

CONNECTIONS: Astronomy, Mythology, and Music

Grade Level or Special Area: 3rd Grade/Music

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Length of Unit: Seven lessons (seven days of 45-minutes each)

I. ABSTRACT

Astronomy, mythology, and music collide in this science fiction ride through the 3rd grade. Gustav Holst's, *The Planets Suite*, written over 90 years ago, remains today the benchmark for space music. Even more, children love it! Because Holst chose to link his composition to ancient Roman gods, their planets, and their myths, a flurry of connections are born across many disciplines including language arts, mathematics, history, astronomy, and music. Third grade classes will enjoy the mystery of Holst's music while maintaining graphs, studying myths, discovering planets, drawing pictures, storytelling, and making music.

II. OVERVIEW

- A. Concept Objectives
 1. Understand the relationship between music, science, and literature.
 2. Understand musical elements and families of instruments.
 3. Understand and apply basic concepts of numbering and measurement.
- B. Content from the *Core Knowledge Sequence*
 1. 3rd Grade Music: Elements of Music (p. 76)
 - a. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timbre, etc.).
 - i. Recognize a steady beat, accents, and the downbeat; play a steady beat.
 - ii. Move responsively to music.
 - iii. Recognize short and long sounds.
 - iv. Discriminate between fast and slow; gradually slowing down and getting faster.
 - v. Discriminate between differences in pitch.
 - vi. Discriminate between loud and quiet.
 - vii. Understand that melody can move up and down.
 - viii. Hum the melody while listening to the music.
 - ix. Echo short rhythms and melodic patterns.
 - x. Play simple rhythms and melodies.
 - b. Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Whole rest, half rest, quarter rest.
 - c) Meter signature.
 - d) Quiet "p", "pp", loud "f", and "ff".
 2. 3rd Grade Music: The Orchestra (pp. 76-77)
 - a. Become familiar with brass instruments – trumpet, french horn, trombone, and tuba.
 - b. Become familiar with woodwind instruments – flute and piccolo (no reeds); clarinet, oboe, and bassoon (with reeds).
 3. 3rd Grade Music: Musical Connections (p. 77)
 - a. Gustav Holst, *The Planets Suite*
 4. 3rd Grade Mathematics: Number and Number Sense (p. 78)
 - a. Identify Roman numerals from one to twenty.
 - b. Create and interpret bar graphs and line graphs.

5. 3rd Grade Mathematics: Fractions and Decimals (p. 78)
 - a. Recognize fractions to 1/10.
 6. 3rd Grade Mathematics: Measurement (p. 79-80)
 - a. Temperature
 - i. Know the degree sign.
 7. 3rd Grade History and Geography: World History and Geography: Ancient Rome (p. 70)
 - a. Background
 - i. Worship of gods and goddesses, largely based on Greek religion.
 8. 3rd Grade Science: Astronomy (p. 83)
 - a. Our solar system
 - i. The nine planets.
 - b. Planetary motion: orbit and rotation
- C. Skill Objectives
1. Respond and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 2. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 3. Display an orbit and a system in relation to our solar system.
 4. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 5. Compare and order fractions with like denominators. (adapted from CSGLE for math 3.1.1.C)
 6. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)
 7. Read, notate, and perform rhythmic patterns using quarter notes, paired eights notes, quarter rests, half notes, half rests, whole notes, and whole rests. (CSGLE for music, 3.5, S1, S2)
 8. Demonstrate the ability to follow and perform a notated rhythmic pattern. (CSGLE for music, 3.6, S1, S4)
 9. Create a short composition that shows contrast in tempo, dynamics, and timbre. (CSGLE for music, 3.9, S3)
 10. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)
 11. Sing play and move to music from different traditions and different cultures. (CSGLE for music, 3.8, S1, S4, S5)
 12. Identify instruments in the orchestra.

III. BACKGROUND KNOWLEDGE

- A. For Teachers
 1. Greene, Richard, *Holst: The Planets*
 2. Dickenson, A.E.F., *Holst's Music: A Guide*
 3. Short, Michael, *Gustav Holst*
- B. For Students
 1. Language Arts: Mythology of ancient Greece (2nd grade, p. 45)
 2. Music: Listening and Understanding: The Orchestra (2nd grade, p. 54)
 - a. Review families of instruments.
 - b. Become familiar with instruments in the string family.
 3. Music: Elements of music (2nd grade, p. 54)
 - a. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timbre, etc.).

IV. RESOURCES

- A. Book - *Kingdom of The Sun.*, J. Milton and C. Balit (Lessons One, Three – Seven) (approximate price is \$12.00 new and \$6.00 used)
- B. CD – *Holst, The Planets*, Chicago Symphony Orchestra, conducted by James Levine (Lessons One - Seven) (approximate price is \$15.00 new and \$4.00 used)
- C. CD Player (Lessons One - Seven)
- D. Video, Disney’s *Fantasia* (Lesson Seven)
- E. TV and Video player (Lesson Two, Seven)
- F. *Optional*: CD – *Mythodea: Music for the NASA Mission: 2001 Mars Odyssey*. Composed, arranged and produced by Vangelis (Lesson Two)
- G. *Optional*: CD – *Star Wars Soundtrack* (any episode) by John Williams (or any other soundtrack composed for outer space) (Lesson Two)
- H. *Optional*: Video – *Star Wars* (Original film) (Lesson Two)

V. LESSONS

Lesson One: Mars, the Bringer of War (45 minutes)

- A. *Daily Objectives*
 - 1. Concept Objective(s)
 - a. Understand the relationship between music, science, and literature.
 - b. Understand musical elements and families of instruments.
 - c. Understand and apply basic concepts of numbering and measurement.
 - 2. Lesson Content
 - a. Music: Elements of Music (p. 76)
 - i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timbre, etc.).
 - a) Recognize a steady beat, accents, and the downbeat; play a steady beat.
 - b) Move responsively to music.
 - c) Recognize short and long sounds.
 - d) Discriminate between fast and slow; gradually slowing down and getting faster.
 - e) Discriminate between loud and quiet.
 - f) Understand that melody can move up and down.
 - g) Echo short rhythms and melodic patterns.
 - h) Play simple rhythms and melodies.
 - ii. Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Whole rest, half rest, quarter rest.
 - c) Meter signature.
 - d) Quiet “p”, “pp”, and loud “f”, “ff”.
 - b. Music: Musical Connections (p. 77)
 - i. Gustav Holst, *The Planets Suite*
 - c. Mathematics: Number and Number Sense (p. 78)
 - i. Create and interpret bar graphs and line graphs.
 - d. Mathematics: Fractions and Decimals (p. 78)
 - i. Recognize fractions to 1/10.
 - e. Mathematics: Measurement (pp. 79-80)
 - i. Temperature
 - a) Know the degree sign.
 - f. History and Geography: Ancient Rome (p. 70)
 - i. Worship of gods and goddesses, largely based on Greek religion.

- g. Science: Astronomy (p. 83)
 - i. Our solar system
 - a) The nine planets.
 - ii. Planetary motion: orbit and rotation
3. Skill Objective(s)
- a. Respond to and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Display an orbit and a system in relation to our solar system.
 - d. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 - e. Compare and order fractions with like denominators. (adapted from CSGLE for math 3.1.1.C)
 - f. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)
 - g. Read, notate, and perform rhythmic patterns using quarter notes, paired eights notes, quarter rests, half notes, half rests, whole notes, and whole rests. (CSGLE for music, 3.5, S1, S2)
 - h. Demonstrate the ability to follow and perform a notated rhythmic pattern. (CSGLE for music, 3.6, S1, S4)
 - i. Listen and respond to the music and the life of a composer and/or musical performer (CSGLE for music, 3.11, S4, S5)
 - j. Sing play and move to music from different traditions and different cultures. (CSGLE for music, 3.8, S1, S4, S5)

B. *Materials*

- 1. CD – Holst, The Planets
- 2. CD Player
- 3. *Kingdom of the Sun*, by J. Mitton and C. Balit
- 4. White board/easel and markers
- 5. Large sheet of light colored construction paper
- 6. Colored markers for the construction paper
- 7. One copy of Appendix A: Planet Bar Graph
- 8. One copy of Appendix B: The Meter of Mars
- 9. One copy of Appendix C: Small Group Evaluation

C. *Key Vocabulary*

- 1. Orbit: the path in space of one body around another; to travel around another body
- 2. Solar: of, derived from, or relating to the Sun
- 3. System: a group of interacting bodies under the influence of related forces
- 4. Solar System: all the things in orbit around the Sun that are kept there by the Sun's gravity, including the planets with their moons, comets, and asteroids
- 5. Astronomy: the study of the universe and the things in it, such as stars and planets
- 6. Astrology: the study of stars
- 7. Numerator: the top number or unit in a fraction
- 8. Meter Signature: a sign used in music to indicate meter and usually written as a fraction with the bottom number indicating the kind of note used as a unit of time and the top number indicating the number of units in each measure

