

Mathematics Education
Nipissing University – Faculty of Ed

Exploring the Relationships of Fractions and Music

Integrated Mathematics Project

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P/J Section 4

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Michelle Watson & Kristin White

Project Outline

Grade Level: Four

Math Curriculum

Strand: Number Sense and Numeration

Specific Expectations:

- Demonstrate and explain the relationship between equivalent fractions, using concrete materials (e.g., fraction circles, fraction strips, pattern blocks) and drawings (e.g., “I can say that $\frac{3}{6}$ of my cubes are white, or half of the cubes are white, or half of the cubes are white. This means that $\frac{3}{6}$ and $\frac{1}{2}$ are equal.”)
- Represent fractions using concrete materials, words, and standard fractional notation, and explain the meaning of the denominator as the number of the fractional parts of a whole or a set, and the numerator as the number of fractional parts being considered.

Arts Curriculum

Strand: Music

Specific Expectations:

- Identify whole notes, half-notes, quarter notes, and eighth-notes, and their corresponding rests in $\frac{4}{4}$ time.
- Demonstrate their understanding of beat through conducting a piece in $\frac{4}{4}$ time, using the standard conducting pattern.

Student Activity Sheet 1

Name _____

Mathematics Knowledge and Understanding

Define the following terms. You can use different resources to find the information such as the internet, books, textbooks or even your classmates.

1. Fraction

2. Equivalent fraction

3. Numerator

4. Denominator

5. Measure

6. Dotted notes









Student Activity Sheet 2

Name _____



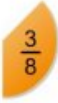


Mathematics Thinking, Inquiry & Problem Solving

Solve or complete the following questions.

1. Match up the equivalent fraction with its appropriate note. Remember, if you don't know the answer use your resources wisely.

 whole note = four beats	
 half note	
 quarter note	
 eighth note	

2. If the whole note is made up of four beats in total, then how many beats each of the other three notes worth. Use your musical and fractional knowledge to figure this out. If you have some trouble, take a look at the pie pieces above and that might give you a clue.
3. When a dot is placed beside a note, it increases its value by one half. If you put a dot beside the last example, how much would it be worth? Remember to note your answer in fraction form and in pie chart.

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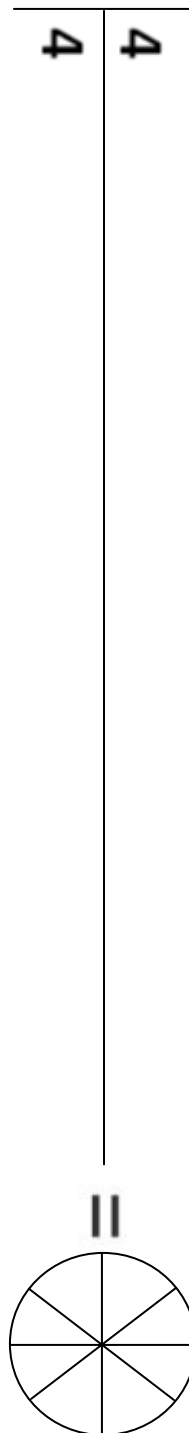
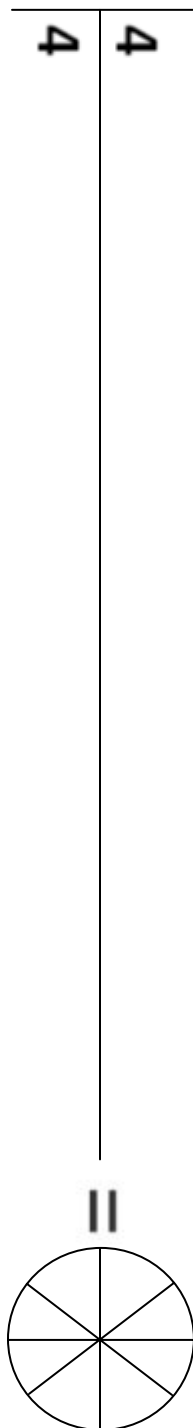
4. At Home Activity: With help from a family member, fill up four glasses with different amounts of water. Fill the first glass to the top, fill the second glass 1/2 full, fill the third glass 1/4 of the way full and fill the last glass 1/8 of the way full. When you tap them gently, what kind of sounds do you get? Explore filling more glasses with various amounts of liquid to see how many more sounds you can get. Remember to help clean up after your activity though.

