

# Calculating Music Study Guide

*The Renaissance*

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## Calculating Study Guide

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**Robert Franz**  
Music Director

## **Calculating Music** Program

During the Calculating Music Program, the Mansfield Symphony will be a gigantic manipulative that we will be used to predict how many people are playing, and how many instruments it takes to make up a symphony orchestra.

**Haydn:**        *Symphony No. 73, La Chasse (Finale)*

**Copland:**    *Fanfare for the Common Man*

**Gounod:**     *Petite Symphonie (Scherzo)*

**Holst:**        *St. Paul's Suite (Mvt. IV)*

**Bizet:**        **Prelude and Aragonaise from *Carmen Suite 1***

**Bizet:**        *Danse Boheme from *Carmen Suite 2**

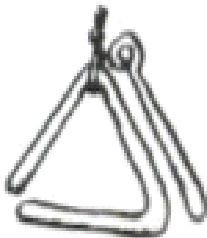
If your students enjoy the program selections included in the *Calculating Music* concert, here are additional selections to introduce to them:

**Copland:**    *Appalachian Spring*

**Gounod:**     *Ballet Music from *Faust**

**Holst:**        *The Planets*

**PERCUSSION INSTRUMENTS**



**TRIANGLE**



**TIMPANI**



**XYLOPHONE**



**CYMBALS**

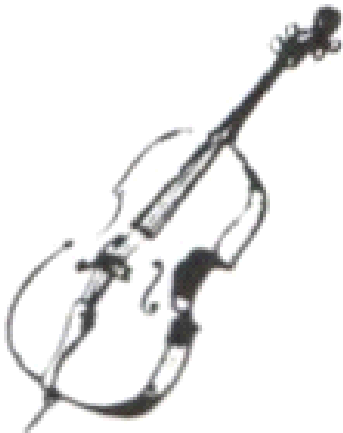
## STRING INSTRUMENTS



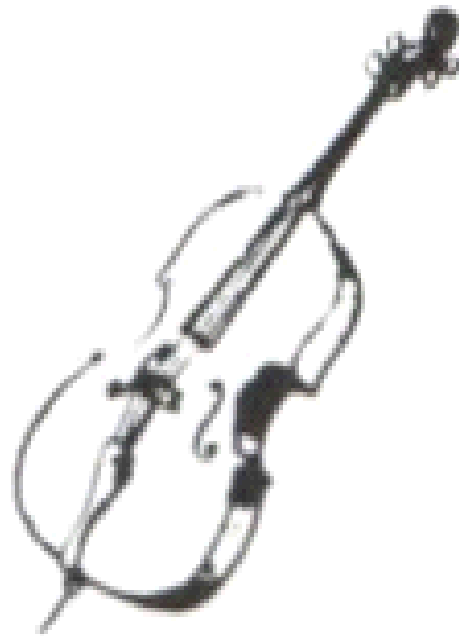
**Violin**



**Viola**



**Cello**



**Bass**

## WOODWIND INSTRUMENTS



FLUTE



CLARINET

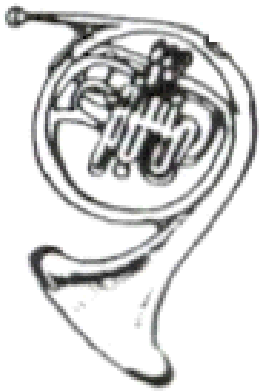


OBOE

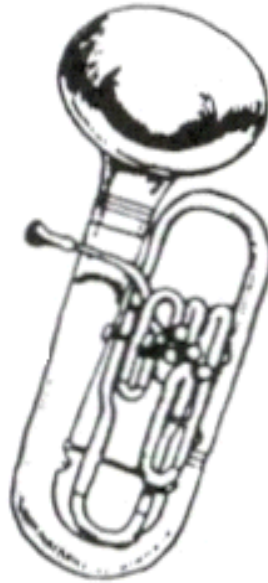


BASSOON

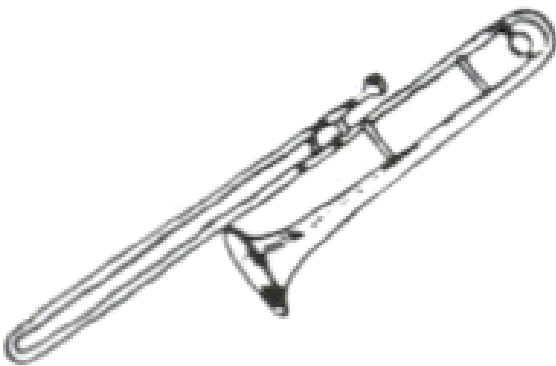
## **BRASS INSTRUMENTS**



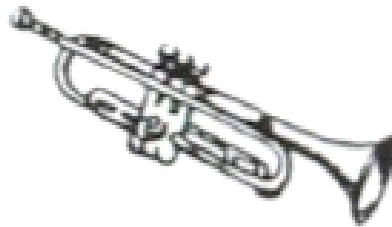
**French Horn**



**Tuba**



**Trombone**



**Trumpet**

## Activity #1

# Dynamics & Instrument Families

### Objective:

- Students will be able to recognize the instrument families of the symphony.
- Students will understand dynamics (how soft or loud music is played) and how that relates to the instrument families.
- Students will use this information to understand place value.

**Procedure:** (approximately 40 minutes)

### Instrument Families:

**Strings:** these have strings that are bowed or plucked

**Brass:** these are made of brass and are blown through a mouthpiece

**Woodwinds:** these are blown through a reed (except for flutes!); a reed is thin strip of material (cane, metal, or plastic) fitted inside a musical instrument that vibrates to produce a sound, usually when the player blows into the instrument.

**Percussion:** these are hit!

### Define DYNAMICS:

**Dynamics:** how soft or loud music is played.

- Add this new term to the “Word Wall” in your classroom.

### Dynamics of Instrument Families:

The number of each instruments needed to create a full orchestra is based on the dynamics of the instruments in each of the instrument families.

1. The string section is usually the largest in the orchestra because the strings have the softest dynamic. Therefore in order for the string section to balance properly with the other instrument families in the full orchestra, more string instruments are needed.