D. *Procedures/Activities*

1. Before beginning the lesson, affix the construction paper in a visible place in the room. Set it up as instructed in Appendix A: Planet Bar Graph. Just draw the vertical and horizontal lines, squares, and temperature numbers. Do not write in the names of the planets yet. Do not write in degree signs or Fahrenheit signs.
2. Begin the lesson very seriously by saying the following; *“I am going to talk to you about war today. (Start any optional CD here for ambience.) In wars, people struggle, fight, sacrifice, and die. Wars have armies, warriors, weapons, machines, and terrible battles. And, most of the time wars have winners and losers. But, most wars are fought because the people involved don’t agree, and can’t get along peacefully.”*
3. Ask the class if they know of any wars that have happened in the history of the world. Allow time for answers and affirmations if needed. (The Civil War and the War of 1812 are studied in 2nd grade and are good examples to put forward should the class not remember. The Punic Wars, studied in 3rd grade may also provide nice “ancient” connections for conversation.)
4. Say to the students, *“We may not realize it, but the ancient Romans also fought in wars. In fact, in ancient Rome, just like in ancient Greece, it was believed that there was a god of war. His Greek name was Ares, but his Roman name was Mars.”*
5. Open the book, *Kingdom of the Sun* to the page “Mars” and share the illustration with the class. Say to the class, *“Mars is not only a god of war, but also a planet in outer space. However, the planet and the god share many similar things. Listen while I read to you.”* Read the page to the class.
6. Say, *“There are nine total planets in outer space that are all part of a solar system. We call it a solar system because all of these planets circle around and orbit the Sun.”* Explain the definition of “orbit”, “solar”, and “system”.
7. Have two student volunteers come forward. Ask one of the student volunteers to circle around the other until you say stop. After stopping the circling volunteer, explain to the class that the circling student was orbiting the stationary one.
8. Invite two others forward. Have the two others join the first circling volunteer so that there are three students orbiting the stationary one. Ask the following question, *“Now we have three students orbiting (insert stationary child’s name here). So this would be called a (insert child’s name) system because the other planets (now name the other students like their names are planet names) are orbiting (insert stationary student’s name).”*
9. Pick four new volunteers and allow the students to create an orbit and an orbiting system around each other by taking turns (one at a time as the stationary student).
10. Now break the class into quick groups of four and allow them all to experience orbit and orbital systems. Take no more than two or three minutes for this exercise and have the class seated.
11. Say to the class, *“People have been studying the stars and planets for thousands of years. This study of the stars and planets is called Astronomy. In addition, with the help of telescopes, and space ships we have been able to learn a great deal about the nine planets in our solar system. So, to help us remember, we are going to make a chart.”*
12. List Mars and the Roman numeral “IV” first on the chart as indicated on Appendix A. Choose two students as volunteers and have them inform the class of their weight. Write the weights down on the board or easel. Have them also guess what temperature it is in the room. Come up with a best guess compromise for room temperature and write it on the board or easel.

13. Now say, *“On Mars, it can get to more than 200 degrees. And, when we talk about degrees of temperature, we write a (write the 200 with a “°” degree sign next to the number) little circle just above and to the right of the number. This little circle means “degrees”.*
14. Ask volunteers to come up and draw the degree signs on the bar graph next. Let them know that the numbers on the left hand vertical column are temperature numbers, but they are not complete until they have their temperature sign. When done, reseal the volunteers.
15. Now move to the chart (construction paper) and explain to the class that they have now correctly numbered the left hand (vertical column) side with numbers for temperature. Then hand a colored marker to one of two more volunteers and have them find the vertical point that says 200 degrees and point to it. Have the second volunteer find the word “Mars” on the chart and point to it. Finally, have the first volunteer draw a straight line between the two points. Help guide the drawing so the graph is readable.
16. Now repeat the same process with two more volunteers, but for the planet Earth. Explain that the maximum temperature on Earth is around 100 degrees. (This is a generalization for graphing purposes. Even though the highest recorded temperatures are more around 140 degrees, this lesson will be rounding to the nearest 100.) This time allow the students to write in the word “Earth” at the bottom horizontal axis next to Mars. As before, help guide the drawing and placement. Add the Roman numeral, “III” as in the Appendix, but save explanation for later.
17. Ask the class which planet has warmer temperatures. (The answer is Mars.) Congratulate the volunteers for helping the class to easily see which planet is warmer. Explain that they have just started a bar graph, and that they will be using the bar graph each coming day to compare temperatures.
18. Transition from temperature with the following question, *“Did you know that in ancient Greece, astrologers believed that all of the planets actually made noise. They called it the “Music of the Spheres”. They thought that anything that was twirling around through space must have also been making a sound.*
19. Ask, *“Do you think they were right? Do planets make their own sound and music as they fly through outer space?”* (The answer is technically “no”.)
20. Say, *“And, even though this “Music of the Spheres” idea was wrong, a musician named Gustav Holst was inspired by it. In fact, Gustav loved the myths about the gods and planets so much that he felt inspired to write music about it. He wrote a song for every planet except for Earth. He called his songs, The Planets Suite.”* (Write that title on the board or easel.)
21. Write down the name Gustav Holst on the board or easel. Next to his name, write the year 1914. Tell the class that Holst wrote his first song for, *The Planets Suite* over 90 years ago in 1914. Next, write the year 1916. Explain that Holst finished the suite of songs in 1916.
22. Ask, *“Can anyone guess what roman god and planet Gustav Holst wrote music for first?”* Let the class guess at planet names until they get it right. If the correct answer does not surface in a minute of guessing, go ahead and help with the answer. (The answer is Mars.)
23. Now, quickly change the mood and say, in your best outer space mystery voice, *“So, Mars was his first song. Once again, the god of war was called upon, but only this time through music. If you listen close to what I am about to play for you, you will hear marching soldiers, giant explosions, and great battles. But remember that this song is also about the planet. So, you will hear exploding*

volcanoes and great winds blistering a fierce, 200 degree red planet. Close your eyes and put your heads down. Let the music create pictures and stories in your mind. When the song is over, I will ask for volunteers to share thoughts of what they heard and what pictures they saw in their minds."

24. Play track one (Mars, the Bringer of War) from the CD, *Holst, The Planets*. Walk the classroom during the song, encouraging focus and quiet from the students.
25. When the song ends, ask for volunteers to describe their listening and imagination experience. Try to draw out images that reflect the character and ferocity of Mars the god and Mars the planet. Take as much time as needed, but avoid tangents. Encourage comments to stay directly related to the experience of listening to "Mars".
26. Transition with the following question, "*Did you think the song was "very" quiet, quiet, loud, or very loud?"* Allow students to answer, and write their answers on the board or easel below Holst's name and composition year (from step number 20 above). Explain that the answer is all of the above, but generally, it was very loud. Ask, "*Does anyone know how to write the sign for "very loud" in music?"* If the students answer correctly, then write it below the student response for very loud. If they do not, do the same with explanation ("ff" stands for fortissimo and means very loud).
27. Now ask for students to provide answers to fill in signs for very quiet ("pp", which stands for pianissimo) quiet ("p", which stands for piano) and loud ("f", which stands for forte).
28. Say, "*Great, you have figured out how loud and soft Mars can be! Now let's figure out the rhythm and beat of Mars!"*
29. Explain to the students that Mars, being so fierce, is different from most music. Say, "*It was written by Gustav Holst in a five-four meter signature."*
30. Write the fraction $\frac{5}{4}$ on the board. Explain that almost all music uses a fraction to count the beats.
31. Write the fractions $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$ next to the $\frac{5}{4}$ and explain that fractions are used in music. Say, "*The trick to finding the beat is finding the top number in the fraction. That number is called the numerator*". Explain that the numerator in music tells us how to count with the song. Say, "*So, if we want to count a song with a $\frac{5}{4}$ meter signature, like Mars, we have to count to 5 over and over as the song plays. Now, if Gustav Holst had made Mars a $\frac{3}{4}$ song, what number would we have to count to over and over?"* (The answer is three.) Re-explain if there is obvious confusion.
32. Practice clapping $\frac{5}{4}$ beats with the whole class as outlined on Appendix B: The Meter of Mars.
33. Proceed to evaluation (below) and then play "Mars" again for the class as exit music.

