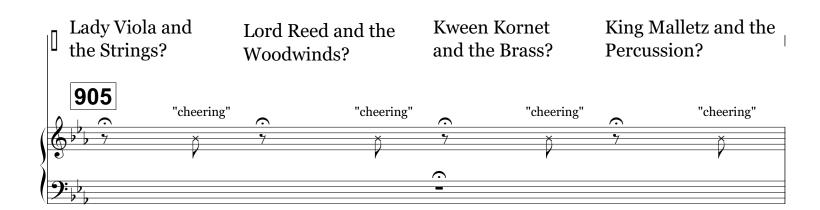


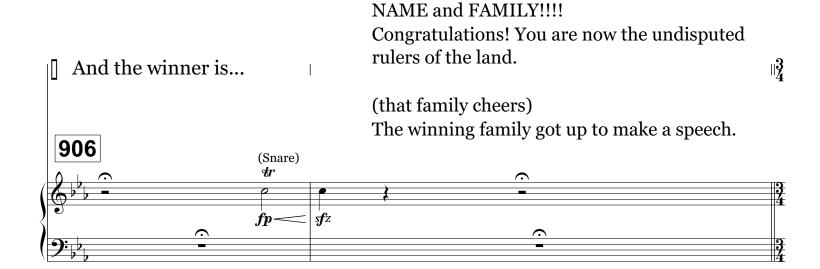


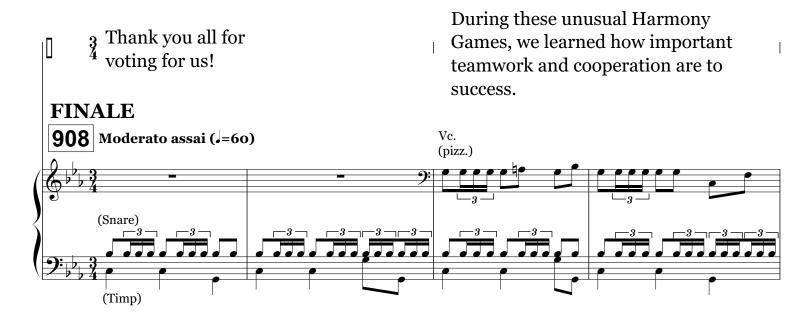


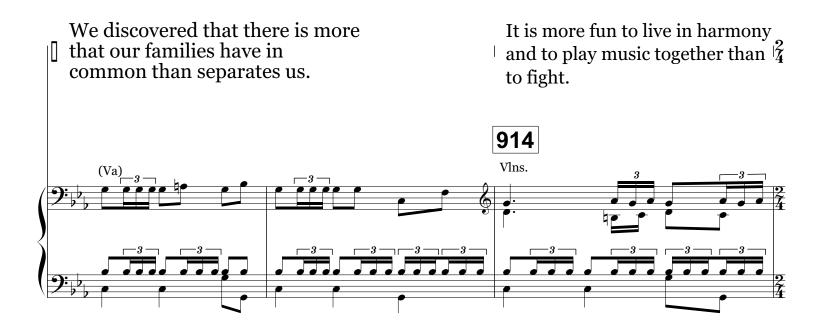








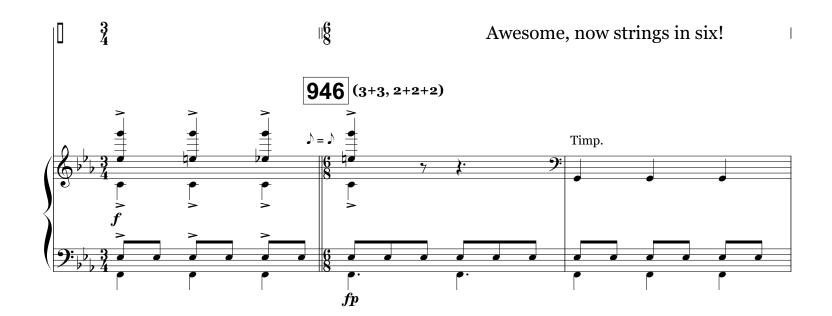






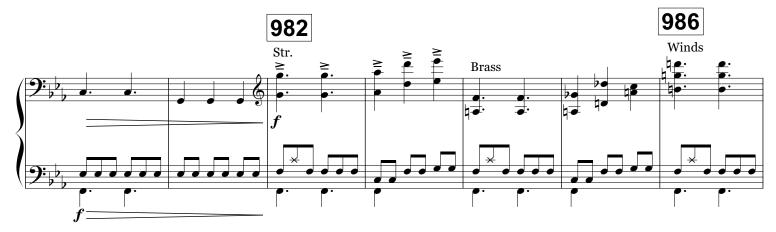


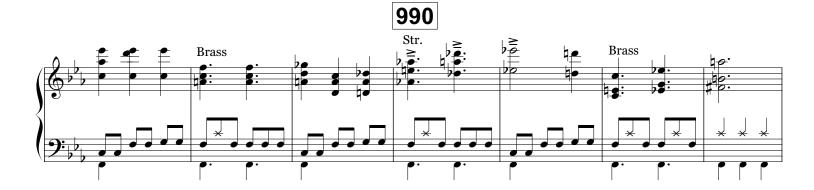


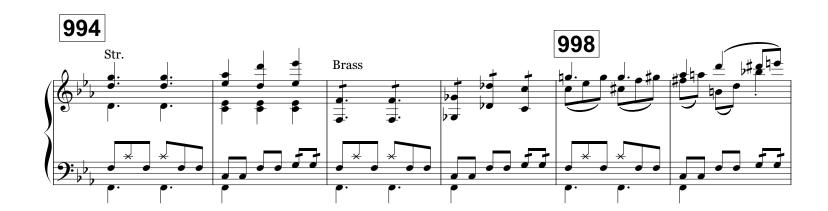