2. The woodwinds section is the second largest in the orchestra because they have the second softest instrument family. Therefore there the woodwind section is smaller than the string section.
3. The brass section is smaller still because they have a louder dynamic than the woodwind family. Less brass instruments are needed to balance with the other instrument families.
4. The percussion sections has the loudest dynamic, therefore less percussion instruments are needed in the full orchestra to create a balance.

### Place Value:

1. Since the percussion family has the highest dynamic, let’s assign them the thousands place (1,000) in numerical value.
2. Since the brass section is next to the highest in dynamic, let’s assign them the hundreds place (100) in numerical value.

3. Since the woodwinds are second to lowest in dynamic, let's assign them the tens place (10) in numerical value.
4. Since the string section is softest in dynamic, let's assign them the ones place (1) in numerical value.

Questions:

1. If we were to say the orchestra has a numerical value of 3,569:
  - a. How many percussion instruments would the orchestra have? (answer: 3)
  - b. How many brass instruments would the orchestra have? (answer: 5)
  - c. How many woodwind instruments would the orchestra have? (answer: 6)
  - d. How many string instruments would the orchestra have? (answer: 9)
2. Repeat the question using the following numbers:
  - a. 1,357
  - b. 2,469
  - c. 3,489
  - d. 267
  - e. 478
  - f. 1,029
  - g. 3,408
  - h. 5,500

## Activity #2

### Patterns

#### **Objective:**

- Students will understand patterns and sequencing by creating patterns using the instruments in the symphony.

#### **Materials:**

Make about 5 copies of the instrument family sheet provided in this packet. Cut out each of the instruments, making sure to keep the name of each instrument with the picture (laminates them if you prefer).

#### **Procedure:** (30 - 40 minutes)

1. Review the instrument families using the illustrations.
2. Use the cut out pictures to create a pattern. For example:
  - a. Line up a picture of a violin, then the cymbals, then a trumpet.
  - b. Explain to students: This is a pattern of three using illustrations of instruments in the instrument families of the symphony.
  - c. Ask students:
    - i. Which instrument should be placed next to start a repeat of the pattern of instrument families? (answer: any of the string instruments)
    - ii. Which instrument should follow to continue the patterns of instrument families? (answer: any of the percussion instruments)
    - iii. Continue having students choose which picture will continue and repeat the pattern.
  - d. Repeat the same activity changing the original pattern.

Activity #3  
**Add & Subtract the Rhythm**

**Objective:**

- Students will use rhythm to understand adding, subtracting and place holders.