E. *Assessment/Evaluation*

1. Appendix C: Small Group Evaluation - tailored to the planet Mars.

Lesson Two: Mars, Day Two (45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand musical elements and families of instruments.
 - b. Understand and apply basic concepts of numbering and measurement.
2. Lesson Content
 - a. Music: Elements of Music (p. 76)

- i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timbre, etc.).
 - a) Recognize a steady beat, accents, and the downbeat; play a steady beat.
 - b) Move responsively to music.
 - c) Recognize short and long sounds.
 - d) Discriminate between fast and slow; gradually slowing down and getting faster.
 - e) Discriminate between loud and quiet.
 - f) Hum the melody while listening to the music.
 - g) Echo short rhythms and melodic patterns.
 - h) Play simple rhythms and melodies.
 - ii. Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Whole rest, half rest, quarter rest.
 - c) Meter signature.
 - d) Quiet “p”, “pp”, loud “f”, and “ff”.
 - c. Music: Musical Connections (p. 77)
 - ii. Gustav Holst, *The Planets Suite*
 - d. Mathematics: Fractions and Decimals (p. 78)
 - ii. Recognize fractions to 1/10.
- 3. Skill Objectives
 - a. Respond and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Compare and order fractions with like denominators. (adapted from CSGLE for math 3.1.1.C)
 - d. Read, notate, and perform rhythmic patterns using quarter notes, paired eighths notes, quarter rests, half notes, half rests, whole notes, and whole rests. (CSGLE for music, 3.5, S1, S2)
 - e. Demonstrate the ability to follow and perform a notated rhythmic pattern. (CSGLE for music, 3.6, S1, S4)
 - f. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)
 - g. Sing play and move to music from different traditions and different cultures. (CSGLE for music, 3.8, S1, S4, S5)

B. *Materials*

- 1. CD — *Holst, The Planets*
- 2. *Optional*: CD – Vangelis, *Mythodea*
- 3. *Optional*: CD – any other outer-space soundtrack
- 4. CD Player
- 5. *Kingdom of the Sun*, by J. Mitton and C. Balit
- 6. White board/easel and markers
- 7. Any non-pitched rhythm instrument (*this is optional*) such as hand drums, click sticks, shakers, tambourines, etc.
- 8. One copy of Appendix B: The Meter of Mars
- 9. Copies for the entire class of Appendix D: Notes and Meter
- 10. VCR/DVD and TV (*for optional “Star Wars” video resource*)

C. *Key Vocabulary*

- 1. Quarter Note: a musical note with the time value of 1/4 of a whole note

2. Half Note: a musical note with the time value of $\frac{1}{2}$ of a whole note
3. Eighth Note: a musical note with the time value of $\frac{1}{8}$ of a whole note
4. Whole Note: a musical note equal in time value to four quarter notes or two half notes

D. *Procedures/Activities*

1. (This lesson is intended for music teachers, but the lesson “is” designed for use in both the classroom and the music room. Classroom teachers may choose to skip this lesson and move on to the next.)
2. Try to begin the lesson with a mood setting material by utilizing one of the three optional materials listed above. The *Mythodea* CD by Vangelis was composed for NASA’s mission to Mars in 2001. It is very relevant and works well to set the mood. Any “Star Wars” soundtrack will also set the tone as John Williams directly used Holst’s ideas in writing his soundtracks for those films. Moreover, the Imperial March and subsequent music used in the destroying of the Death Star in “Star Wars” is a direct variation of Holst’s “Mars”. In fact, by now you may have already noticed that many of the students in the last lesson mistook the song “Mars” for “Star Wars” music. If no options are available, then proceed by replaying the song “Mars” for the class as they enter.
3. When the class is settled, take time to listen to the selection being played and then ask the following questions about the music or video:
 - a. Who do you think wrote this music?
 - b. What does it make you think of?
 - c. What pictures does it create in your mind?
 - d. Do you like it or dislike it? Why?
 - e. Can you clap to the meter signature of this music?
4. At this point, crazy clapping will have taken over. Stop the music or video, and quiet the class. Say the following, *“Yesterday, we talked about Mars, and how Mars was both a planet and an ancient god. We learned that Mars was warmer than the Earth. We also learned about Gustav Holst and his music for Mars. Today we are going to learn more about this furious song, and more about this windy planet.”*
5. Say, *“Mars is the fourth planet from the Sun in our solar system. The Earth is the third planet from the Sun. So, Mars is our next-door neighbor. But, we can tell by looking at the bar graph that being neighbors doesn’t make us the same.”* Ask, *“Can anyone tell me some differences between the Earth and Mars?”* (Some differences would include answers like, “Mars is warmer”, and “Earth is closer to the Sun.”) Allow for some brief discussion and then move on to the next step.
6. Say, *“Gustav Holst (write his name again on the board) saw many differences when he compared Mars to the Earth. He saw Mars just like the god of war. That is why he chose to write the song so loud, and fast.”* On the board or easel, write out the fraction $\frac{5}{4}$ on the board again for the class. Then write out the fraction of $\frac{1}{4}$ on the board below it. Say, *“Yesterday we talked about the numerator”*. (Point to the $\frac{5}{4}$ fraction) *“Which one of these numbers is the numerator?”* Allow the correct answer to surface. Next, explain that the bottom number is the “denominator”. Ask the class what the denominator is for the two fractions on the board. The answer is “4”.
7. Now draw a quarter note (a letter p or d with a filled in center) underneath the fraction of $\frac{1}{4}$. Say, *“This is a musical note called a quarter note. In music, if we see the fraction $\frac{1}{4}$, then we think of a quarter note (point to the new note). Each*

quarter note has a “1” as a numerator so it only gets one beat. So, if I have a 5/4-meter signature I need 5 quarter notes to add up to 5 beats.”

8. Now draw five quarter notes in a horizontal row on the board or and number them below 1-5. Have the class clap them like in Appendix B, Step 2. Congratulate the class for good music reading and good clapping.
 9. Now draw an eighth note (add a single-lined flag to the stem of a quarter note), half note (like the quarter note but the center is not filled in), and whole note (a circle with no stem) on the board.
 10. Ask the class if they know the names of these notes. If so, fill them in below the notes as they are volunteered. If they do not know the names, say the names as you write each name below the note.
 11. Say, “*We all now know that the quarter note (point to it) receives one count (write a 1 beneath the quarter note’s name). Does anyone know how many counts the other three notes get?*” (Answer: eighth note = ½ count, half note = two counts, and whole note = four counts.) As before, fill in the counts as they are guessed, or explain and fill in if the correct answer is not guessed.
 12. Pass out Appendix D: “Notes and Meters” to each student. Allow no more than 10 minutes for them to answer all questions. Have them hand in the worksheet (Appendix D) for grading and review the correct answers for each question for the class. Allow students to volunteer answers as you go.
 13. Now write out (on the board or easel) the rhythm shown at the bottom of Appendix B titled “Mars Rhythm”. Underneath the rhythm, write the phrase, “Bringer of war is furious” so that the syllables line up directly with the rhythm (as pictured in Appendix B).
 14. Pass out non-pitched rhythm instruments (see “Materials” for description) of your choice for each student (If none are available, pens, pencils, rulers, markers, or even hands can be used here.).
 15. Explain to the students that you are about to start the CD recording of Gustav Holst’s, “Mars” and that whenever they hear the rhythm written on the board (almost the entire song) they are to play along with it. Whenever the rhythm stops in the song, they are to stop as well.
 16. If time permits, swap instruments and try it again while speaking the phrase and playing the rhythm.
- E. *Assessment/Evaluation*
1. Worksheet: Appendix D: Notes and Meters, and observation of steps #12 and 13 above. Use Appendix E for grading.

Lesson Three: Venus and Mercury (45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand the relationship between music, science, and literature.
 - b. Understand musical elements and families of instruments.
 - c. Understand and apply basic concepts of numbering and measurement.
2. Lesson Content
 - a. Music: Elements of Music (p. 76)
 - i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timbre, etc.).
 - a) Discriminate between fast and slow; gradually slowing down and getting faster.
 - b) Discriminate between differences in pitch.
 - c) Discriminate between loud and quiet.

