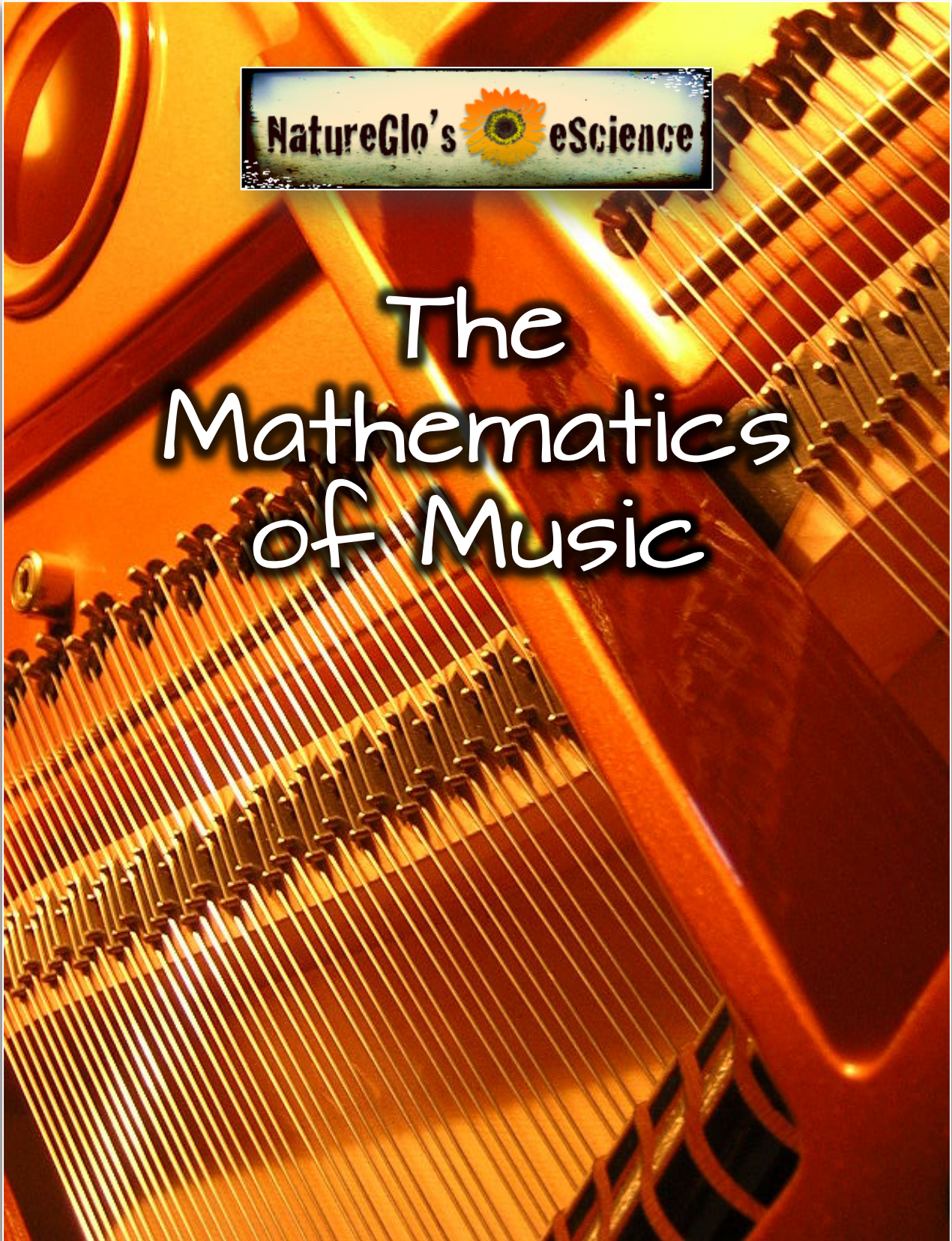




# The Mathematics of Music



## **The Mathematics of Music**

Mathematics are found everywhere including in art, architecture and astronomy. Even our own bodies are made up of mathematical proportions and numbers. It's no surprise that music is composed of mathematical properties including time, sound frequencies, fractions and proportions. Beginning musicians typically learn to read music which is made up of numeric values. The early ancients made the correlation with music and mathematics. Finally, the Golden ratio and Fibonacci number series have been used for ages to create musical pieces.

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# **PowerPoint Interaction Questions**

## **The Mathematics of Music**

**Directions – Read through Natureglo’s PowerPoint, the Mathematics of Music. You can complete this activity guide and or do the Quizlet found on the course page.**

### Slide #2 Music, Mathematics & Ancient History

1. The Pythagoreans of ancient Greece investigated these in ratios of small integers. Short answer. \_\_\_\_\_

### Slide #5 Pitch & Tempo

2. The higher up the music scale, the higher the note sound will be for this. Short answer. \_\_\_\_\_

### Slide #8 Music & Fractions

3. Do fractions and counting when playing their music. Multiple choice.  
a. Music staff b. musicians c. musical d. piano

### Slide #4 Music Staff

4. This contains 4 lines and 5 spaces with each line & space representing a different musical pitch. Multiple choice.  
a. Tempo b. musical scales c. music staff

### Slide #5 - Pitch & Tempo

5. \_\_\_\_\_ is a note's speed. Multiple choice.  
a. Tempo b. musical scale c. music staff

## **PowerPoint Interaction Questions – Mathematics of Music**

6. The Pythagoreans of ancient Greece investigated these in ratios of small integers.  
  
a. music staff    b. tempo    c. musical scale
7. \_\_\_\_\_ do fractions and counting when playing their music. Fill in the blank.
8. Music written in the past and present have used the golden ratio and the Fibonacci numbers. True or False.  
\_\_\_\_\_
9. The mathematics in music are found as simple operations of counting and \_\_\_\_\_. Fill in the blank
10. Musical sounds have numeric properties. True or False.  
\_\_\_\_\_
11. Pythagoras said, "All nature consists of harmony arising out of numbers." True or false. \_\_\_\_\_
12. \_\_\_\_\_ figure patterns are produced by sound vibrations in fine powder on a square plate.