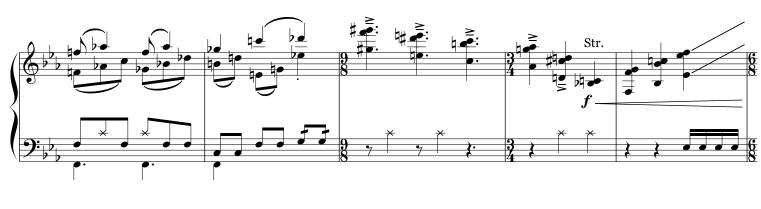


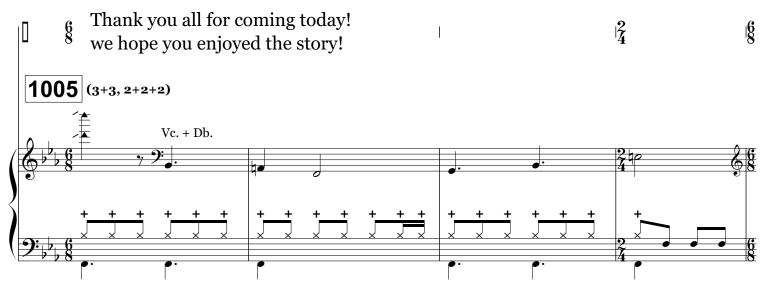


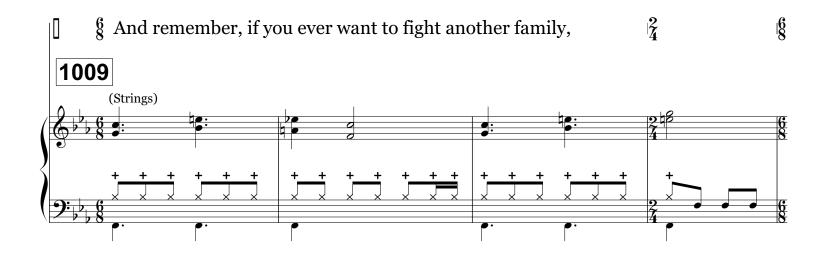


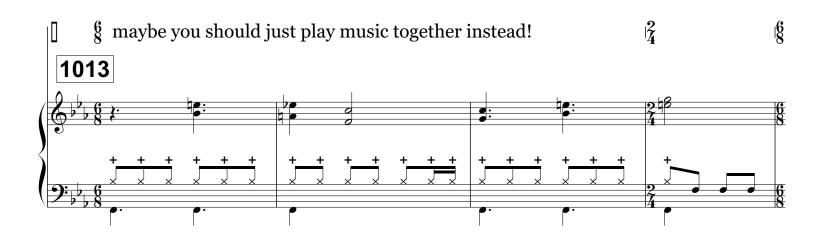














Guided Q & A

(Narrator:)

What did you think of the performance by your ORCHESTRA, did you like it? Now let's see if you were listening carefully...