**Rhythm:** the regular pattern of beats and emphasis in a piece of music;  
a pattern of beats in a piece or a particular kind of music

**Materials:** two pencils or rhythm sticks (or students can clap)

**Procedure:** (approximately 40 minutes)

1. Explain to students you will be clapping or hitting rhythm sticks in a simple 4 count pattern.
2. Demonstrate: Clap or hit rhythm sticks 4 times slowly (counting as you go), then repeat the 4 slow counts.
3. Have students participate by repeating your demonstration (a repeated 4 count).
4. Write the pattern on the board. It will look like this:  
1 2 3 4
5. Have students clap it or hit the rhythm sticks again, repeating the pattern.
6. Now, remove (subtract) the number 2 from the pattern on the board so it looks like this:  
1 3 4
7. Have students clap the new rhythm or hit the rhythm sticks, repeating the pattern (make sure there is silence – or a rest - where the second clap or hit used to be).
8. Add a 2+ to the place in the pattern where the 2 was, so it will look like this:  
1 2+ 3 4  
The 2+ represents two quick hits or claps in the rhythm.
9. Have students clap the new rhythm or hit the rhythm sticks, repeating the pattern.
10. Remove (subtract) the number 3 from the pattern on the board so it looks like this:  
1 2+ 4
11. Have students clap the new rhythm or hit the rhythm sticks, repeating the pattern (make sure there is silence – or a rest - where the third clap or hit used to be).
12. Repeat this process adding and subtracting numbers and counts to the rhythmic pattern.

# *The Renaissance*

## **Preparing your students for their trip to the Renaissance Theatre**

Here is some information about the Renaissance Theatre and the Mansfield Symphony that will help you and your students prepare for their role as an audience member.

### **Expected Behavior:**

For many students, this will be their first experience with a live symphony performance. It is important to discuss with them the expected behavior of an audience member.

1. All aisles must be kept clear throughout the performance (no sitting or standing in the aisles).
2. Visit the washroom before the performance begins. It is hard to leave once the performance starts without disturbing those around you.
3. Do not bring food or drinks into the theatre. Theatre is not a place for popcorn or the rustling of candy wrappers. *Due to the scheduling of these field trips, arrangements can be made for students to eat lunch in the theatre. Please contact the Director of Education to make these arrangements ahead of time. Please prepare students that since this is a school time performance, there is flexibility in this theatre etiquette rule.*
4. Try not to talk during the performance. Even whispering can be distracting to fellow audience members and the performers. *Music Director Robert Franz encourages student participation and interaction. Please follow his lead on how this will be conducted during the performance, and encourage and prepare students to participate.*
5. Don't leave your seats unless instructed by the teacher or theatre staff.
6. Turn off your cell phone, if you brought one, and don't use a camera, video or tape recorder.
7. Do not go on stage at any time, unless invited by the Music Director and escorted by an adult.



### **The Mansfield Symphony at the Renaissance:**

There are many people who work together to bring the Mansfield Symphony to the stage at the Renaissance Theatre. The whole process takes many months from deciding what music to perform up until the performance date. The team consists of the following:

1. Conductor: the person in charge of an orchestra or choir who marks time and signals musicians or singers when and how to play or sing.
2. Musicians: somebody who plays a musical instrument; someone who performs, conducts, or composes music
3. Stage Manager: the person who runs the lights and sound cues for the performance; the stage manager's booth is usually found in the rear of the theatre.
4. Technical Director: the person in charge of making sure the lights and stage setting for the performance are in place and running properly.
5. Lighting Designer: the person who provides the lighting for the performance. The designer will decide what color the lights should be to complement the performance.
6. Box Office Staff: the people who sell tickets to the performance; the box office is usually located at the main entrance to the theatre.
7. House Manager & Ushers: the people who greet the audience and help them to find their seats.
8. Music Librarian: the person who acquires, organizes and maintains the music performed by the orchestra.
9. Operations Director: the person who makes sure the scheduling and production of all orchestra events run smoothly and effectively.

# Which Instrument family?

Find the hidden words within the grid of letters,  
then find the hidden message.

S T R I N G I N B S A T R U M  
E N T S N I N L A Y L U J O U  
V P C Y G W R D S B O J T P B  
Q K N V A K E V S F I M E T E  
R Q G A I H T N Z B V Q Q Q L  
Q H G C J M R E L Q K P J E B  
G D H T D R D Z L Y A O H X B  
Y X Z A Q H S J C R Q P Q Q K  
V T E E O R H H W A R D Q V X  
C N H G E X Y F W D L M I D M  
H E O C D G I D J S P O M B K  
J Z L K E C A T D J L V W H N  
A N U L X K Z D F I V A E W R  
F O B F O I H U N K A T B X U  
S P L F U P C J A W J O Y D X

