

Final Project – Sequence of Activities
 Doreen Sandor
 Grade Level: 4th – 6th

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SEQUENCE OF ACTIVITIES for:
 FIBONACCI SEQUENCE UNIT

Teacher	Doreen Sandor
Members of Collaborative Team in class	Teacher's Aide (one on one) OT (pull out) Speech Teacher (push-in and pull-out) Psychologist (push-in and pull-out) Special Ed Teacher (push-in and pull-out)
Grade Level	Fourth Grade
Population	Inclusion Class. Students with special needs in this inclusion class include: <ul style="list-style-type: none"> • an Autistic student • a student with hearing loss • several students classified with ADHD • three LD students who require modifications • two Gifted and Talented students in the classroom. See attached list of Accommodations, Modifications and Strategies.
Time Required for lesson:	Estimated time: four 30 - minute sessions for 4 consecutive classes (for me that would be 4 classes over 2 weeks.)
Goals/Purpose:	During four 45-minute music classes (over 2 weeks), the students, by completing all the components of a Webquest and lesson, will investigate and explore patterns in music, math, science and nature and apply this knowledge to a measuring (Math) project. In small groups, they will measure body parts and complete a table using Create a Graph online program http://nces.ed.gov/nceskids/createagraph/ to record, analyze and compare data. They will assess whether the measurement data they have gathered aligns with the .618 ratio to satisfy the "Golden Rectangle" theory that is related to the Fibonacci Sequence. They will present their graphs and data to support and defend their

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	<p>position. They will also complete tasks to a Proficient (Level 3) level on the Webquest Rubric.</p> <p>Further:</p> <ol style="list-style-type: none"> 1) Students will access, generate, process, and transfer information using appropriate technologies. 2) Students will recognize, use, and represent algebraically patterns, relations, and functions. 3) Students will describe, extend, and make generalizations about geometric and numeric patterns. 4) Students will recognize and analyze patterns in music, nature, science, and Math. 5) Students will either work collaboratively as a whole group or within a smaller group through steps or procedures in the lesson. 6) Students will accurately cite three sources used, in the desired format; 7) Students will complete any writing portion of the assignment with only 1 error in capitalization or punctuation. 8) Students will save their work on the school server in a folder created by the teacher for that purpose. 9) Students will be able to list some connections between mathematics and music. 10) Students will describe the Fibonacci number pattern sequence, commonly called the Fibonacci Sequence, and explain some ways that it appears in music.
<p>Essential Questions</p>	<p><i>Essential Question 1: How does the geography of where someone lives determine how people use the land?</i></p> <p><i>Essential Question 2: Do you know of any artists who use math in their artwork?</i></p> <p><i>Essential Question 3 : How might science and art be related?</i></p>
<p>INSTRUCTIONAL PLAN</p>	
<p>Materials/Resources/Preparation Needed:</p>	<ul style="list-style-type: none"> • Adequate space for students to meet as a group. • 4th Grade Music book from Silver Burdett’s “Making Music” series.

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	<ul style="list-style-type: none"> • Poster with pentatonic scale. • Orff keyboards with only notes of pentatonic scale left on. • Laptop with PowerPoint software. • PowerPoint presentation for lesson. • SMART Board™ Interactive Whiteboard • CDs & CD/Tape Player • Computers in classroom (5) with Internet Access. • Internet time scheduled at library or groups scheduled at the computer labs in the classroom. • Provide the IT department with a list of sites that the students need to visit for the project, and confirm that these will be available to the students. • Writing implements and index cards. • PDA handhelds or AlphaSmarts if available (to be used instead of index cards.) • Teacher to print out the Fibonacci Math Worksheet, even though it is available online – to save time. <ul style="list-style-type: none"> - Fibonacci Math Worksheet http://www.readwritethink.org/lesson_images/lesson91/research.pdf • For the internet research portion of the Weblesson, provide the students with a list of websites that will be helpful to them via Hotlist: http://dsandormusic.com/MST1/HotList.htm. • Rubric for assignment printed out to review with students. http://dsandormusic.com/MST1/fibonacci_final_rubric2.htm 	
<p>Integration with other Content Areas:</p>	<p>Curricular Areas of Correlation: Music, Math & Technology Technology (PowerPoint, CD/Tape Player, Electronic Keyboard) Social Studies (World Geography) Math (Patterns, Fibonacci sequence, Golden Rectangle)</p>	
<p>Vocabulary:</p>	<p>Pentatonic Scale Golden Mean</p>	<p>Ratio The Divine Proportion</p>