- ii. Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Whole rest, half rest, quarter rest.
 - c) Meter signature.
 - d) Quiet “p”, “pp”, loud “f”, and “ff”.
 - b. Music: Musical Connections (p. 77)
 - i. Gustav Holst, *The Planets Suite*
 - c. Mathematics: Number and Number Sense (p. 78)
 - i. Create and interpret bar graphs and line graphs.
 - d. Mathematics: Fractions and Decimals (p. 78)
 - i. Recognize fractions to 1/10.
 - e. Mathematics: Measurement (p. 79-80)
 - i. Temperature
 - a) Know the degree sign.
 - f. History and Geography: Ancient Rome (p. 70)
 - i. Worship of gods and goddesses, largely based on Greek religion.
 - g. Science: Astronomy (p. 83)
 - i. Our solar system
 - a) The nine planets.
 - ii. Planetary motion: orbit and rotation
3. Skill Objective(s)
- a. Respond and discuss myths (adapted from Colorado Standards and Grade Level Expectations. (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Display an orbit and a system in relation to our solar system.
 - d. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 - e. Compare and order fractions with like denominators. (adapted from CSGLE for math 3.1.1.C)
 - f. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)
 - g. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)

B. Materials

- 1. CD – *Holst, The Planets*
- 2. CD Player
- 3. One copy of Appendix C: Small Group Evaluation
- 4. One copy of Appendix A for reference
- 5. Ongoing use of the bar graph
- 6. *Kingdom of the Sun*, by J. Mitton and C. Balit
- 7. White board/easel and markers

C. Key Vocabulary

- 1. Fahrenheit: of or concerning a temperature or scale that indicates that the freezing point of water is 32 degrees and the boiling point of water is 212 degrees

D. Procedures/Activities

- 1. When class begins, say to the class, “*Today we start a journey towards the Sun. Who can tell me how many planets are between the Earth and the Sun?* (Answer is two. - Take guesses until the correct answer is given.). “*Does anyone know what the names of these two planets are?*” (Answer is Venus and Mercury. -

- Take guesses until the correct answers are given or until the class gives up. At that point, answer for them.)
2. Write in the names of Venus and Mercury on the horizontal axis of the bar graph.
 3. Write in the Roman numerals below them as listed in Appendix A.
 4. Say, *“Let’s see if we can learn more about these two new planets by adding them to our graph”*.
 5. Select two students to graph Venus’s temperature and inform them that on Venus the temperature can get as hot as 900 degrees Fahrenheit. Make sure the students fill in all the space from 900 degrees down to the planet Venus.
 6. Have two more volunteers come up to graph Mercury. Explain that the surface temperature on Mercury can reach almost 800 degrees Fahrenheit.
 7. Compare and contrast the four planets listed on the graph and ask; *“Now which of our two new planets is closer to the Earth and which is closer to the Sun?”* (Don’t answer yet, but for reference, the order is: Sun - Mercury, and Venus - Earth)
 8. Now say, *“Think about your answer while I read you the story about each new planet and its god”*. Read “Venus”, from the book *Kingdom of the Sun*, and then read “Mercury”.
 9. Say, *“So, which planet is closer to the Sun?”* Allow for guessing.
 10. Explain that Mercury is closer to the Sun and Venus is closer to the Earth.
 11. Now tell the class that it is time to hear what Gustav Holst thought about our two new planets. Explain that Gustav called Venus the “Bringer of Peace”. He felt that Venus, the goddess of love, could calm the rage and fury of Mars. Say, *“Close your eyes and let your imagination create pictures in your mind as I play the song Venus by Gustav Holst. When the song is over, I will ask for your thoughts and pictures.”* Play track two (Venus, Bringer of Peace) from the CD, *Holst, The Planets*.
 12. Walk around the room during the song to encourage concentration and participation. When the song ends, allow volunteers to explain their thoughts, and mental pictures. Ask the following three questions at the end of the discussion time:
 - a. *Was there a difference in speed (fast or slow) between Venus and Mars?*
 - b. *Does that make sense in relation to the ancient Roman gods represented by the planets?*
 - c. *Was there a difference in loud and soft between the two songs?*
 Limit this total discussion time to a maximum of 10 minutes.
 13. Next, say, *“It is time to go as close to the Sun as we dare. We’ll have to be quick, so be ready. Listen in as I read, and as we head towards Mercury.”* Read “Mercury” from the book, *Kingdom of the Sun*.
 14. When finished reading, ask, *“Would you like to hear how Gustav Holst thought Mercury the planet, and Mercury the Winged Messenger would sound?”* This answer from the class should be a resounding yes.
 15. Say, *“Okay then, to finish today’s journey, we travel right next to the Sun. We are so close that we would melt in seconds without space suits. Be careful, close your eyes, and let the music create pictures for you in your minds as you here the song.”* Play track three, (Mercury, the Winged Messenger) from the CD, *Holst, The Planets*.
 16. Ask for thoughts and mental pictures about the music when the song ends. Finish this discussion with the following prompt, *“Name any three differences between Venus and Mercury. These could be differences between the planets, the gods, and the songs.”* (Answers should include temperature differences,

character differences between the gods, and song style differences.) Discuss for no more than 10 minutes.

17. Finish the lesson with Appendix C: Small Group Evaluation.
18. If time permits after the evaluation, play Mars again and see if the class can clap or pat the 5/4 rhythms as in the past two lessons.

E. *Assessment/Evaluation*

1. Appendix C: Small Group Evaluation. Make sure to use both planets (Mercury and Venus) in the substitution portion of the evaluation. This will add more questions and allow more opportunities for group participation. Use a 4/4-meter signature for the meter portion of the evaluation.

Lesson Four: Jupiter, the Bringer of Jollity (45 minutes)

A. *Daily Objective(s)*

1. Concept Objective(s)
 - a. Understand the relationship between music, science, and literature.
 - b. Understand musical elements and families of instruments.
 - c. Understand and apply basic concepts of numbering and measurement.
2. Lesson Content
 - a. Music: Elements of Music (p. 76)
 - i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timber, etc.).
 - a) Recognize a steady beat, accents, and the downbeat; play a steady beat.
 - b) Move responsively to music.
 - c) Recognize short and long sounds.
 - d) Discriminate between fast and slow; gradually slowing down and getting faster.
 - e) Discriminate between differences in pitch.
 - f) Discriminate between loud and quiet.
 - g) Understand that melody can move up and down.
 - h) Hum the melody while listening to the music.
 - i) Echo short rhythms and melodic patterns.
 - j) Play simple rhythms and melodies.
 - ii. Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Whole rest, half rest, quarter rest.
 - c) Meter signature.
 - d) Quiet “p”, “pp”, and loud “f”, “ff”.
 - b. Music: The Orchestra (p. 76-77)
 - i. Become familiar with brass instruments – trumpet, French horn, trombone, and tuba.
 - ii. Become familiar with woodwind instruments – flute and piccolo (no reeds); clarinet, oboe, and bassoon (with reeds).
 - c. Music: Musical Connections (p. 77)
 - i. Gustav Holst, *The Planets Suite*
 - d. Mathematics: Number and Number Sense (p. 78)
 - i. Identify Roman numerals from 1 to 20.
 - b. Create and interpret bar graphs and line graphs.
 - e. Mathematics: Fractions and Decimals (p. 78)
 - i. Recognize fractions to 1/10
 - f. Mathematics: Measurement (p. 79-80)

- i. Temperature
 - a) Know the degree sign
 - g. History and Geography: Ancient Rome (p. 70)
 - i. Worship of gods and goddesses, largely based on Greek religion.
 - h. Science: Astronomy (p. 83)
 - i. Our solar system
 - a) The nine planets
 - ii. Planetary motion: orbit and rotation
3. Skill Objective(s)
 - a. Respond and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Display an orbit and a system in relation to our solar system.
 - d. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 - e. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)
 - f. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)
 - g. Identify instruments in the orchestra.
- B. Materials
- 1. CD player
 - 2. CD – *Holst, The Planets*
 - 3. One copy of Appendix A for reference
 - 4. One copy of Appendix C: Small Group Evaluation
 - 5. *Kingdom of the Sun*, by J. Mitton and C. Balit
 - 6. White board/easel and markers
- C. Key Vocabulary
- 1. Jollity: the quality or state of being jolly
 - 2. Pitch: highness or lowness of sound
 - 3. Solo: a part of music that features one sound or instrument above all others
- D. Procedures/Activities
- 1. As class begins, start track two (Venus, Bringer of Peace) on the CD, *Holst, The Planets*. Do your best to keep the class quiet and keep a keen eye on the CD player. This song begins with a French horn solo, and the French horn solos again at 0:19, 1:11, and 4:33 during the song. When the solos begin, alert the class by asking what instrument is playing that solo. Continue this “solo alert” throughout the song by following the times and instruments listed below:
 - a. French horn: 0:19, 1:11, and 4:33
 - b. Cello: 4:00, and 4:53
 - c. Violin: 1:50, and 2:55
 - d. Oboe: 2:31, and 3:35
 - e. Double (String) Bass: 0:35
 - 2. Help provide instrument names by writing them on the board. Spend a solid ten minutes skipping through the song to the solo points listed above, allowing the students to raise hands to guess the solo instrument. Once the class seems to be guessing each solo instrument correctly, move on.
 - 3. Explain to the class that an orchestra has many different instruments capable of making very high and very low sounds.

