

Musical Fractions

Grade Level: Grade 5

Content area(s): Math and Music

Classroom Time: 2 – 3 60 minute class periods

Purpose: Introduce fractions through the understanding of music and practice adding fractions by using musical notes and measures

Skills Addressed:

Math skill: Understanding fractions through the use of music, addition and subtraction of similar and non-similar fractions

Music Skill: Create music and understand music notation

Supplies: Handout, online access, pencil, and instruments (or created instruments materials below)

Optional: Paper towel tubes, rice or beans, paper plates, hole punch, bells, glue, markers or paint, 1” x 4” x 2” pieces of wood, felt, medium grit sandpaper, scissors, string, pieces of cloth, rubber bands, heavy paper or cardstock, tin cans, empty soda or pop bottles, glass glasses, water, pot covers (two of the same size for each set), dowel rod cut into 1’ pieces – even number, spoons, and oatmeal boxes or coffee cans,

Lesson Process:

Warm-up –

- A. Give each student the music for “Twinkle, Twinkle, Little Star.” (Attachment 1) or display for the class to see from the website
http://upload.wikimedia.org/wikipedia/commons/1/16/Twinkle_Twinkle_Little_Star.png
- B. Play the music while the students sing along. <http://www.imeem.com/kissing-coffins/music/kYfRlCxt/barney-barney-twinkle-twinkle-little-star/> (Barney sings it and it repeats. It can be stopped after one or two times.)
- C. Ask the students the following questions:
 - Looking at the music, what do you notice? – *Five lines, a squirrelly sign at the beginning of each set of lines, black circles with lines attached, a “C” at the beginning, some of the circles are open, etc...*
 - How do the words fit with the musical notes? – *Each syllable has a black circle to go with it or note to go with it.*

Lesson procedure –

- A. The black circles on the music are called musical “notes.” Each note has a value to it. Distribute attachment 2 with note values on it.
- B. Review the sheet with the students. Ask the students the following questions:
 - How many beats does a quarter note have? - *One*
 - How many beats does a dotted quarter note have – *1 1/2*
 - Is there a quarter rest? If so, how many beats does a quarter rest have? – *Yes, one*

- How many beats does a half note have? - *Two*
 - How many beats does a dotted half note have? - *Three*
 - What does the dot do to the note? – *Ex: the dot adds half the value of the note to the original note.*
 - How many beats does an eighth note have? - *1/2*
 - What different note and rest combinations could you put together to equal four beats? – *Ex: Four quarter notes, a whole note, two quarter notes and a half note, 16 thirty-second notes, etc.*
- C. Have the students look at “Twinkle, Twinkle, Little Star” again. Tell them to look at the first two words and the notes above them. What is the value of each note and the total value of that “measure” (from the beginning until the first line on the staff) - $1 + 1 + 1 + = 4$
- D. The first measure is complete. Have the students put the value of the note above each note then go back and find the number of counts in each measure. *See Attachment 1*
- E. What did the students notice about each measure? – *All the measures have four beats*
- F. The “C” after the treble clef sign tell us each measure will have four beats in it. If it looked like 3 over 4 (note it on the chart) then there would only be three beats in a measure. This is called common time, there are four beats in a measure and a whole note equals four beats.
- G. Watch the video “The Rhythm Track” - http://www.thefutureschannel.com/dockets/realworld/the_rhythm_track/index.php
Ask the students the following questions:
- What instrument does Ndugu Chanclor play? - *The drums*
 - What instrument played the quarter note? – *The bass drum*
 - What number did he use to divide by to get the smaller notes? - *Two*
 - Which rhythm do you like? – *Answers will vary*
 - Do computers create music? – *No, it is created by the person creating it on the computer*
- H. The students complete “Making Music” – Attachment 2
- I. Give each student an instrument or have each student construct an instrument to use – Attachment 3
- J. Each student takes a turn to “play” one of their measures.
- K. Distribute “My Song” – Attachment 4
- L. Each student is to create their own song using four beats per measure, they have to use the correct types of notes but it doesn’t matter where they put the note on the staff. Each song is to include the following: (Rubric – Attachment 5)
- ✓ Bar lines after each measure of four counts
 - ✓ At least one of each note: whole, dotted half note, half note, quarter note, dotted quarter note, eighth note, sixteenth note, and thirty-second note
 - ✓ At least one of each of the following rests: whole, half, quarter, eighth, sixteenth and thirty-second
 - ✓ At least 8 measures