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	Golden Ratio Golden Spiral	Phi Fibonacci Numbers
Class Procedures:	<p><u>Prior Knowledge:</u></p> <ol style="list-style-type: none"> 1) Students know and use Curwen hand signs and solfege in almost every class. 2) Discussions have included the Essential Questions posed in prior lessons. 3) Reviewed Note Taking Skills 4) Students have used PowerPoint, Word, blogs, PDAs, Kidspiration, and conducted internet research for previous projects. 5) Students have worked in various groups since the beginning of the year – not just in music class but in homeroom classes and Art classes. <p><u>Also:</u></p> <ol style="list-style-type: none"> 1) Each group will get 15 minutes of time on the computer per class; 2) Groups must participate in the class Fibonacci blog (http://fibonacci-sandor.blogspot.com/) timely. 3) Print out resources during group's computer time to review when they are not at computers. <p><u>CLASS BY CLASS PROCEDURES</u></p> <p><u>Day One – the Music Connection</u></p> <p><u>Teacher will:</u></p> <ol style="list-style-type: none"> 1) Invite students to be “pattern detectives” and ask them to <u>quietly</u> locate as many patterns in the room that they can find within 30 seconds. 2) ASK: students to share the patterns that they found, 3) With each response, ASK the rest of the class to assess if the found ‘pattern’ is truly a pattern, and ask them to defend their position. If it IS a pattern, they should explain WHY they think 	

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	<p>it is a pattern, and if it is NOT a pattern, why they do not think it is a pattern.</p> <p>4) ASK: How many patterns can you find that repeat more than once?</p> <p>5) With each response, ASK the rest of the class to assess if the found 'pattern' is truly a pattern, and ask them to defend their position. If it IS a pattern, they should explain WHY they think it is a pattern, and if it is NOT a pattern, why they do not think it is a pattern.</p> <p>6) Ask the students to turn to page 62 of their 4th grade music book, Silver Burdett's "Making Music." This lesson is called "Melody Goes Round." The Element Focus: Melody - extended pentatonic patterns. Skill Objective: Reading- read extended pentatonic patterns. Cultural connection: Discuss the country of Eritrea.</p> <p>7) Ask for a volunteer (or pull name from Popsicle sticks in jar) to read the introduction to the lesson that introduces the song, "Hashewie" from Eritrea in North Africa.</p> <p>8) Using the laptop with internet access and using a projector and Interactive Smartboard, go to Google Earth (http://earth.google.com/) and ask for a student volunteer to locate this small country that lies along the coast of the Red Sea and was once a region of Ethiopia using this program.</p> <p>Invite other student(s) to experiment with Google Earth, examining Eritrea's location within Africa, within its hemisphere, comparing size with other African nations or other nations around the world.</p> <p>9) Ask for another student volunteer to come up to the laptop and go to Encyclopædia Britannica online (http://www.britannica.com) and locate information about Eritrea using the search function. (http://www.britannica.com/nations/Eritrea).</p>
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- 10) Visit links to learn about the country's history, geography, and people. Ask students to take out an index card (or if available, their PDAs) and list three (3) things that they have learned about Eritrea and to list one (1) thing that they would still like to learn.