4. Cue the CD player to (Venus, track two) 1:35 and let it play. Stop it after a few seconds. Ask the class whether what they just heard was high or low (it is low). Now move forward to the 6:50 and let the music play for about 10 seconds. Ask the class if they thought it was high or low (it is high).
 5. Explain that high and low sounds in music are described with the word, “pitch” (write “pitch” on the board). Say, “*So in music, if an instrument is playing very high, like the violin, we say it has a high pitch. If it is playing low, like the Double Bass, it has a low pitch.*”
 6. Start track two (Venus, Bringer of Peace) again, and let it play in the background. Open the book, *Kingdom of the Sun* to the page for Jupiter. Invite the class to gather in closely to learn about a new planet. Tell them it is the largest of the ancient Roman gods, and the largest planet in our solar system.
 7. Read “Jupiter” from the book to the class.
 8. When done, stop the CD and ask, “*Who can tell me how many planets there are between Jupiter and the Sun?* (Answer is four.). Take guesses until the correct answer is given.
 9. Ask, “*Now what are the names of the four planets between Jupiter and the Sun?*” Write them on the board as they are offered.
 10. Next, say, “*Now, can we put these planets in the right order?*” Allow guesses at the order, and re-order them on the board in the correct order once guessed (which is: Mercury, Venus, Earth, Mars, and then Jupiter).
 11. Say, “*Jupiter is the 5th planet from the Sun, and it is HUGE!!! In fact, we could put 1000 Earths together and they would still be smaller than Jupiter!*”
 12. Turn to the back page of the book, *Kingdom of the Sun* and show the class the illustration of the Earth compared to Jupiter. Allow for questions and discussion on the illustration, but only discuss planets that have been studied to this point.
 13. Say, “*Did you know that scientists guess that it gets up to 100 degrees Fahrenheit on Jupiter? Can I get two volunteers to put that on the graph?*”
 14. Ensure the volunteers graph the data correctly.
 15. Ask for questions and encourage discussion about the graph.
 16. Ask, “*Would you like to hear what Gustav thought about the biggest planet in our solar system?*”
 17. Say, “*Then close your eyes, and let Zeus, also known as Jupiter, ruler of all ancient Greek and Roman gods tell you his story through music. Let this giant planet and Gustav’s music create pictures for you in your minds as you listen. Remember that there will be time to talk about the song when it’s over.*” Play track four, (Jupiter, the Bringer of Jollity) from the CD, *Holst, The Planets*.
 18. Walk around the room and keep the class focused.
 19. When the song ends, ask for thoughts and mental pictures and finish the lesson with Appendix C: Small Group Evaluation
- E. Assessment/Evaluation
1. Appendix C: Small Group Evaluation. Make sure to include both Jupiter and Venus in the planetary substitutions since they were both discussed in today’s lesson. Use a 4/4-meter signature for the clapping portion.

Lesson Five: Saturn, the Bringer of Old Age (45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand the relationship between music, science, and literature.
 - b. Understand musical elements and families of instruments.
 - c. Understand and apply basic concepts of numbering and measurement.

2. Lesson Content
 - a. Music: Elements of Music (p. 76)
 - i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timbre, etc.).
 - a) Recognize a steady beat, accents, and the downbeat; play a steady beat.
 - b) Discriminate between loud and quiet.
 - ii. Understand the following notation.
 - a) Meter signature.
 - b) Quiet “p”, “pp”, and loud “f”, “ff”.
 - b. Music: Musical Connections (p. 77)
 - i. Gustav Holst, *The Planets Suite*
 - c. Mathematics: Number and Number Sense (p. 78)
 - i. Create and interpret bar graphs and line graphs.
 - d. Mathematics: Measurement (p. 79-80)
 - i. Temperature
 - a) Know the degree sign.
 - e. History and Geography: Ancient Rome (p. 70)
 - i. Worship of gods and goddesses, largely based on Greek religion.
 - f. Science: Astronomy (p. 83)
 - i. Our solar system
 - a) The nine planets.
 - ii. Planetary motion: orbit and rotation
3. Skill Objective(s)
 - a. Respond and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Display an orbit and a system in relation to our solar system.
 - d. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 - e. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)
 - f. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)

B. Materials

1. CD – *Holst, The Planets*, by Gustav Holst.
2. CD Player
3. Pencils
4. One copy of Appendix A for reference
5. One copy of Appendix C: Small Group Evaluation
6. A copy for each student of Appendix F: Saturn Drawing
7. *Kingdom of the Sun*, by J. Mitton and C. Balit
8. White board or easel with markers

C. Key Vocabulary

1. Fahrenheit: of or concerning a temperature or scale that indicates that the freezing point of water is 32 degrees and the boiling point of water is 212 degrees
2. Kelvin: pertaining to a temperature scale, the zero point of which is equivalent to –273.16 degrees Celsius
3. Celsius: of or pertaining to a temperature scale that registers the freezing point of water as 0 degrees Celsius and the boiling point is 100 degrees Celsius

D. *Procedures/Activities*

1. Dig around in your attic or at a second hand store, so you can begin this lesson looking like you are much older than you are - a cane, overcoat, cape, old gray wig, wire rimmed glasses, old hat, etc. The goal here is to look like Father/Mother time. Costuming is not essential to this lesson, but it will enhance the overall experience.
2. When class begins, play track 4 (Jupiter) from *Holst, The Planets* as background music. Say (in your best “father time” voice) *“The mighty Jupiter rules proudly in the solar system, but was not always king. Jupiter’s father ruled until Jupiter was old enough to take away his father’s throne. In fact, Jupiter angrily sent his father away to the stars. His father was pushed far away so that he could never threaten Jupiter’s kingdom. And so Saturn, the once mighty king sits old and alone and far beyond Jupiter in the solar system, watching the sands of time disappear.”*
3. Stay in character, open the book, *Kingdom of the Sun* to the page for Saturn, and begin reading. When done, stop the CD. Ask if there are any questions.
4. Say, *“Did you know the temperature on Saturn averages around 200 degrees Fahrenheit?”* Walk to the graph and write in the name “Saturn” as shown in Appendix A: Planet Bar Graph. Write in the correct Roman numeral underneath the name Saturn. At this point hands should rise for graphing this new data.
5. Select two students to graph the temperature. Help as needed.
6. Ask for questions about the bar graph by using the following prompt: *“Who can tell me how Saturn is different from other planets on the bar graph?”* Allow for a brief discussion.
7. Now say, (still in old age character) *“When we talk about temperature, there are three different ways to mark it. There is Kelvin, Celsius, and Fahrenheit. Which one of those have I been saying when I talked about temperature?”* (Answer is Fahrenheit – write it on the board) *“So, when I want others to know when I am talking about temperature in Fahrenheit, I put this sign (draw a lower case “f” on the board beneath the word “Fahrenheit) next to my degree sign. For example, if it was freezing outside, meaning it was 32 degrees Fahrenheit, I could write that by writing “32” then putting the degree sign (“°”) to the right of that and then putting the Fahrenheit sign (“F”) to the right of that”.*
8. Ask volunteers to put the Fahrenheit sign next to the temperatures on the bar graph.
9. Write the name Gustav Holst on the board. As you write the years “1874 – 1934” underneath his name, explain to the class that those were the 60 years that Gustav Holst was alive. Ask the students if they can remember when he wrote the first song for *The Planets*. (The answer is 1914.) Ask the class, “How old was he in 1914. (The answer is 40 years old.)
10. Stay in character! Ask the class if they think 40 years old is old. Then say, *“Did you know it takes 30 years just for Saturn to orbit once around the Sun. On Earth, we orbit around the Sun once a year, but in Gustav Holst’s 60 years of life, Saturn only made two orbits. Maybe that is why Gustav called Saturn the “Bringer of Old Age”. Maybe that is why if you listen close, you can hear his instruments acting like a slow heartbeat as they play Saturn’s song. And, if you listen closely, you can hear how Gustav made the instruments make it sound painful and sad to be so old and far away.”*
11. Pass out a copy of Appendix F to each student. Tell them to take out a pencil.
12. Read the directions on Appendix F to the class.