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bass

cello

viola

violin

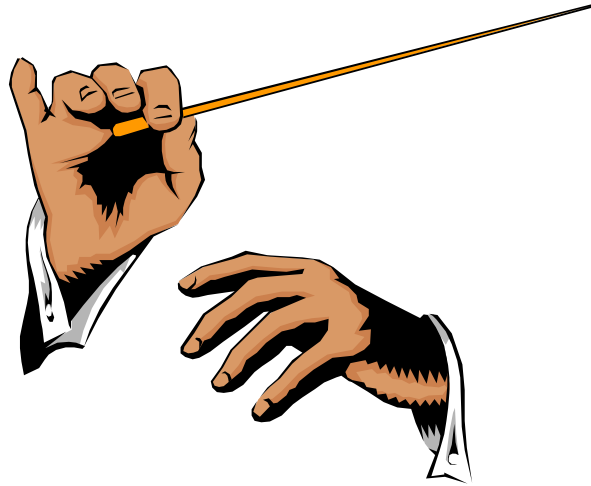
# Calculating Music

Use the numbers 1 through 9 to fill the spaces in the grid and complete each numerical expression.

Each number is used once.

3	+		+		15
+		+		+	
	+	6	+	2	9
+		+		+	
	+		+	9	21
11		15		19	

7	-		-	1	0
-		+		+	
	-		-		-12
+		-		-	
	-	4	+	8	7
8		11		-2	



## Instrument Family Word Search

Find the hidden words within the grid of letters, then find the hidden message.

G L O C K E N S P I E L F O O  
 U T E P M U R T R N B A S S B  
 I R R N S T R U M E I N T F O  
 V I A O B A S S O O N L M I E  
 I A L I M E S F A D T J O J P  
 O N I B M B I H A J N J E I G  
 L G D A B H O G E T C Z H Z V  
 A L C T U B A N E K Y V D K K  
 M E R O N C P N E I M A K Z C  
 U X P G Z T I W A N B Y L M E  
 I W G K S R M E M A A F B M L  
 R N V P A O L O D P L C R O L  
 E T U L F G R R U M S E H W O  
 F C C E E K H O R I O G M L N  
 N K A H H J O M P T B T J S P