Homework today is to post their notes on the Fibonacci blog: <http://fibonacci-sandor.blogspot.com>. Then respond to at least three (3) fellow classmates' postings, using Grade 4 ELA standards. Due Date: Tomorrow a.m.

- 11) Next, I will put poster with pentatonic scale on board. We will echo sing the pentatonic scale that appears in the shaded box, using the solfege names (Do, re, mi, so and la) and Curwen hand signs.

- 12) Returning to the 4th grade Music Books, ask students to review the song, "Hashewie," visually and locate patterns within the song, raising their hand to be called upon. Are these rhythmic or melodic patterns?

- 13) Ask students to listen to the song (CD 3 , Track 21), following the words with their fingers.

- 14) Have students sing "Hashewie," with track that includes other voices 2x. then sing with only the instrumental version 1x.

- 15) Collect 4th Grade Music books.

Students will:

- 1) Participate in activities above, such as searching for patterns in the classroom, conducting internet research about Eritrea, singing pentatonic scale using solfege and hand signs, identifying musical patterns (rhythm and/or melodic) in the song, and listening and singing the song.

- 2) Assist in Internet research (here on volunteer basis) and

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demonstrate technology, research, and keyboarding skills.

- 3) Demonstrate appropriate and expected classroom behavior and follow procedures already introduced regarding distribution and collection of music books, computer etiquette, taking turns, and listening to others.

Assessment: Through observation during the pattern detective activity and the class searching for patterns in the music introduced, teacher will assess that each student can identify a pattern. Teacher will check that each student posted in the Fibonacci blog and responded to three other students' postings.

Day Two

Teacher will:

- 1) Write the first six numbers of the Fibonacci Sequence on the chalkboard.:

1, 1, 2, 3, 5, 8, 13
- 2) Ask students to explain how the numbers are generated or related. Students must be able to come to the board and justify/prove their answers.
- 3) Have students independently complete the Fibonacci Worksheet. Students requiring one-on-one or additional help will receive it (either via the one-on-one TA and/or inclusion class TA.)
- 4) Once all paperwork is handed in, students will come up to the board and share their answers and explanations.
- 5) If there is time at the end of the day, encourage students to continue to add numbers to the Fibonacci Sequence. A game environment could be created to foster some fun and interest.

Student will:

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- Participate in activities above and hand in completed Worksheet prior to the end of class.

Assessment: Students will be assessed on their correctly completing the mathematics portion of the Fibonacci Worksheet. The number of accurate of facts filled in (based on the Project Rubric.) Also, their participation in the Fibonacci blog will be part of the overall assessment.

Day Three

Teacher will:

- 1) Introduce WebQuest using laptop, projector and Interactive Smartboard. Review features of site with students, and click through all links.
- 2) Answer any questions that the students might have.
- 3) This Webquest can be reviewed with the entire class, or class can break up into smaller groups of 5. In the past when music students have had to use the computers in the classroom, I have designed other activities for the groups so that the computers have been used. However, it takes too long this way, so I would leave the WebQuest link with the homeroom teacher and the librarian so that students could work on the Webquest at other times. I would also send a notification home to the parents so that some students could complete the Webquest at home.

Students will:

- 1) Using appropriate listening skills, will take notes as teacher reviews the WebQuest.
- 2) Take note of the assignments that are due for the WebQuest.
- 3) Make arrangements to use the in class computer, visit the library or use the computer during recess or breaks to complete the WebQuest.
- 4) Complete all tasks and assignments that are part of the Webquest, including completing the Math Worksheet, posting responses, observations, etc., on the classroom blog and responding to other students' work timely.

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Assessment: Students' participation in the Fibonacci blog will be part of the overall assessment.

Day Four

Teacher will:

- 1) Check for understanding of the Fibonacci Sequence by checking work submitted via the blog.
- 2) Introduce the Powerpoint presentation and the concept of the Golden Rectangle / Spiral / Ratio, and go slide by slide through presentation in whole group.