13. Say, “As I play the song *Saturn*, by Gustav Holst, let your imagination help you draw a picture of Saturn’s 30-year orbit through space. Try to include everything the directions ask for, including pictures of Saturn, its orbit around the Sun, other planets, and do not forget the ancient Roman god, old and tired, yet once a king. When the song ends, I will ask for volunteers to share their drawing with the class.”
 14. Play track 5 (Saturn, the Bringer of Old Age) from the CD *Holst, The Planets*.
 15. Walk around the room to make sure that all students remain focused and on task. The song is nine minutes long, so help the students gauge their progress so they finish on time.
 16. When the song ends, ask volunteers to share their drawings with the class. Use the details asked for on Appendix F as prompts for discussion about the drawings.
 17. When the discussion and sharing begins to slow, have the students look back to the bar graph. Explain that six planets have been discovered so far, and there are more to come.
 18. Collect the Saturn drawings for grading (as outlined in Appendix F) with the goal of hanging them around the room until completion of the unit.
 19. Proceed to Appendix C: Small Group Evaluation.
 20. Play track 5 (Saturn) again as class ends.
- E. Assessment/Evaluation*
1. Appendix C: Small Group Evaluation using Saturn as the planetary substitution. Use a 2/4-meter signature for the clapping portion.
 2. Appendix F: Saturn Drawing

Lesson Six: Uranus, the Magician (45 minutes)

A. Daily Objectives

1. Concept Objective(s)
 - a. Understand the relationship between music, science, and literature.
 - b. Understand musical elements and families of instruments.
 - c. Understand and apply basic concepts of numbering and measurement.
2. Lesson Content
 - a. Music: Elements of Music (p. 76)
 - i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timber, etc.).
 - a) Recognize short and long sounds.
 - ii. Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Meter signature.
 - b. Music: Musical Connections (p. 77)
 - i. Gustav Holst, *The Planets Suite*
 - c. Mathematics: Number and Number Sense (p. 78)
 - i. Identify Roman numerals from 1 to 20.
 - ii. Create and interpret bar graphs and line graphs.
 - d. Mathematics: Fractions and Decimals (p. 78)
 - i. Recognize fractions to 1/10
 - e. Mathematics: Measurement (p. 79-80)
 - i. Temperature
 - a) Know the degree sign
 - f. History and Geography: Ancient Rome (p. 70)
 - i. Worship of gods and goddesses, largely based on Greek religion.

- g. Science: Astronomy (p. 83)
 - i. Our solar system
 - a) The nine planets
 - ii. Planetary motion: orbit and rotation
3. Skill Objective(s)
- a. Respond and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Display an orbit and a system in relation to our solar system.
 - d. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 - e. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)
 - f. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)
 - g. Sing play and move to music from different traditions and different cultures. (CSGLE for music, 3.8, S1, S4, S5)

B. *Materials*

1. Whiteboard/easel with markers
2. CD player
3. CD, *Holst, the Planets*, by Gustav Holst
4. One copy of Appendix A for reference
5. TV and Video player
6. Video: Disney's *Fantasia*, cued up to the Mickey Mouse portion titled "Sorcerers Apprentice", with music by Paul Dukas.
7. Pencils for each student
8. Copies for each student of Appendix G: Roman Numerals
9. One copy of Appendix C: Small Group Evaluation

C. *Key Vocabulary*

1. Roman Numerals: any of the numerals formed with the characters I, V, X, L, C, D, and M in the ancient Roman system of numeration

D. *Procedures/Activities*

1. (Be aware that the planet Pluto is being avoided for a reason, and should not be mentioned until later in this unit.)
2. When class begins, start track five (Saturn) on the CD, *Holst, the Planets*. Use the music as background for the beginning of the lesson.
3. Ask, "*Who is the father of Jupiter?*" (Answer is Saturn) "*Who is the father of Saturn?*" (Answer is Uranus, but do not let the answer out even if the class guesses it.) Say, "*Whoever he is, he is mysterious. He is a magician.*"
4. Say, "*He is a sorcerer with great power. His name is* (please say this without an emphasis on "Anus" or "Urine" – pronounce it "Yorannis" and you will avoid giggles) *Uranus, the Magician.*" (Spell "Uranus" for the class on the board so they can see the name.)
5. Open the book *Kingdom of the Sun*, and turn to the page for Uranus. Read the page to the class. Take time to show the illustrations and the planet's size illustrated at the back of the book.
6. Next, say, "*The story of Uranus is well known and is best told in a video that many of us have seen. It is called Fantasia, and the story is called the Sorcerer's Apprentice. In the story, Uranus has a young, but clumsy apprentice (Mickey Mouse) who gets into a little trouble.*"

7. Stop the CD, and play the video.
8. When the video finishes, explain that the music for the video was written by a man named Paul Dukas (write his name on the board) in 1897. Say, "*Gustav Holst was inspired by Dukas and inspired by the story of Uranus when he wrote his song for that planet. Listen now as I play it for you. Listen for the short choppy sounds you heard when the broomsticks began to come alive in the video. Close your eyes and see if you hear some of those same sounds in Gustav's music. See if you can picture the same story as you listen.*"
9. Play track six (Uranus, the Mystic) from the CD *Holst, The Planets*.
10. Walk around the room to make sure there is no talking and plenty of listening.
11. When the song ends, stop the CD and ask, "*Did anyone think this song sounded like the song from Fantasia?*" The answer will likely be "yes".
12. Ask volunteers to share their thoughts or mental pictures from the song. Allow a few minutes for students to participate in the discussion.
13. When the comments die down, write in the name Uranus on the bar graph in the position noted in Appendix A. Write the Roman numeral underneath the name as pictured in Appendix A.
14. Say, the average surface temperature on Uranus is negative 300 degrees Fahrenheit. Have two volunteers graph the temperature. Ensure that the proper signs and positions are used. Help where needed.
15. Now, have the volunteers sit back down and move to the bar graph. Say, "*Has anybody noticed that I have been writing little numbers and signs below each planet name?*"
16. Say, "*Does anybody know what these numbers and signs are?*" Explain that they are Roman numerals. Say, "*Roman numerals were used in ancient Rome for counting*".
17. On the bar graph, point to Mercury and explain to the class that Mercury is the first planet in the solar system because it is closest to the Sun. Write the Roman numeral for Mercury on the board. Repeat the same process by explaining that Venus is the second planet. Identify the Roman numeral for Venus and write it on the board.
18. By now, the students will have caught on, so ask for volunteers to write the Roman numerals for Earth, Mars, Jupiter, Saturn, and Uranus next to the numerals for Mercury and Venus on the board.
19. Once the students finish, complete the set of numerals up to ten, explaining the "IX" as "One less than ten" and the "X" as ten.
20. Write out the same numbers directly underneath the first, but in lower case. Have the class count the numbers aloud as you write.
21. Now say, "*If we want to count past ten, it is exactly the same, but we need to add an X in front of the numbers. We do this because the "X" adds ten to whatever number comes after it.*"
22. Write out the Roman numerals from eleven to twenty and have the class say them aloud as you write.
23. Hand out Appendix G to each student and have him or her complete it. Allow ten minutes for students to complete the worksheet. Walk the classroom and monitor the progress, answering questions as needed. Collect the worksheets for grading when done.
24. Play track six (Uranus, the Magician) from the CD, *Holst, The Planets*, if time permits, to end the class.

- E. *Assessment/Evaluation*
1. Appendix G: Roman Numerals, and Appendix B: Small Group Evaluation with Uranus and Neptune as planetary substitutions. Use 6/4-meter for the clapping portion of the evaluation.

Lesson Seven: Neptune and Pluto (45 minutes)

- A. *Daily Objective(s)*
1. Concept Objective(s)
 - a. Understand the relationship between music, science, and literature.
 - b. Understand musical elements and families of instruments.
 - c. Understand and apply basic concepts of numbering and measurement.
 2. Lesson Content
 - a. Music: Elements of Music (p. 76)
 - i. Through participation, become familiar with basic elements of music (rhythm, melody, harmony, form, timber, etc.).
Recognize a steady beat, accents, and the downbeat; play a steady beat.
Discriminate between loud and quiet.
Play simple rhythms and melodies.
Understand the following notation.
 - a) Whole note, half note, quarter note, eighth note.
 - b) Whole rest, half rest, quarter rest.
 - c) Meter signature.
 - d) Quiet “p”, “pp”, and loud “f”, “ff”.
 - b. Music: Musical Connections (p. 77)
 - i. Gustav Holst, *The Planets Suite*
 - c. Mathematics: Number and Number Sense (p. 78)
 - i. Identify Roman numerals from 1 to 20.
 - ii. Create and interpret bar graphs and line graphs.
 - d. Mathematics: Fractions and Decimals (p. 78)
 - i. Recognize fractions to 1/10
 - e. Mathematics: Measurement (p. 79-80)
 - i. Temperature
 - a) Know the degree sign
 - f. History and Geography: Ancient Rome (p. 70)
 - i. Worship of gods and goddesses, largely based on Greek religion.
 - g. Science: Astronomy (p. 83)
 - i. Our solar system
 - a) The nine planets
 - ii. Planetary motion: orbit and rotation
 3. Skill Objective(s)
 - a. Respond and discuss myths. (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for language arts, 3.6.E)
 - b. Identify and discuss the ancient Roman gods and goddesses that make up the nine planets in our solar system.
 - c. Display an orbit and a system in relation to our solar system.
 - d. Compare objects according to measurable attributes. (adapted from CSGLE for math, 3.5.2.A)
 - e. Describe the units for measuring temperature. (adapted from CSGLE for math, 3.5.1.I)