Student Activity Sheet 3

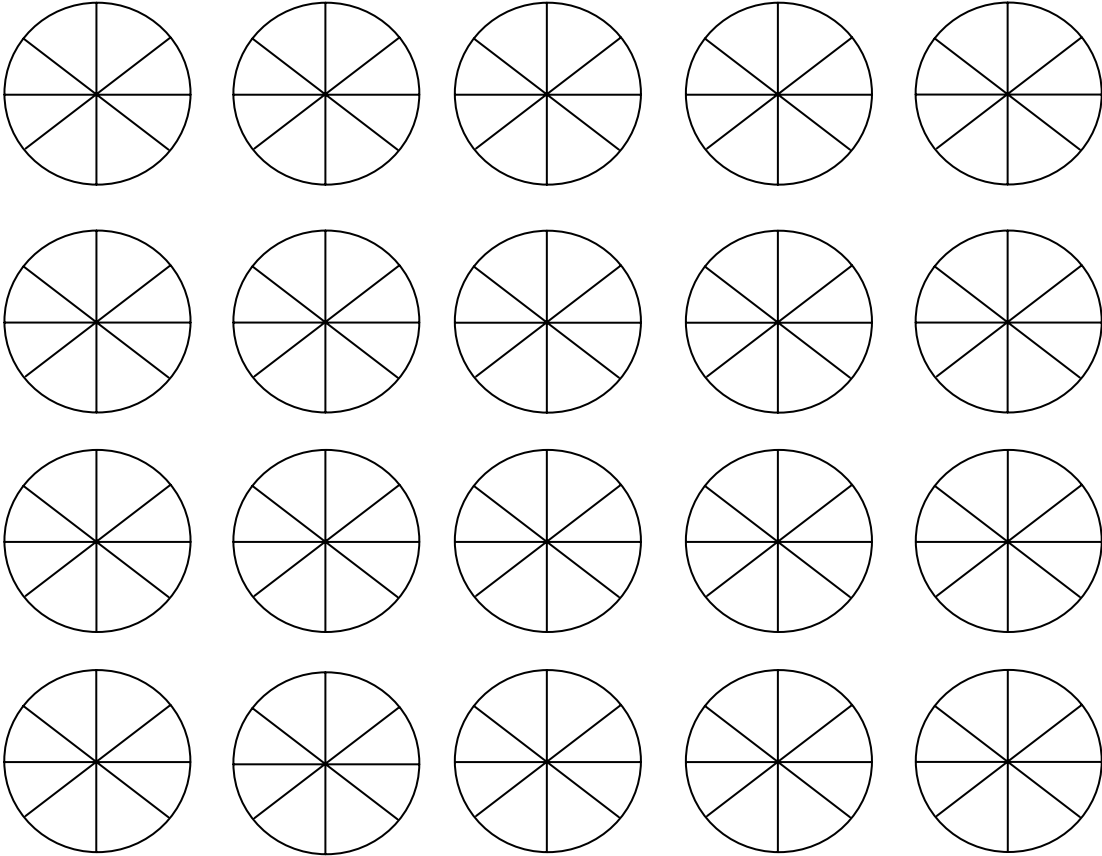
Name _____

Application Activity

You have been given the task of making a 2 bar composition for the upcoming Toronto Music Festival. Your short recital must have a total of four beats per **measure**. Using what you have learned from the previous activities along with the fraction handout, create your own fraction representations of all the notes you have learned and use them. Here's a hint – as you glue on your fractions, colour in the pie at the end of the line. This will help you to know how much more you need. If you need an extra hand in hearing what your composition sounds like, you can visit <http://www.philtulga.com/pie.html> to help you out.



Fraction Handout



Reflections

Kristin White

In completing this assignment, I have learned that there are many ways of integrating math across the curriculum. For this assignment we decided to integrate music with math. I have learned that music can be used to help teach fractions to grade 4/5 students. Through doing this assignment I have also enhanced my knowledge of the note values, such as whole note, quarter notes, half notes and eighth notes. I also became familiar with the note names on both the bass and treble clef staff.

I believe this is a great way of teaching fractions to students. I believe if students are taught fractions in a fun manner they will want to learn and the understanding of fractions will come easier. I know many students including myself have great difficulty when it comes to fractions due to a lack of understanding and poor teaching. Incorporating music to teach fractions, I believe will help many students with the understanding of fractions.

I will definitely use this technique in my classroom. Once the students have learned all the note names and values, they will be able to add and subtract fractions. The students will also be able to put pitch to their operations and perform them for their peers. This would also include the integration of language such as public speaking into the classroom.

I never realized how much you can integrate math across the curriculum. I have learned that math does not have to be scary anymore and can be taught in ways that help all individual students learn effectively.

Michelle Watson

Overall I found this project to be quite a challenge but on the other hand I really enjoyed the process of creating it because it was a great learning experience. I'm still not quite sure if we completely hit the nail on the head with everything we've done here because it was something so different and out of our element. However, now having gone through and actually planned something like this I think I'd be more comfortable trying to implement an integrated project into my future classroom. I think the concept of it is totally great because it's over and above the unit so it's something the students can work on at their own pace and sort of chug away at when they may be done their class work or maybe even at home. By allowing them that extra time, it sort of takes that element of anxiety away and really lets them delve into the project.

Another challenge that we faced during this project was not really knowing a heck of a lot about music but we really put our heads into it and tried to do as much research as possible. As we were online taking a look at different websites and such, we found that a lot of people have really caught onto this "integrated" trend and there's actually more resources out there than we thought. So as a future teacher, this will also tie into my decision about implementing something like this. With all those resources it's not only good for the teacher but for the students too for extra research.

The fact that it ties two curriculums together though is such an added bonus as a teacher. It may be a lot of planning up front but combining elements of the curriculum together can really save time in the long run, but at the same time really benefit the students. I think this sort of activity would be great for kids who tend to think one way, to get them really thinking outside of the box. There's an element of creativity so it allows students to explore the concept and put their own little spin on it and really own it. I think once they experience that, I think it will make that great long lasting impression and they'll really benefit from the learning. Tying different subjects together like math and music also gives them a more real-life context which could create that needed "eureka" moment for a student where they finally understand a concept that they've been struggling with.

References

Small, Marian (2008). *Making Math Meaningful to Canadian Students, K – 8*. Toronto: Nelson Education Ltd.

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