Students will:

- 1) Using appropriate listening skills, will take notes as teacher reviews the Powerpoint.
- 2) Take note of the assignments that are due for the Powerpoint.
- 3) Make arrangements to use the in class computer, visit the library or use the computer during recess or breaks to complete the WebQuest.
- 4) Complete all tasks and assignments that are part of the Webquest, including completing the Math Worksheet, posting responses, observations, etc., on the classroom blog and responding to other students' work timely.
- 5) Conduct the finger measuring project to test the Golden Ratio theory as it relates to one's fingers.
- 6) Complete all tasks and assignments that are part of the Powerpoint, including posting responses, observations, etc., on the classroom blog and responding to other students' work timely.

Assessment: Students have handed in a "Final Draft" of their newsletter and saved a "Draft" of their PowerPoint Presentation on the network for teacher review.

Day Five

Teacher will:

- 1) Answer any questions about work in progress and guide students to continue to work in the groups to complete the assignment.
- 2) Complete Assessments and hand them out to the students.

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	<p>Students will:</p> <ol style="list-style-type: none"> 1) At the end of the Powerpoint Presentation, follow instructions for the final project: Student will work in a team of four students to complete their final Fibonacci Project. The task will be to measure each student in your group using centimeters. 2) First, measure the height of the Navel and then measure the overall height. 3) Next, the students will calculate ratios with a spreadsheet program such as Excel or Create a Graph, and see how many students' measurements are close to 0.618. 4) Next, calculate ratios with a spreadsheet program such as Excel or Create a Graph, and and see how many students' measurements are close to 0.618. 5) Post your findings on the class Fibonacci Blog. Read and respond to other groups' postings. 6) Return to the Webquest once the work from the Powerpoint Presentation has been completed. Students will access the "Conclusion" Page and follow instructions. <p>Assessment: The final product, graphs, all of the blog entries and responses to other students must be completed by tomorrow a.m.</p>
Extensions	<p>Combine the data from all the groups, put them in a spreadsheet program such as Excel or Create a Graph, and explore the averages – how many students' measurements are close to 0.618?</p> <p>Extend the research to other classes at the same grade level – or perhaps the entire school – and create a graph that shows the averages and deviations.</p>
STANDARDS	View Standards marked in Taskstream as part of the Keystone Project.

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Additional Resources

Hall, Grace. "The Golden Mean - ppt." The Golden Mean - Math Integration. Wilkes Central High School in Wilkesboro, NC.. 27 Aug 2006.

<http://www.princetonol.com/groups/iad/lessons/high/Grace-GoldenMean.ppt>

Hubbell, Elizabeth Ross. "Elizabeth Ross Hubbell." Fibonacci Webquest. 12 Mar 2006. 27 Aug 2006 <<http://www.elizrosshubbell.com/fibonacci/index.html>>.

"Fibonacci - Wikipedia." Wikipedia online. Wikimedia Foundation. 27 Aug 2006 <<http://en.wikipedia.org/wiki/Fibonacci>>.

"Fibonacci Number - Wikipedia." Wikipedia online. Wikimedia Foundation. 27 Aug 2006 <http://en.wikipedia.org/wiki/Fibonacci_number>.

Britton, Jill. "Fibonacci Numbers in Nature." Camosun College. 07 May 2005. 27 Aug 2006 <<http://britton.disted.camosun.bc.ca/fibslide/jbfbfslide.htm>>.

Knott, Dr. Ron. "The Parthenon and Greek Architecture ." Fibonacci Numbers and The Golden Section in Art, Architecture and Music. 17 May 2006. 27 Aug 2006

"Fibonacci." MathematiciansPictures.com. MathematiciansPictures.com. 27 Aug 2006 <<http://www.mathematicianspictures.com/FIBONACCI/Fibonacci.htm>>.

Schrock, Kathleen. *Kathy Schrock's Home Page*. 1 Jan. 2003. 27 Aug. 2006 <<http://kathyschrock.net/>>.