- f. Demonstrate the ability to follow and perform a notated rhythmic pattern. (CSGLE for music, 3.6, S1, S4)
- g. Create a short composition that shows contrast in tempo, dynamics, and timbre. (CSGLE for music, 3.9, S3)
- h. Listen and respond to the music and the life of a composer and/or musical performer. (CSGLE for music, 3.11, S4, S5)

B. *Materials*

1. CD Player
2. CD – *Holst, The Planets*, by Gustav Holst
3. Book – *Kingdom of the Sun*
4. One copy of Appendix C: Small Group Evaluation
5. One copy of Appendix A for reference

C. *Key Vocabulary*

1. Mystic: having magical properties

D. *Procedures/Activities*

1. (Be aware that the planet Pluto is being avoided with reason, and should not be mentioned until later in this lesson.)
2. When class begins, quietly play track two (Venus) from the CD, *Holst, The Planets* as background music.
3. Quietly call the class around you on the floor. Say to them in a soft, meaningful voice, “*Today, we have reached our final planet. Its name is Neptune, and it lies far, far out in space, wrapped in icy cold.*”
4. Open the book *Kingdom of the Sun* and read the page for Neptune.
5. When done reading, walk to the bar graph and write in the name “Neptune” as it is written in Appendix A. Explain to the class that the average temperature on Neptune is negative 300 degrees Fahrenheit. Have volunteers record the temperature on the bar graph.
6. Now ask a volunteer to write the correct Roman numeral for Neptune on the bar graph. (The correct Roman numeral is VIII.)
7. Say, *Gustav Holst was a composer in London. He wanted to play piano, but he had problems with his fingers, so he decided to play the trombone instead. As he grew older, he began composing more music, and at the age of 41, he composed the song for Neptune.*”
8. Say, “*Gustav ended his Planets Suite with Neptune because it was the farthest known planet in our solar system. He called his last song, “Neptune, the Mystic”. And, even though Neptune is a legendary and powerful god of the sea, Holst chose to end this song as if the god Neptune stood proud and quiet, floating above his calm, lonely ocean, full of haunting, mystical sounds. So, close your eyes and listen to Gustav’s final song. As you listen, picture Neptune the Mystic, a magical god on a planet so far from the Sun that cold is everywhere. Picture the long path it has as it orbits the Sun once every 164 years. Listen carefully at the end of the song and you will hear this mystical planet fading away into space*”
9. Play track seven (Neptune, the Mystic) from the CD *Holst, The Planets*.
10. When the song is finished, stop the CD and ask volunteers to share their thoughts about what they heard.
11. When the comments come to a close, say, “*Well, that’s all the planets!*” Hopefully hands will raise and students will remind you that you are forgetting the planet Pluto. Either way, say, “*Well, maybe we have left one planet undiscovered, but it is not a very happy place. It is called Pluto.*”
12. Open the book *Kingdom of the Sun* to the page for Pluto and read it to the class.

13. When finished reading, walk to the bar graph and write in the name Pluto like in Appendix A.
 14. Say, “*Did you know it gets near negative 400 degrees Fahrenheit on Pluto?*”
 15. Select volunteers to graph the new temperature and to write in the correct Roman numeral (IX). Spend time comparing and contrasting the differences in temperature between the nine planets on the graph.
 16. When done, proceed with Appendix C: Small Group Evaluation with Neptune and Pluto as planetary substitutions. Use a $\frac{3}{4}$ meter for the clapping portion of the evaluation.
 17. As class ends, make the class aware (if they haven’t yet done it for you) that they have not heard the music for Pluto yet. Say, “*Pluto is a very new planet to us. In fact, some scientists think it should not have been called a planet. Either way, the planet Pluto was not discovered until 1930, and that was 14 years after Gustav Holst finished his “Planets Suite”. When the new planet was discovered, people asked Holst to compose a song for it, but he decided not to. Gustav Holst died four years later in 1934.*”
 18. Say, “*A man by the name of Colin Matthews was so inspired by Gustav that he composed the song “Pluto” in honor of Gustav Holst in the year 2000. In the next lesson, we will also compose our own song for Pluto, so be ready to create a short composition for the coldest, darkest planet in our solar system.*”
 19. Play track one (Mars) for the class to exit to if any time remains.
- E. *Assessment/Evaluation*
1. Appendix C: Small Group Evaluation tailored to Neptune and Pluto.

VI. CULMINATING ACTIVITY (45 minutes)

- A. The culminating activity will be four parts.
 1. Have groups of four or five remake the bar graph by putting the planets in the correct order. Provide construction paper and markers as needed. (15 Minutes)
 2. Act out the orbit of a complete solar system with nine planets orbiting the Sun. This exercise will require ten students. Students should take turns as different planets and rotate in and out of the system so all students get a chance to participate. (10 Minutes)
 3. Write a song for Pluto. In small groups of four or five, hand out scratch paper so groups can outline a series of sounds lasting 30 seconds. These sounds should be sounds they can make with the resources within the room. The sounds should relate to the planet Pluto’s surface conditions (harsh, dark, and cold) and the god Pluto (god of the underworld). When done, each group will play its own 30-second set of sounds back to back so that there is continuous music from group to group until the final group finishes. Music teachers should require that all groups compose a written rhythm for the performance (with classroom resources) using the music notes studied in this unit (Eighth notes, Quarter notes, Half Notes, and Whole notes). (25 minutes)
 4. Finish the unit by using Appendix I: Unit Final Exam. Make copies for all students and administer the test. (Date administered and time taken varies.)

VII. HANDOUTS/WORKSHEETS

- A. Appendix A: Planet Bar Graph (Lessons One - Seven)
- B. Appendix B: The Meter of Mars (Lesson One, Two)
- C. Appendix C: Small Group Evaluation (Lessons One, Three - Eight)
- D. Appendix D: Notes and Meters (Lesson Two)
- E. Appendix E: Notes and Meters “Key” (Lesson Two)

- F. Appendix F: Saturn Drawing (Lesson Six)
- G. Appendix G: Roman Numerals (Lesson Seven)
- H. Appendix H: Roman Numerals Key (Lesson Seven)
- I. Appendix I: Unit Final Exam
- J. Appendix J: Unit Final Exam Key

VIII. BIBLIOGRAPHY

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- C. Michael, S. *Gustav Holst*, Oxford University Press, 1990
- D. Milton, J. and C. Balit. *Kingdom of the Sun*. London, UK: Frances Lincoln Limited, 2001. ISBN 0-7922-7220-X
- E. Richard, G. *Holst: The Planets*, Cambridge, 1995
- F. ed. Sadie, S. *The Grove Concise Dictionary of Music*. New York, NY: Macmillan Publishing, 1994. ISBN# 0-333-43236-3

Appendix A Planet Bar Graph

With construction paper, design the graph as pictured here. DO NOT write in the “°” degree symbol or Fahrenheit abbreviation (f) until you explain it to the class. It is even helpful to have students draw these symbols. DO NOT write in all planets. Only write in the planet when discovered in each new lesson throughout the unit. DO NOT write in the Roman numerals for each planet until asked to do so within the lesson. Continue to fill in the graph with each new planet studied in the unit.

	1000									
T	800									
E	600									
M	500									
P	400									
E	300									
R	200									
A	100									
T	0									
U	-100									
R	-200									
E	-300									
	-400									
	<u>Planets</u>	<u>Mars</u> IV	<u>Earth</u> III	<u>Venus</u> II	<u>Mercury</u> I	<u>Jupiter</u> V	<u>Saturn</u> VI	<u>Uranus</u> VII	<u>Neptune</u> VIII	<u>Pluto</u> IX

It will be most helpful to keep the planets written on the graph in this order so that they align with the order of “The Planets Suite”. As part of the culmination for the unit, students will rebuild this graph while putting the planets in their correct order in relation to their distance from the Sun (as shown with Roman numerals above).

Appendix B The Meter of Mars

Gustav Holst's song "Mars" is in 5/4-meter. This means that there are five beats of music per measure that repeat throughout the song. In order for a class of students to truly grasp the timing of the rhythm in the song, they must learn to internalize this repetitive, yet unfamiliar pulse. Use the methods described below to reinforce the 5/4-meter signature used in "Mars". Try to teach only the meter signature you are currently working on in your lesson.

Step #1: Make sure you have written the 5/4-meter signature on the board or easel in a very visible place.

Step #2: Have the class clap a steady beat while counting aloud to the numerator of the meter signature. Always have the class return to the first beat once they reach the last so the exercise repeats. For instance, when working on 5/4-meter, the class would be counting out loud and clapping the following: "1, 2, 3, 4, 5, 1, 2, 3, 4, 5, 1, 2, 3, 4, 5" etc.