- M. Students number each measure of their song.
- N. Students write a mathematical equation for each measure ensuring each measure has a sum of four. – Attachment 6
- O. Students exchange papers for a partner to check.
- P. Select a few students to play their “song” for the class
- Q. Ask the students the following questions:
- Musicians use math when they play. What type of math do they use? – *Ex: addition of fractions*
 - Notice, you were adding fractions. When you were adding the notes together how did you think about adding them? – *Ex: group like notes together to get a total then add the other values to it, etc...*
 - State a general rule for adding fractions from your observations. – *Ex: It is easier to add like notes together so add like fractions or fractions with the same denominator, therefore to add fractions the denominator or bottom has to be the same, etc.*
 - What happens if the denominator is not the same and you have to add the fractions? *Answers will vary: You can't do it; you have to make them the same, etc....*
- R. The denominators of fractions can be changed to be the same. To change them the fraction is multiplied by 1 but in a different form. Just as in music, the same notes don't have to be next to each other but they can be added together to create a count. An example would be a dotted quarter note and an eighth note adds together to equal two counts.
- S. Ask the students what other note/rest combinations can be put together to create full beats, they may have used some when they created their song. Put their examples on the board. - *Ex: 1 eighth note and two sixteenth notes; Two sixteenth notes and four thirty-second note; 3 sixteenth notes, 2 thirty-second note, and a dotted quarter note and two eighth note , etc...*
- T. Ask the students how they put the notes together to create the full counts. Put the mathematical equivalents under the notes and add them as a class. – *Ex: They knew that two sixteenth notes equal one eighth note which equals $1/2$ so two $1/2$'s equal a whole, 2 sixteenth notes equal $1/2$ and 4 thirty-second notes equal $1/2$ and $1/2 + 1/2 = 1$; a sixteenth note equals $1/4$, a thirty-second note equals $1/8$, and a dotted quarter note equals $1 1/2$ and an eighth note equals $1/2$, $1/4 + 1/4 + 1/4 + 1/8 + 1/8 + 1 1/2 + 1/2 = 3$, etc...*
- U. Write the equations the students suggested mathematically with common denominators showing the students how to multiply the equations by one. Note to look to see what number is needed to multiply the smaller denominator by to get the larger. Practice with the problems as long as needed. - *Ex: $1/4 + 1/4 + 1/8 + 1/8 + 1/8 + 1/8$: Multiply the 4 by two to equal 8. Therefore multiply all the $1/4$ ths by 2 in the form of $2/2$. $1/4 * 2/2 = 2/8$... $2/8 + 2/8 + 1/8 + 1/8 + 1/8 + 1/8 =$ then add the numerators as before, $2+2+1+1+1+1 = 8$. The sum is then $8/8 = 1$.*
- V. In music you do not subtract notes or fractions. How would you subtract fractions? - *Ex: the denominators have to be the same then subtracts the top numbers, etc.*

W. Practice as a class adding and subtracting fractions with the students: Attachment 7 - Add more as needed.

X. Students review adding and subtracting fractions. - Attachment 8

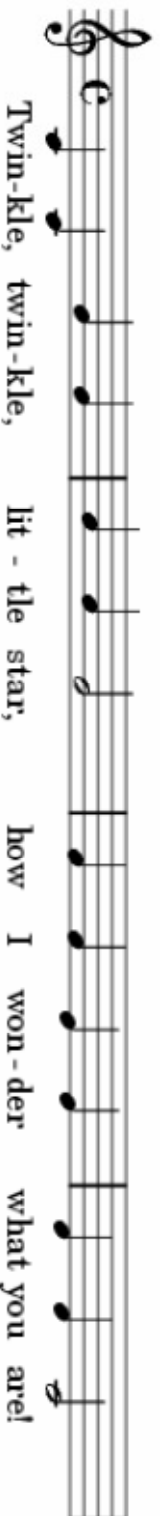
Student assessment or final product to be developed:

Class participation, teacher observation, handouts, and instruments

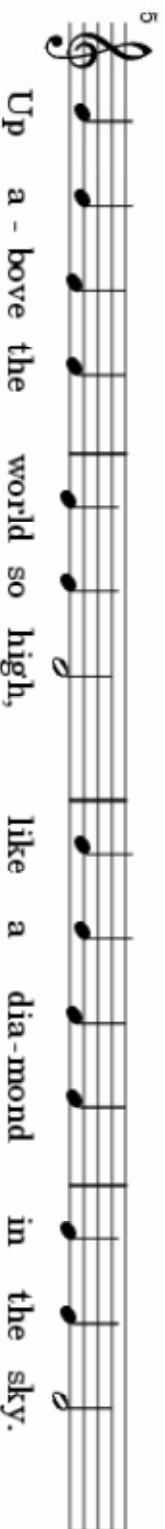
Extension activities (optional)

- A. Use dotted eighth notes and dotted sixteenth notes to create different fractions.
- B. Extend the addition and subtraction of fractions to mixed numbers.
- C. Select a couple of the student songs, copy them and as a class everyone plays the same song using their instrument.
- D. Listen to different types of music to determine the beat and try to guess the types of notes used.

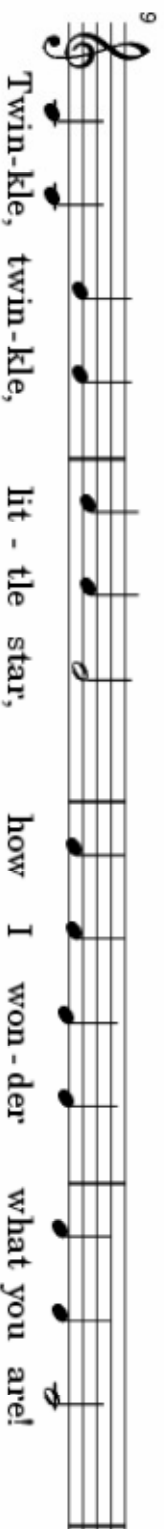
Twinkle, Twinkle, Little Star



Twinkle, twinkle, lit - tle star, how I won - der what you are!

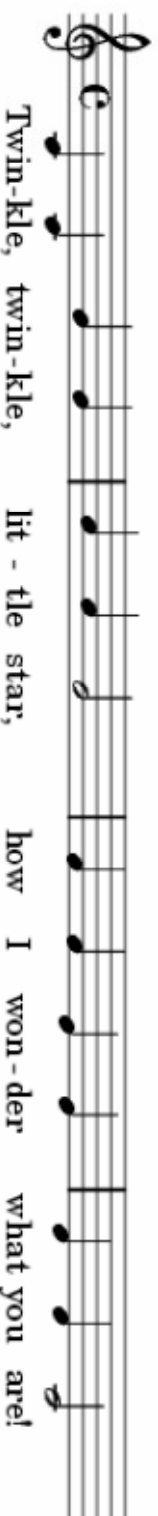


Up a - bove the world so high, like a dia - mond in the sky.

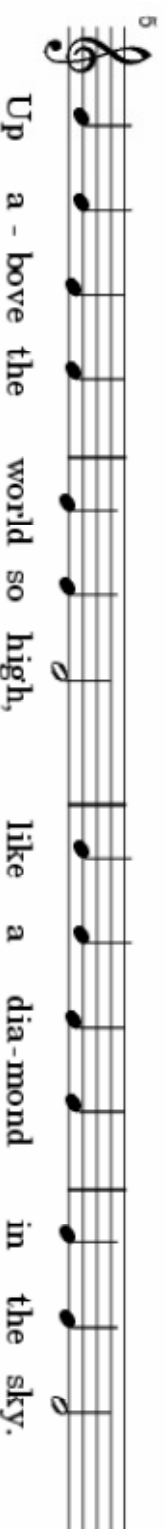


Twinkle, twinkle, lit - tle star, how I won - der what you are!