Who won the Harmony Games?

And what was a big lesson they learned about cooperating with other families?

We heard a lot about how math and music can be related today. What are some ways you can use addition in music?

Excellent!

Now here to tell us more about our ORCHESTRA is our conductor, NAME.

I. INTRO

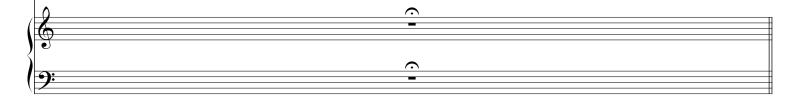


(Conductor:)

Thanks, NARRATOR!

Hi Everyone!I'm so glad we got to share the legend of the first Symphony Orchestra with you today.

Family was a very important part of our story, so let's see if we can remember all the families that make up an orchestra.



Which family is sitting up here in front, closest to you?

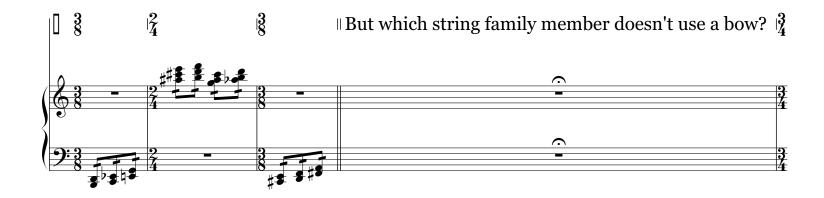
Strings, right! Made up of violins, violas, cellos and basses.

Does anyone remember what string players need to pull back and forth to make the strings vibrate? The bow!

II. STRINGS







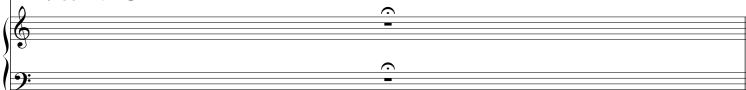


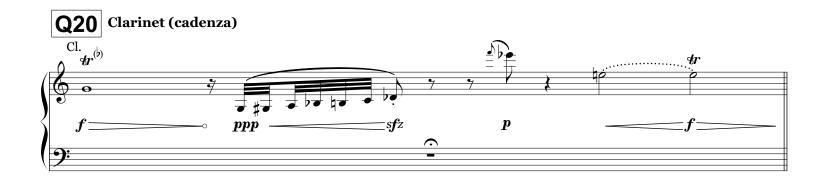
Thank you Strings!

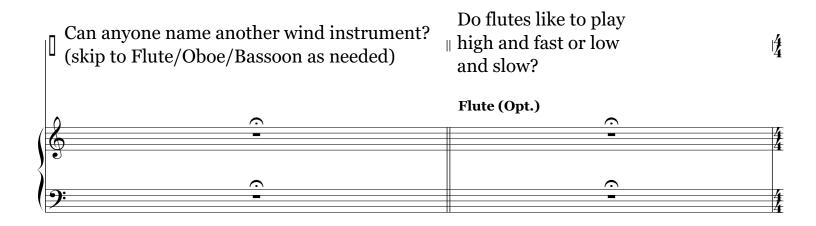
How about the Wind family next?

Can anyone tell me which wind instrument can disappear and then sneak up on people?