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bass  
 bassoon  
 cello

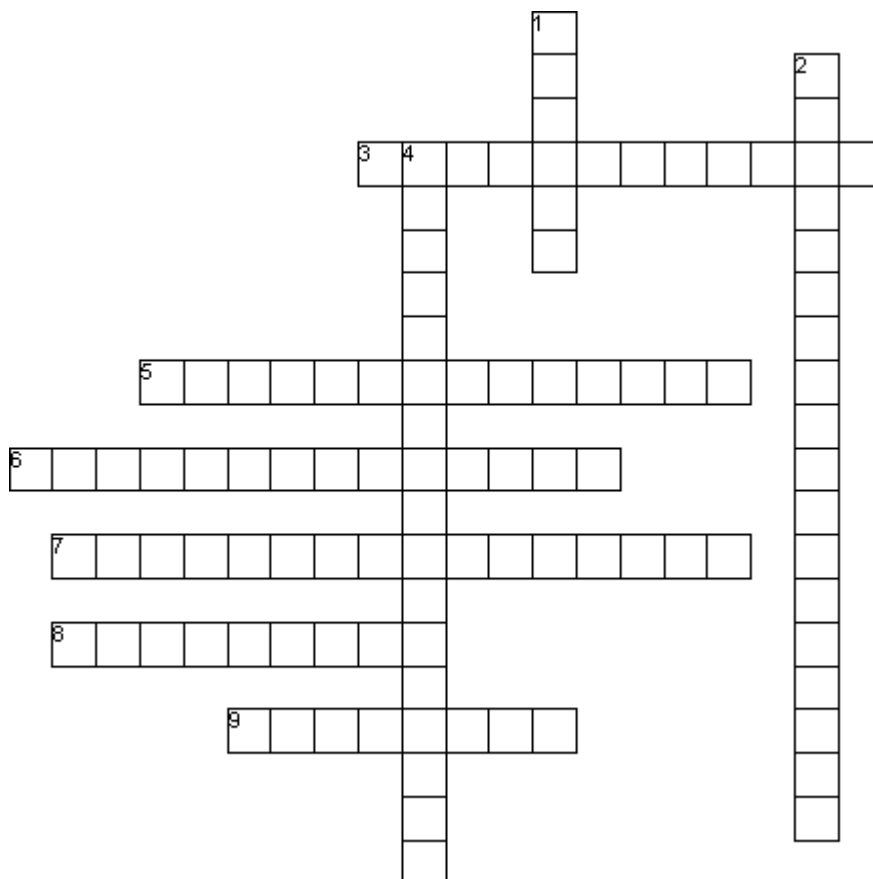
clarinet  
 cymbals  
 flute

glockenspiel  
 oboe  
 timpani

triangle  
 trombone  
 trumpet

tuba  
 viola  
 violin

## The Mansfield Symphony at the Renaissance Theatre Crossword Puzzle



### Across

3. the person who runs the lights and sound cues for the performance (2 words)
5. the people who sell the tickets to the performance (3 words)
6. the person who acquires, organizes and maintains the music performed by the orchestra (2 words)
7. the person who provides the lighting for the performance (2 words)
8. the person in charge of an orchestra or choir who marks time and signals musicians or singer when and how to play or sing
9. somebody who plays a musical instrument, conducts or composes music

### Down

1. the people who greet the audience and help them find their seats
2. the person who makes sure the scheduling and production of all orchestra events run smoothly and effectively (2 words)
4. the person in charge of making sure the lights and stage setting for the performance are in place and running properly (2 words)

## Which Instrument family? Solution

S T R I N G I N B S A T R U M  
 E N T S N I N L A Y L U J O U  
 V P C Y G W R D S B O J T P B  
 Q K N V A K E V S F M E T E  
 R Q G A I H T N Z B V Q Q Q L  
 Q H G C J M R E L Q K P J E B  
 G D H T D R D Z L Y A O H X B  
 Y X Z A Q H S J C R Q P Q Q K  
 V T E E O R H H W A R D Q V X  
 C N H G E X Y F W D L M I D M  
 H E O C D G I D J S P O M B K  
 J Z L K E C A T D J L V W H N  
 A N U L X K Z D F I V A E W R  
 F O B F O I H U N K A T B X U  
 S P L F U P C J A W J O Y D X

s t r i n g i n s t r u m e n t s

bass cello viola violin

## Calculating Music Solutions

3	+	4	+	8	15
+		+		+	
1	+	6	+	2	9
+		+		+	
7	+	5	+	9	21
11		15		19	

7	-	6	-	1	0
-		+		+	
2	-	9	-	5	-12
+		-		-	
3	-	4	+	8	7
8		11		-2	





# MANSFIELD SYMPHONY



**Robert Franz**  
Music Director

**The following Ohio State Academic Standards will be addressed and Benchmarks achieved when using these materials and participating in the Mansfield Symphony *Calculating Music* program at the Renaissance Theatre:**

## **MATH:**

- Numbers, Number Sense and Operations:  
By the end of the K-4 program:
  - A. Use place value concepts to represent whole number using numerical, words and physical models.
  - B. Recognize, classify and order whole numbers.
  - F. Count, using numerical and ordinal numbers.
  - G. Model, represent and explain addition as combining set and counting on.
  - H. Model, represent and explain subtraction as comparison, take-away and part-to-whole.
- Patterns, Functions and Algebra:  
By the end of the K-4 program:
  - A. Sort, classify and order objects by size, number and other properties, and describe the attributes used.
  - B. Extend sequences of sounds and shapes or simple patterns, and create and record similar patterns.
  - C. Create and extend patterns, and describe the rule in words.
  - G. Describe and compare qualitative and quantitative changes.
- Data analysis and Probability:  
By the end of the K-4 program:
  - A. Pose questions and gather data about everyday situations and familiar objects.
  - B. Sort and classify objects by attributes, and organize data into categories in a simple table or chart.
  - D. Describe the probability of chance events as more, less or equally likely to occur.

## **FINE ARTS - MUSIC:**

- Historical, Cultural and Social Contexts  
By the end of the K-4 program:
  - A. Identify and demonstrate basic music forms.
  - B. Identify and respond to music of historical and cultural origins.
  - C. Recognize the interaction of people and music.
- Analyzing and Responding  
By the end of the K-4 program:
  - A. Identify and demonstrate element of music using developmentally appropriate music vocabulary.
  - B. Identify the sounds of a variety of instruments including orchestra, band and classroom instruments.
  - C. Discuss and evaluate individual and group music performance.
- Valuing Music/Aesthetic Reflection  
By the end of the K-4 program:
  - B. Demonstrate audience behavior appropriate for the context and style of music performed
  - C. Demonstrate how music communicates meaning of text, feelings, moods, images, and influences personal preferences.
- Connections, Relationships and Applications  
By the end of the K-4 program:
  - D. Identify and demonstrate roles of musicians in various music settings.