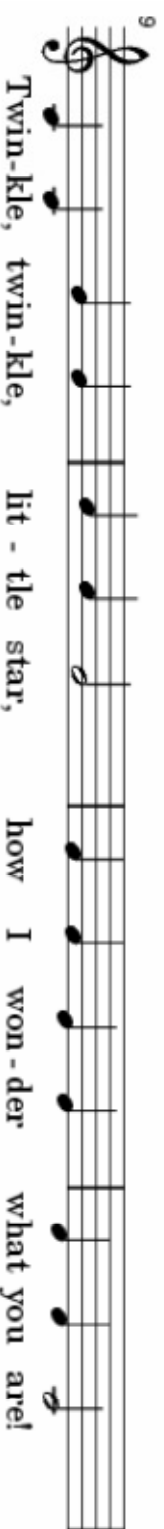
Twinkle, Twinkle, Little Star



Twinkle, twinkle, lit - tle star, how I won - der what you are!



Up a - bove the world so high, like a dia - mond in the sky.



Twinkle, twinkle, lit - tle star, how I won - der what you are!

Twinkle, Twinkle, Little Star

4

4

4

4

1 1 1 1 1 1 2 1 1 1 1 1 1 2

Twin-⁴kle, twin-⁴kle, lit - tle star, ⁴how I won-⁴der ⁴what you are! ⁴















1 1 1 1 1 2 1 1 1 1 1 2

Up a - bove the ⁴world so high, ⁴like a dia-⁴mond ⁴in the sky. ⁴

1 1 1 1 1 2 1 1 1 1 1 2

Twin-⁴kle, twin-⁴kle, lit - tle star, ⁴how I won-⁴der ⁴what you are!

Music Note Beats in Common time (4/4 Meter)

Note	Beats	Name	Note	Beats	Name
	4	Whole note		4	Whole rest
	3	Dotted half note			
	2	Half note		2	Half rest
	1	Quarter note		1	Quarter rest
	1 1/2	Dotted quarter note			
	1/2	Eighth note		1/2	Eighth rest
	1/4	Sixteenth note		1/4	Sixteenth rest
	1/8	Thirty-second note		1/8	Thirty-second rest

Common Music Terms







Symbol	Name	Symbol	Name
	Treble clef	$\frac{4}{4}$	4/4 meter
	Common time (4/4 meter)	$\frac{3}{4}$	3/4 meter
	Staff		Bar line for Treble clef

- ♪ 2 half notes = 1 whole note
- ♪ 2 quarter notes = 1 half note
- ♪ 2 eighth notes = 1 quarter note
- ♪ 2 sixteenth notes = 1 eighth note

- ♪ 2 thirty-second notes = 1 sixteenth note
- ♪ 4 quarter notes = 1 whole note
- ♪ 8 eighth notes = 1 whole note
- ♪ 16 sixteenth notes = 1 whole note




Making Music





Match the note with the number of beats in common time.

- | | | | |
|--------|---|----|-------|
| ___ 1. |  | A. | 4 |
| ___ 2. |  | B. | 2 |
| ___ 3. |  | C. | 3 |
| ___ 4. |  | D. | 1/2 |
| ___ 5. |  | E. | 1 1/2 |
| ___ 6. |  | F. | 1 |
| | | G. | 1/16 |
| | | H. | 1/4 |


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Find the value of each equation.

7.  +  +  = _____

8.  +  +  +  = _____

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9.  +  +  +  +  +  +  = _____

Create 5 *different* musical equations that equal 4 beats.

10.

11.

12.

13.

14.

Making Music

Match the note with the number of beats in common time.

F 1.

D 2.

B 3.

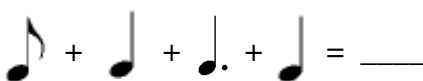
E 4.