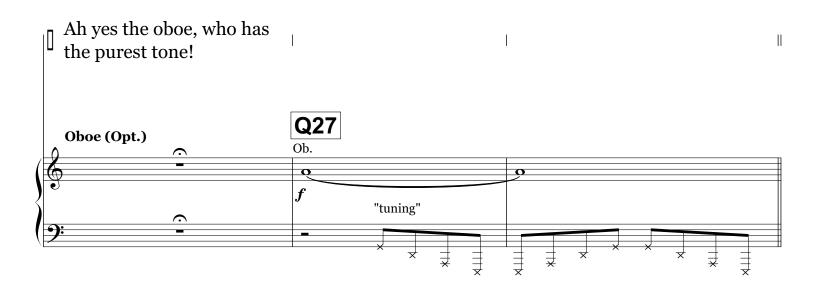
III. WINDS

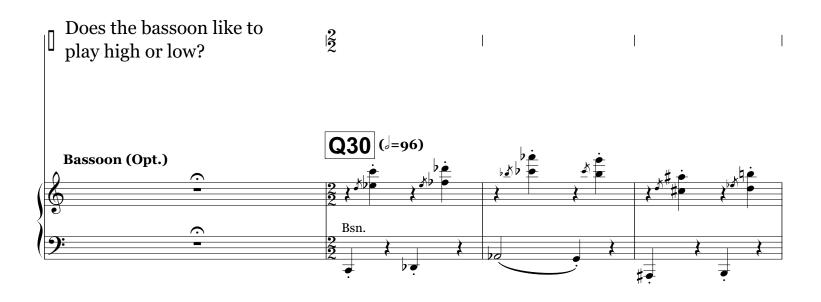


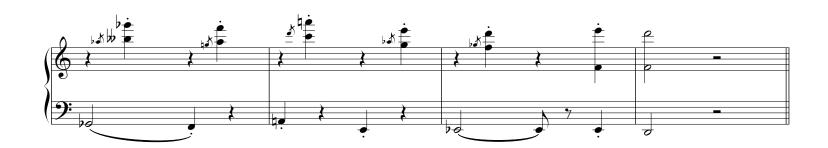












Our wind family today demonstrated that adding layers created harmony and polyphony. The music also got louder as we added more musicians.

In music, volume is called dynamics. Let's take a passage played by just a few players and hear what it sounds like.

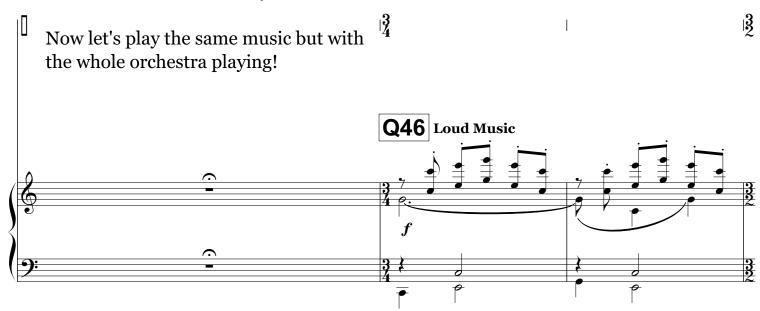
IV. DYNAMICS

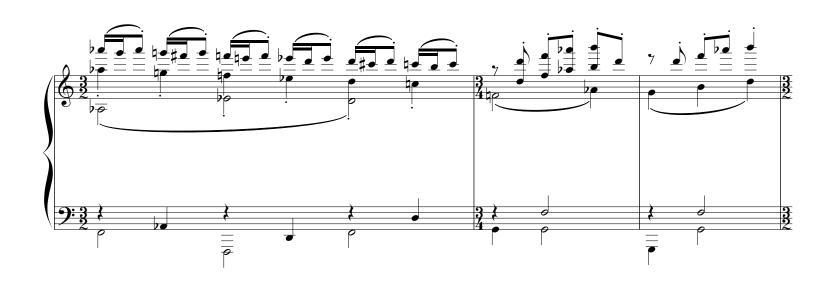


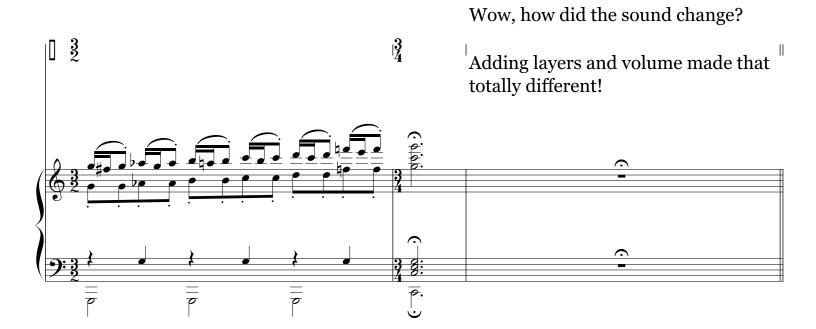




How did that music make you feel?





