

A Symphony of Fractions

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- **Target Group:** Secondary education (12-14)
- **Subject:** Math and Music
- **Aims:** At the end of the unit, most of the students will be competent to...
 - Explain relationships between music and math
 - Compare the language of music and math in different languages (L1, L2...)
 - Deduce what languages play an important role in the field of music
 - Explain how music is written
 - Compare how music is written and expressed in different cultures and in different languages
 - Cooperate in teams to learn about a shared topic
 - Synthesize written input to communicate it orally and in written form
 - Find language equivalences in one owns mother tongue
 - Use the ICT to create and write music
 - Integrate math knowledge when reading or writing music
 - Reflect on the connections between languages, math and artistic languages
 - Search for extended information on the Internet
 - Compose rhythms and tunes using math and music knowledge
 - Interact in L1 and FL to learn content and language
- **Key Competencies**
 1. Communication in L1
 - Interact with other people and approach other cultures and languages.
 - Communicate thoughts, feelings and facts orally
 - Interpret and understand everyday life situations
 - Code-switch between L1 and FL to learn content and language
 2. Communication in FL(s)
 - Reflect on how to use the communicative resources specific of the subject

- (math and music).
 - Interact with other people and approach other cultures and languages.
 - Communicate thoughts, feelings and facts orally
 - Interpret and understand everyday life situations
 - Relate observations, explanations, thoughts...
 - Synthesize information
- 3. Mathematical competence and basic competences in science and technology
 - Use and relate the tools and the forms of expression of mathematical thought
 - Reason mathematically in order to produce and interpret different types of information.
 - Interpret and put into practice processes of mathematical reasoning leading to solving the problems and questions in everyday situations.
- 4. Learning to learn
 - Gain, process and assimilate new knowledge and skills (intellectual, emotional and physical) as well as seek and make use of guidance.
 - Apply study skills that include strategic thinking and cooperation and self-evaluation skills.
 - Handle effectively an array of resources to transform information into personal knowledge.
- 5. Digital competences
 - Access and communicate information using different digital supports.
 - Transform information into knowledge activating thinking skills in order to organize, relate, analyze, synthesize, make inferences and deduct at different levels of complexity.
- 6. Interpersonal, intercultural and social and civic competences
 - Respect others and value different ways of expressing oneself.
- 7. Cultural expression
 - Show interest and respect towards music as a means of expression.
- **Timing of the overall activities:** 3 class sessions + homework
- **Resources and materials needed**
 - Expert cards (for each team)
 - Access to a computer and to the Internet
 - Trial version of a music notation software
 - Free-hosting websites

Task 1: Becoming Music Experts

- **Timing:** 40 minutes
- **Material required:**
 - Worksheet 1: Music Jigsaw Reading
 - Expert cards
- **Grouping:** groups of 5
- **Focus on content:**
 - Learning to write music
 - The concept of duration
 - Systems for naming note values
 - Rests and dotted notes
 - Time signatures
 - Learning note values nicknames
 - The meaning of fractions in music
 - Triplets and syncopation
 - Expressing musical notes
 - The relationship between music and math
- **Focus on language:**
 - The language of music
 - Explaining how music is written
 - Specific vocabulary
 - Expressing music in words
 - Sharing knowledge about music
- **Description of activities:** Jigsaw Reading
See student's worksheet 1
- **Document 1:**
See student's worksheet 1 "Becoming Music Experts" and "Expert Cards".
- **Assessment**
 - Classroom interaction (use voice recorders to record students' oral performance)
 - End of the activity oral QUIZ

Task 2: Language in the Worlds of Math and Music

- **Timing:** 55 minutes
- **Material required:**
 - Worksheet 1: Languages and Cultures in Tune
 - Website: www.wordle.net to make a word cloud
 - Cards (cardboard) to make expert cards
- **Grouping:** Pair work / Team work
- **Focus on content:**
 - The importance of languages in the world of music: differences and similarities
 - New relations between math and music
- **Focus on language:**
 - Music words and expressions in different languages
 - Expressing music and math concepts through words of different languages
 - Equivalences in different languages
- **Description of activity 1:** Word Clouds
See student's worksheet 1.
- **Document 1:**
See student's worksheet 1 "Languages and Cultures in Tune"
- **Assessment**
 - Class plenary to discuss questions 1 and 2
 - New expert cards (use of rubrics to assess cards)
 - Word clouds (use of rubrics to assess cards)

Task 3: Composing a Symphony of Fractions

- **Timing:** 55 minutes + homework
- **Material required:**
 - Worksheet 1
 - Trial version of a music notation software
 - Free-hosting website
- **Grouping:** Team work
- **Focus on content:**
 - Understanding fractions in music
 - Using math knowledge to compose music
 - Creating and performing rhythms an/or tunes
 - Writing music using a music notation software
- **Focus on language:**
 - Using a music notation software (in the CLIL language)
 - Music vocabulary
 - Creative writing (lyrics)
- **Description of activity 3:** : Composing a Symphony of Fractions
See student's worksheet 3.
- **Document 1:**
See student's worksheet 1 “Composing a Symphony of Fractions”
- **Assessment**
 - Classroom music performances (peer assessment)
 - Mp3 files with rhythms and tunes (peer assessment)
 - Here is an example of a rubric which can be used for peer assessment. Students, guided by the teacher, should finish this rubric by adding 2-3 more categories to be assessed.

CATEGORY	3	2	1	R - Redo
Overall Performance	The composition was creative and included all required elements.	The composition was somewhat creative. Most of the required elements were included.	The composition was very basic. At least half of the required elements were included.	The composition was not complete. Under half of the required elements were included. Project will needs to be revised.
Meter and Rhythm	All measures have the correct # of beats and a variety of rhythms are used.	Most measures have the correct # of beats and a variety of rhythms are used.	Only some measures have the correct # of beats. Rhythms are very basic.	Under half of the measure have the correct # of beats. Composition needs to be edited and resubmitted.

ANSWER KEY:

Activity 1:



Any of the values can be also expressed as rests.