A 5.

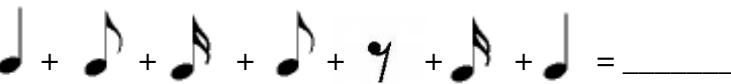
H 6.

Find the value of each equation.

7.  = 4

8.  = _____

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9.  = _____

Create 5 *different* musical equations that equal 4 beats.

EXAMPLES: Answers will vary....

 = 4

 = 4

 = 4

 = 4

Mathematically correct, musically incorrect:

 = 4

 = 4

Musical Instruments

Shakers:

Cut the paper towel tubes in half. Cover one end with either a piece of cloth and a rubber band or glue a piece of heavy paper to it. Place a quarter cup of rice or beans in the tube. Cover the opposite end. Decorate as desired. Shake the tube to create the sound.

Tambourine:

Optional: Put $\frac{1}{4}$ beans or rice on a heavy paper plate.

Glue two plates together with the tops facing each other. Punch holes 1 – 2” apart. Put string through the bells and attach to the plates where the holes are. Decorate as desired.

Cow bells:

Remove all the paper from the tin cans. Make sure the open end is smooth. Bend the open end to different circumferences. Punch a hole into the middle of the closed end. Cut a string twice the length of the can. Put a bell in the middle of the string; tie a knot above the bell. Thread the string through the hole of the can from the inside. Place the bell about half way up the can. Tie a knot in the string close to the top of the can. Tie a knot at the other end. Ring the cow bell by moving the string on top of the can in order to make the can move. Decorate as desired.

Cymbals:

Use two pot covers about the same size to bang together to create a sound.

Sand blocks:

Cut pieces of felt and sandpaper 4” x 2”. Glue felt to the larger side of the block. Glue the sandpaper on top of the felt. Rub two blocks together to create a sound. Decorate the top of the blocks as desired.

Blocks:

Two blocks are hit together to create a sound. Decorate the top of the blocks as desired.

Sticks:

Hit two dowel rods together to create a sound. Decorate dowels as desired.

Tone bottles:

Either leave the bottles empty or put different levels of water in each bottle. Blow over the hole to create a sound. Decorate the bottles as desired.

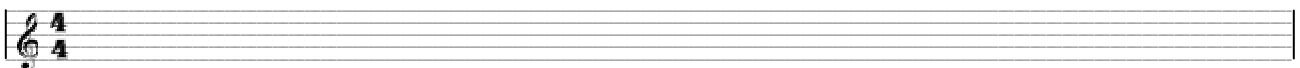
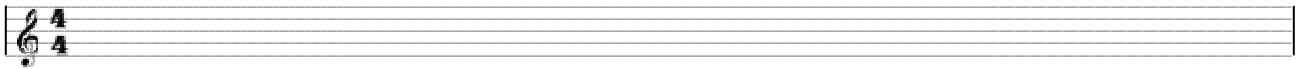
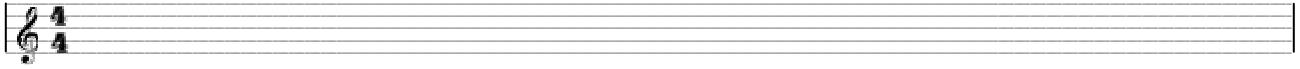
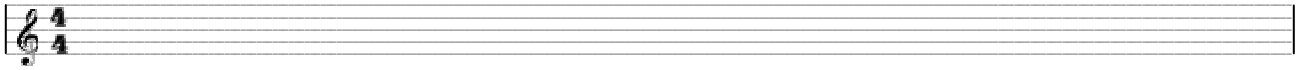
Water glasses:

Fill the glasses with different levels of water. Tap the glasses with a spoon to create a sound.

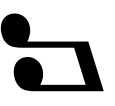
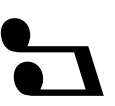
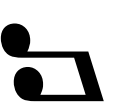
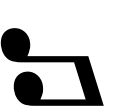
Drums:

Keep the cover on the oatmeal containers or coffee cans. Using a hand or an object the sound is created by banging on the container. Decorate as desired.