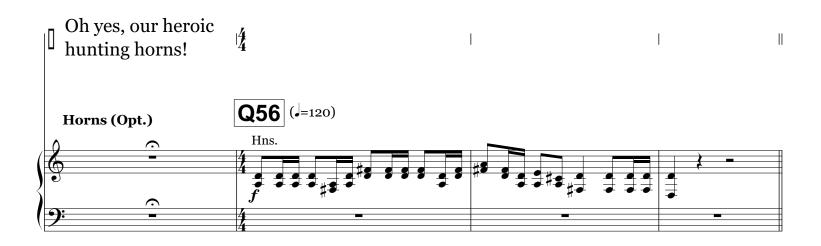


Speaking of volume, let's talk about our Brass family. Does anyone have a favorite brass instrument?

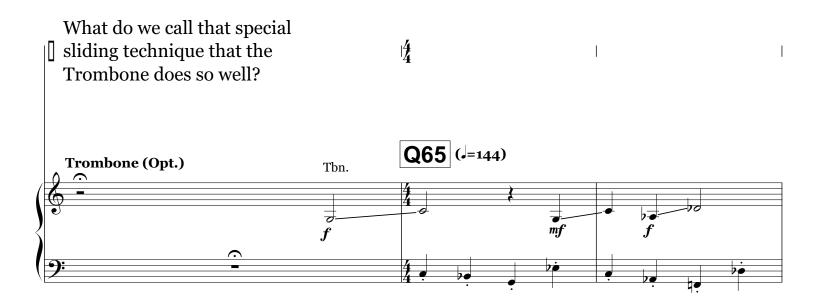
(skip to horns/trumpet/trombone/tuba as needed)