# Journal Entry

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Directions: Fill in the information below about your favorite topic from this lesson.

## Sketch

### 1). General Description

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### 2). Size

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### 3). Color

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### 4). Patterns

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### 5). Related numbers and geometric shapes

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## Natureglo's eScience Student Project Rubric:

**Usage: PowerPoints, posters & other written research projects**

| Category   | Criteria  |  |   |  | Points |
|--|---|--|---|--|--------|
|  | 4<br>Exemplary  | 3<br>Accomplished  | 2<br>Developing   | 1<br>Beginner  |        |
| <b>Accurate Research/ Information Gathering &amp; Citation</b> | All taken from several sources & cited in work  | Most taken from sources & cited  | Some taken from sources and cited   | Little or none taken from sources and or not cited                   |        |
| <b>Content</b>   | Great number of interesting facts around topic  | Many interesting or too many facts   | Some important facts  | Few or no facts  |        |
| <b>Graphics/ Sound/ Animation</b>                              | High quality; enhance understanding on every page. All borrowed graphics with source cited.           | Many enhance understanding on most pages; most borrowed graphics cited.                      | Some enhance understanding; some cited  | Zero, unrelated, very few or poor quality graphics and/or none cited |        |
| <b>Organization &amp; Attractiveness</b>                       | Well organized and very attractive; demonstrates creative & logical sequencing and sentence structure | Mostly well organized and attractive; demonstrates logical sequencing and sentence structure | Somewhat organized and attractive, but some illogical sequencing and sentence structure | Unattractive and or weakly organized or disorganized                 |        |
| <b>Grammar and Mechanics</b>                                   | All correct   | 1 – 5 errors   | 5 – 10 errors   | Frequent errors  |        |
| <b>Divide total points from 20 for grade.</b>                  |   |  | <b>Total Points/Grade:</b>  |  |        |

# **Mathematics of Music Quiz**



# **The Mathematics of Music - Quiz**

**Directions – After completing the PowerPoint interaction questions. Study them. When you are ready you can take the quiz below.**

1. The Pythagoreans of ancient Greece investigated these in ratios of small integers. Short answer.

\_\_\_\_\_

2. The higher up the music scale, the higher the note sound will be for this. Short answer.

\_\_\_\_\_

3. Do fractions and counting when playing their music. Multiple choice.

a. Music staff b. musicians c. musical d. piano

4. This contains 4 lines and 5 spaces with each line & space representing a different musical pitch. Multiple choice.

a. Tempo b. musical scales c. music staff

5. \_\_\_\_\_ is a note's speed. Multiple choice.

a. Tempo b. musical scale c. music staff

## **PowerPoint Interaction – Mathematics of Music**

6. The Pythagoreans of ancient Greece investigated these in ratios of small integers.  
a. music staff    b. tempo    c. musical scale
7. \_\_\_\_\_ do fractions and counting when playing their music. Fill in the blank.
8. Music written in the past and present have used the golden ratio and the Fibonacci numbers. True or False.  
\_\_\_\_\_
9. The mathematics in music are found as simple operations of counting and \_\_\_\_\_. Fill in the blank
10. Musical sounds have numeric properties. True or False.  
\_\_\_\_\_
11. Pythagoras said, "All nature consists of harmony arising out of numbers." True or false. \_\_\_\_\_
12. \_\_\_\_\_ figure patterns are produced by sound vibrations in fine powder on a square plate.

**PowerPoint Interaction  
Questions  
& Quiz Answer Key**

# The Mathematics of Music - Quiz

**Directions – After completing the PowerPoint interaction questions. Study them. When you are ready you can take the quiz below.**

1. The Pythagoreans of ancient Greece investigated these in ratios of small integers. Short answer. **Musical scales**
2. The higher up the music scale, the higher the note sound will be for this. Short answer. **pitch**
3. Do fractions and counting when playing their music. Multiple choice.
  - a. Music staff **b. musicians** c. musical d. piano
4. This contains 4 lines and 5 spaces with each line & space representing a different musical pitch. Multiple choice.
  - a. Tempo **b. musical scales** c. music staff
5. \_\_\_\_\_ is a note's speed. Multiple choice.
  - a. Tempo** b. musical scale c. music staff

## PowerPoint Interaction – Mathematics of Music

6. The Pythagoreans of ancient Greece investigated these in ratios of small integers.
  - a. music staff
  - b. tempo
  - c. **musical scale**
7. **Musicians** do fractions and counting when playing their music. Fill in the blank.
8. Music written in the past and present have used the golden ratio and the Fibonacci numbers. **True** or False.
9. The mathematics in music are found as simple operations of counting and **measuring**. Fill in the blank
10. Musical sounds have numeric properties. **True** or False.
11. Pythagoras said, "All nature consists of harmony arising out of numbers." **True** or false.
12. **Chladni** figure patterns are produced by sound vibrations in fine powder on a square plate.