My Song



My Song Rubric

	Whole	Dotted Half	Half	Quarter	Dotted Quarter	Eighth	Sixteenth	Thirty-second	TOTAL
Notes									
Rests									
	Measure 1	Measure 2	Measure 3	Measure 4	Measure 5	Measure 6	Measure 7	Measure 8	
Measures									
Correct count per measure									
Correct equations									
	1	2	3	4	5	6	7	8	
Extra correct measures									
	1	2	3	4					
Neatness									

My Song Rubric Example

	Whole	Dotted Half	Half	Quarter	Dotted Quarter	Eighth	Sixteenth	Thirty-second	TOTAL
Notes	1	1	1	1		1	1	1	7
Rests	1		1	1		1	1	1	6
Measures	Measure 1	Measure 2	Measure 3	Measure 4	Measure 5	Measure 6	Measure 7	Measure 8	
Correct count per measure	1	1	1	1	1	1			6
Correct equations	1		1	1		1			4
Extra correct measures	1	2	3	4	5	6	7	8	3
Neatness		1	2	3	4				4

TOTAL 30

My Song Equations

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Extra Credit:

1. _____

2. _____

3. _____

4. _____

Class Fraction Practice

1. $\frac{1}{2} + \frac{1}{2} = 1$

2. $\frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

3. $\frac{1}{4} + \frac{1}{2} = \frac{3}{4}$

4. $\frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$

5. $\frac{3}{4} + \frac{1}{2} = \frac{5}{4} = 1 \frac{1}{4}$

6. $\frac{1}{8} + \frac{3}{4} = \frac{7}{8}$

7. $\frac{5}{8} + \frac{1}{4} = \frac{7}{8}$

8. $\frac{3}{8} + \frac{1}{4} + \frac{1}{2} = \frac{9}{8} = 1 \frac{1}{8}$

9. $\frac{3}{16} + \frac{5}{8} + \frac{1}{2} + \frac{5}{16} + \frac{1}{8} = 1 \frac{6}{8} = 1 \frac{3}{4} \quad (\frac{8}{16} + \frac{1}{2} + \frac{6}{8} = \frac{1}{2} + \frac{1}{2} + \frac{6}{8})$

10. $\frac{3}{5} + \frac{1}{10} + \frac{1}{5} + \frac{3}{10} = \frac{12}{10} = \frac{6}{5} = 1 \frac{1}{5}$

11. $\frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$

12. $\frac{5}{4} - \frac{3}{4} = \frac{2}{4} = \frac{1}{2}$

13. $\frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

14. $\frac{1}{2} - \frac{1}{4} = \frac{1}{4}$

15. $\frac{5}{8} - \frac{1}{4} = \frac{3}{8}$

16. $\frac{13}{16} - \frac{5}{8} = \frac{3}{16}$

17. $\frac{15}{16} - \frac{3}{4} = \frac{3}{16}$

18. $\frac{11}{16} - \frac{1}{8} = \frac{9}{16}$

19. $\frac{2}{5} - \frac{3}{10} = \frac{1}{10}$

20. $\frac{5}{6} - \frac{2}{3} = \frac{1}{6}$

BONUS QUESTION: $\frac{1}{2} + \frac{3}{4} - \frac{3}{8} - \frac{5}{16} = (\frac{2}{4} + \frac{3}{4}) - \frac{3}{8} - \frac{5}{16} = \frac{5}{4} - \frac{3}{8} - \frac{5}{16} = \frac{10}{8} - \frac{3}{8} - \frac{5}{16} = \frac{7}{8} - \frac{5}{16} = \frac{14}{16} - \frac{5}{16} = \frac{9}{16}$

Fraction Fun!