V. BRASS

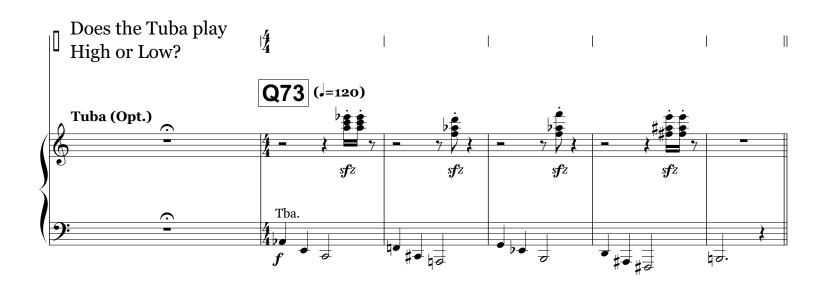


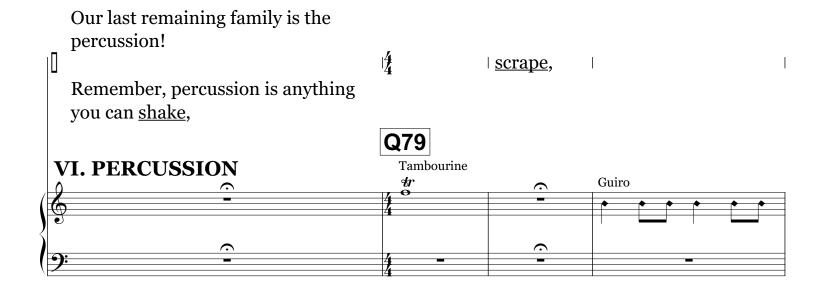


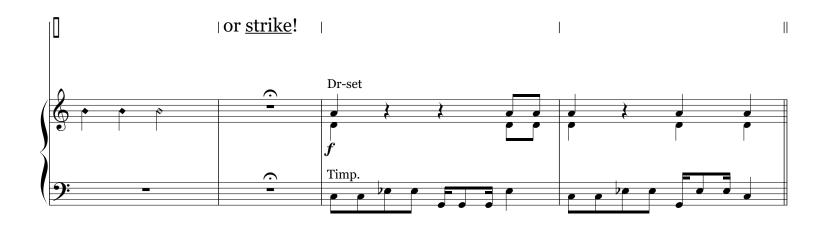




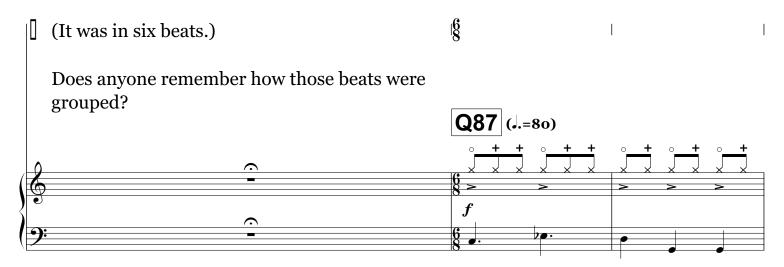


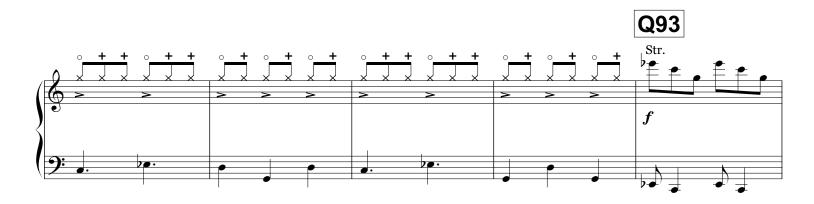


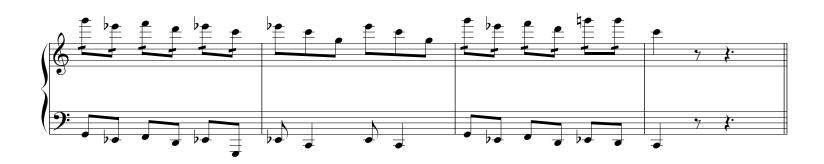




Do you remember that percussion groove that brought down the house?







We've heard a lot about math and music, but there is one more important thing we should mention: speed.

Speed in music is called tempo, and the tempo is determined by the number of beats played in one minute.

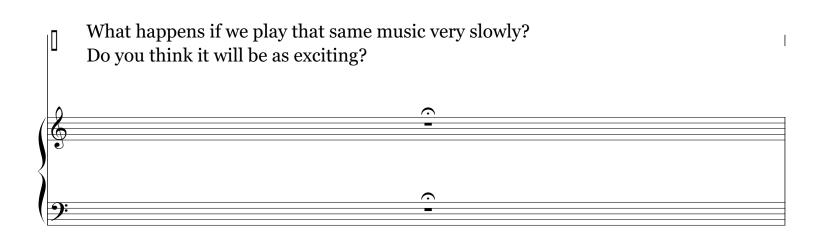
Do you remember the exciting battle music at the beginning of our story? It went like this:

VII. TEMPO



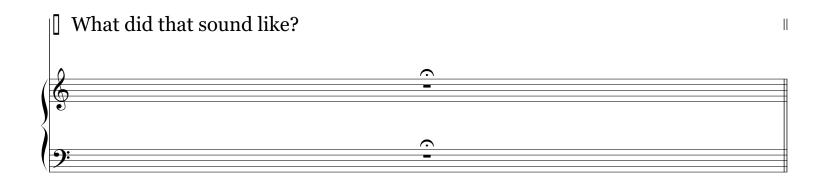












Now you yourselves have heard what big differences dynamics and tempo make to the music, maybe someone wants to show us how to change the tempo by conducting the orchestra? (Choose volunteer)

Hi. What's your name?

Welcome NAME, now take a bow. (help them)

Have you ever bounced a basketball? OK great! In order to control the tempo, pretend you are bouncing a ball.

If you want the ball to bounce slower, how will you move your arm? (bounce larger, demo using your entire arm)

And faster? (bounce smaller, demo only using the wrist)

Excellent, so now you can get in front of the orchestra and we will start in a basic tempo, and you can make the music speed up or slow down by bouncing the imaginary ball faster or slower. Are you ready?

I'll start the orchestra for you: "One, One"

(After the excerpt, have the participant bow again, and then repeat the process with another 1-3 kids, time allowing. I suggest scanning the audience to not just pick from the front, although easy access to the aisle and stage should be considered. Furthermore, I recommend being inclusive with as large a variety of ages, genders and

Furthermore, I recommend being inclusive with as large a variety of ages, genders and ethnicities as possible. Between 2-4 guests yields a very rewarding experience in a limited amount of time.)

VIII. "GUESTS" CONDUCTING



Q118

Flexible tempo, rubato, etc.

Follow the "guests"





Wow! Great job to [both/all of] our guest conductors! So many things can change in music by adding beats, notes, harmonies, and altering the tempos and dynamics.

Thank you all for being such a fantastic and attentive audience!

Back to you, NARRATOR!

(Narrator:)

Thank you CONDUCTOR and ORCHESTRA! And thank YOU ALL for coming and becoming a part of our big symphonic family.

We hope you come back and visit us again soon! You never know what you will discover at the Symphony!