1. $\frac{1}{2} + \frac{1}{2} + 3 = \underline{\hspace{2cm}}$

9. $\frac{7}{8} - \frac{3}{8} = \underline{\hspace{2cm}}$

2. $\frac{3}{8} + \frac{5}{8} + \frac{2}{4} = \underline{\hspace{2cm}}$

10. $\frac{5}{8} - \frac{3}{8} = \underline{\hspace{2cm}}$

3. $2 + \frac{3}{8} + \frac{5}{8} + \frac{1}{4} = \underline{\hspace{2cm}}$

11. $\frac{3}{8} - \frac{1}{4} = \underline{\hspace{2cm}}$

4. $\frac{1}{4} + \frac{3}{8} + \frac{5}{4} + \frac{1}{2} = \underline{\hspace{2cm}}$

12. $\frac{3}{4} - \frac{1}{2} = \underline{\hspace{2cm}}$

5. $\frac{7}{8} + \frac{1}{2} + 3 + \frac{3}{4} + \frac{5}{8} = \underline{\hspace{2cm}}$

13. $\frac{7}{8} - \frac{1}{2} = \underline{\hspace{2cm}}$

6. $\frac{5}{6} + \frac{2}{3} + \frac{1}{3} + \frac{1}{6} = \underline{\hspace{2cm}}$

14. $\frac{7}{8} - \frac{1}{2} - \frac{1}{4} = \underline{\hspace{2cm}}$

7. $\frac{4}{9} + \frac{5}{9} + \frac{2}{3} + \frac{1}{9} = \underline{\hspace{2cm}}$

15. $\frac{1}{2} + \frac{3}{4} - \frac{5}{8} = \underline{\hspace{2cm}}$

8. $\frac{5}{6} + \frac{7}{9} + \frac{2}{3} + \frac{4}{9} + \frac{1}{6} + \frac{2}{9} = \underline{\hspace{2cm}}$

BONUS: $\frac{5}{8} + \frac{1}{4} - \frac{1}{2} + 1 - \frac{3}{8} = \underline{\hspace{2cm}}$

Fraction Fun!

$$1. \frac{1}{2} + \frac{1}{2} + 3 = 4$$

$$2. \frac{3}{8} + \frac{5}{8} + \frac{2}{4} = \frac{12}{8} = \frac{3}{2} = 1 \frac{1}{2}$$

$$3. 2 + \frac{3}{8} + \frac{5}{8} + \frac{1}{4} = 2 \frac{10}{8} = 2 \frac{5}{4} = 3 \frac{1}{4}$$

$$4. \frac{1}{4} + \frac{3}{8} + \frac{5}{4} + \frac{1}{2} = 2 \frac{3}{8}$$

$$5. \frac{7}{8} + \frac{1}{2} + 3 + \frac{3}{4} + \frac{5}{8} = 5 \frac{3}{4}$$

$$6. \frac{5}{6} + \frac{2}{3} + \frac{1}{3} + \frac{1}{6} = 2$$

$$7. \frac{4}{9} + \frac{5}{9} + \frac{2}{3} + \frac{1}{9} = 1 \frac{7}{9}$$

$$8. \frac{5}{6} + \frac{7}{9} + \frac{2}{3} + \frac{4}{9} + \frac{1}{6} + \frac{2}{9} = 3 \frac{1}{9}$$

$$9. \frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$$

$$10. \frac{5}{8} - \frac{3}{8} = \frac{2}{8} = \frac{1}{4}$$

$$11. \frac{3}{8} - \frac{1}{4} = \frac{1}{8}$$

$$12. \frac{3}{4} - \frac{1}{2} = \frac{1}{4}$$

$$13. \frac{7}{8} - \frac{1}{2} = \frac{3}{8}$$

$$14. \frac{7}{8} - \frac{1}{2} - \frac{1}{4} = \frac{1}{8}$$

$$15. \frac{1}{2} + \frac{3}{4} - \frac{5}{8} = \frac{3}{8}$$

$$\text{BONUS: } \frac{5}{8} + \frac{1}{4} - \frac{1}{2} + 1 - \frac{3}{8} = 1$$

Website links

- <http://www.philtulga.com/resources.html>
- <http://www.dolmetsch.com/musicalsymbols.htm>
- http://www.google.com/imgres?imgurl=http://rath.ca/HomeSchool/MusicGifs/DottedHalfNote.gif&imgrefurl=http://rath.ca/HomeSchool/FlashCardMusic.shtml&h=175&w=200&sz=1&tbnid=UTPAbyzQyM10QM:&tbnh=91&tbnw=104&prev=/images%3Fq%3Ddotted%2Bhalf%2Bnote&hl=en&usq= wtjzO DkUZgJcz8b30Xd3CetCIY=&ei=pPyvSs_QCY-wtge07I2pCA&sa=X&oi=image_result&resnum=4&ct=image
- http://www.thefutureschannel.com/dockets/realworld/the_rhythm_track/index.php

National Standards

Math

Understand numbers, ways of representing numbers, relationships among numbers, and number systems: recognize equivalent representations for the same number and generate them by decomposing and composing numbers; develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines and as division of whole numbers; use models, benchmarks, and equivalent forms to judge the size of fractions; recognize and generate equivalent forms of commonly used fractions, decimals, and percents

Compute fluently and make reasonable estimates: use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals

Understand patterns, relations, and functions: represent and analyze mathematical situations and structures using algebraic symbols, express mathematical relationships using equations

Communication: organize and consolidate their mathematical thinking through communication; communicate their mathematical thinking coherently and clearly to peers, teachers, and others; analyze and evaluate the mathematical thinking and strategies of others; use the language of mathematics to express mathematical ideas precisely

Music

Composing and arranging music with specified guidelines: students use a variety of traditional and nontraditional sound sources and electronic media when composing and arranging

Reading and notating music: students read whole, half, quarter, eighth, sixteenth and dotted notes and rests, students use standard notation to record their musical ideas and the musical ideas of others

Understanding relationships between music, the other arts, and disciplines outside the arts: students describe ways in which the principles and subject matter of other disciplines taught in the school are interrelated with those of music (e.g., language arts; issues to be considered in settings texts to music; mathematics; frequency ratios of intervals; sciences; the human hearing process and hazards to hearing ; social studies; historical and social events and movements chronicled in or influenced by musical works

TEKS

Math

Number, operation, and quantitative reasoning; The student uses fractions in problem-solving situations. The student is expected to: (A) generate a fraction equivalent to a given fraction such as $\frac{1}{2}$ and $\frac{3}{6}$ and $\frac{4}{12}$ and $\frac{1}{3}$; (B) generate a mixed number equivalent to a given improper fraction or generate an improper fraction equivalent to a given mixed number; (C) compare two fractional quantities in problem-solving situations using a variety of methods including common denominators

Number, operation, and quantitative reasoning; The student adds, subtracts, multiplies and divides to solve meaningful problems. The student is expected to: (E) model situations using addition and/or subtraction involving fractions with like denominators using concrete objects, pictures, words, and numbers.

Patterns, relationships, and algebraic thinking; The student makes generalizations based on observed patterns and relationships. The student is expected to: (A) describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams

Underlying processes and mathematical tools; The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to: (A) identify the mathematics in everyday situations; (D) use tools such as real objects, manipulative, and technology to solve problems.

Underlying processes and mathematical tools; The student communicates about Grade 5 mathematics using informal language. The student is expected to: (A) explain and record observations using objects, words, pictures, numbers, and technology; and (B) relate informal language to mathematical language and symbols

Underlying processes and mathematical tools; The student uses logical reasoning. The student is expected to: (A) make generalizations from patterns or sets of examples and non-examples; and (B) justify why an answer is reasonable and explain the solution process

Music

Creative expression/performance; the student sings or plays an instrument, individually and in groups performing a varied repertoire of music. The student is expected to: © demonstrate appropriate small- and large- ensemble performance techniques during formal and informal concerts.

Creative expression/performance; the student reads and writes music notation. The student is expected to: (A) read standard notation

Creative expression/performance; the student creates and arranges music within specified guidelines. The student is expected to: (A) create rhythmic and melodic phrases; and (B) create/arrange simple accompaniments.