Step #3: Have the class only clap and say the first number and then rest while the teacher claps the remaining beats up to the numerator. For instance: (All) "1" (Teacher) "2, 3, 4, 5" (All) "1" etc. Encourage the class to count the beats the teacher is clapping while saying, "rest, rest, rest, rest" to signify the counting of silent beats as done normally in music.

Step #4: Start the CD recording of "Mars". Once the pulsating beat of the song begins, model Step #2 (above) to the music. Have the class join in. Be sure to count aloud or this step will get too hard. Once the class seems to be staying with you stop the recording, wipe your brow, and proceed to the next step.

Step #5: The 5/4 pattern used in "Mars" is made up of a triplet, two quarter notes, two eighth notes, and one last quarter note. (Music teachers: write this pattern on the board for the class to see.) Additionally, the phrase, "Bringer of war is furious" fits nicely with the rhythm pattern because of its similar rhythm. (Music teachers: write this phrase underneath the notes you have written for the class.) The phrase works out as shown below:

Bring-er-	of	War	Is	Fur-	I-	ous
X	X	X	X	X	X	X

Each X symbolizes another beat in the repeating rhythm. With a little quick practice to the recording, the teacher and class will be able to repeat this phrase aloud to the music as it plays. Have the class practice saying the phrase to the music until they demonstrate mastery of the rhythm.

**MARS
RHYTHM**
(For Lesson Two)

tri pl. et 2 3 4 + 5

5
—
4

Bring er of war is fu ri ous!

1 2 3 4 + 5

Appendix C

Small Group Evaluation

1. Break the class into groups of four or five. Have them sit in circles.
2. Ask the planetary questions (below) to each group, one by one, and group by group.
3. Have the groups demonstrate an orbit, and then a solar system. (Help this process if necessary by having the groups designate who will be the Sun.)
4. Have one group clap the first beat of a repeating meter signature steady beat (relevant to the current meter signature being studied) while the rest of the groups clap the ongoing steady beats. Ensure all members of the group show mastery before stopping. Remember, like in Appendix B, to have the group count silent beats by saying the word, “rest” for each silent beat. Rotate groups until all groups have shown mastery.

PLANETARY QUIZ:

1. Who gave *Mars its name? Answer: The ancient Romans – and they used the idea from the ancient Greeks.
2. Describe “who” the ancient Romans thought *Mars was. What was he/she like? Answer: *Located in the *Kingdom of the Sun* book on each planet’s page.
3. What number order is *Mars in our solar system? For instance, the Earth is the third planet from the Sun. What number is *Mars? Answer: *Fourth
4. Is *Mars generally warmer or colder than the Earth? Answer: *Warmer
5. What is the average warmest temperature on *Mars? Answer: check Bar graph.
6. Describe the weather on *Mars. Answer: *Located in the *Kingdom of the Sun* book on each planet’s page.
7. Name a planet next to *Mars. Answer: The order of planets is: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto.
8. Which composer wrote *The Planets Suite* more than 90 years ago?
Answer: Gustav Holst.

* - Substitute the current planet and planetary answers for areas marked above with an asterisk.

Appendix D

Notes and Meters

Name: _____ Class: _____

1. How many beats does a quarter note get? _____
2. How many beats does a half note get? _____
3. How many beats does a whole note get? _____
4. How many beats does an eighth note get? _____
5. A whole note plus a half note equals how many beats? _____
6. Four quarter notes plus a half note equals how many beats? _____
7. Two quarter notes plus two half notes equals how many beats? _____
8. How many quarter notes does it take to equal a whole note? _____
9. How many half notes does it take to equal a whole note? _____
10. How many eighth notes does it take to equal a quarter note? _____
11. What is the numerator in $4/4$ -meter? _____
12. What is the numerator in $3/4$ -meter? _____
13. What is the numerator in $5/4$ -meter? _____
14. What is the numerator in $6/4$ -meter? _____
15. What is the numerator in $2/4$ -meter? _____
16. What is the numerator in $1/4$ -meter? _____
17. What is the numerator in $6/8$ -meter? _____
18. What is the denominator in $5/4$ -meter? _____
19. What is the denominator in $4/4$ meter? _____
20. What is the denominator in $3/4$ meter? _____

Appendix E

Notes and Meters Answer Key

Name: _____ Class: _____

1. How many beats does a quarter note get? **1**
2. How many beats does a half note get? **2**
3. How many beats does a whole note get? **4**
4. How many beats does an eighth note get? **1/2**
5. A whole note plus a half note equals how many beats? **3**
6. Four quarter notes plus a half note equals how many beats? **6**
7. Two quarter notes plus two half notes equals how many beats? **6**
8. How many quarter notes does it take to equal a whole note? **4**
9. How many half notes does it take to equal a whole note? **2**
10. How many eighth notes does it take to equal a quarter note? **2**
11. What is the numerator in 4/4-meter? **4**
12. What is the numerator in 3/4-meter? **3**
13. What is the numerator in 5/4-meter? **5**
14. What is the numerator in 6/4-meter? **6**
15. What is the numerator in 2/4-meter? **2**
16. What is the numerator in 1/4-meter? **1**
17. What is the numerator in 6/8-meter? **6**
18. What is the denominator in 5/4-meter? **4**
19. What is the denominator in 4/4 meter? **4**
20. What is the denominator in 3/4 meter? **4**

Appendix F Saturn Drawing

The song “Saturn” by Gustav Holst is nine minutes long. In that time, complete a picture in the space below with the following details included:

1. ___ Draw Saturn in its long slow orbit around the Sun. (1 point)
2. ___ Write Saturn’s temperature, with the degree and Fahrenheit symbol, on the planet. (1 point)
3. ___ Show the Sun and other planets in the solar system. (1 point)
4. ___ Label (write the name for) any planet you draw. (1 point)
5. ___ Include a picture of Saturn, the ancient Roman god. (1 point)

5 Points Total

Each detail above is worth one point. Check off each detail after you draw it! A detail “MUST” be included to receive a point.

Saturn: orbits, planets, temperatures, and gods

Appendix G Roman Numerals

Name: _____ Class: _____

In the sections below, fill in the rest of the numbers below the Roman numerals. Numbers, 1, 5, 10, 15, and 20 are done for you.

lower case from one to twenty

i, ii, iii, iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv, xvi, xvii, xviii, xix, xx
1 _ _ _ 5 _ _ _ 10 _ _ _ 15 _ _ _ 20

UPPER CASE FROM ONE TO TWENTY

I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, XVII, XVIII, XIX, XX
1 _ _ _ 5 _ _ _ 10 _ _ _ 15 _ _ _ 20

Answer the following:

- I. Write the lower case symbol for the number 3 as a Roman numeral: _____
- II. Write the lower case symbol for the number 5 as a Roman numeral: _____
- III. Write the lower case symbol for the number 8 as a Roman numeral: _____
- IV. Write the lower case symbol for the number 2 as a Roman numeral: _____
- V. Write the lower case symbol for the number 14 as a Roman numeral: _____
- VI. Write the lower case symbol for the number 19 as a Roman numeral: _____
- VII. Write the upper case symbol for the number 7 as a Roman numeral: _____
- VIII. Write the upper case symbol for the number 11 as a Roman numeral: _____
- IX. Write the upper case symbol for the number 9 as a Roman numeral: _____
- X. Write the upper case symbol for the number 16 as a Roman numeral: _____
- XI. Write the upper case symbol for the number 20 as a Roman numeral: _____
- XII. Write the upper case symbol for the number 15 as a Roman numeral: _____

Appendix H Roman Numerals (Key)

Name: _____ Class: _____

Fill in the rest of the numbers below the Roman Numerals. Numbers, 1, 5, 10, 15, and 20 are done for you.

lower case from one to twenty

i, ii, iii, iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv, xvi, xvii, xviii, xix, xx
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

UPPER CASE FROM ONE TO TWENTY

I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, XVII, XVIII, XIX, XX
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Answer the following:

- I. Write the lower case symbol for the number 3 as a Roman numeral: **iii**
- II. Write the lower case symbol for the number 5 as a Roman numeral: **v**
- III. Write the lower case symbol for the number 8 as a Roman numeral: **viii**
- IV. Write the lower case symbol for the number 2 as a Roman numeral: **ii**
- V. Write the lower case symbol for the number 14 as a Roman numeral: **xiv**
- VI. Write the lower case symbol for the number 19 as a Roman numeral: **xix**
- VII. Write the upper case symbol for the number 7 as a Roman numeral: **VII**
- VIII. Write the upper case symbol for the number 11 as a Roman numeral: **XI**
- IX. Write the upper case symbol for the number 9 as a Roman numeral: **IX**
- X. Write the upper case symbol for the number 16 as a Roman numeral: **XVI**
- XI. Write the upper case symbol for the number 20 as a Roman numeral: **XX**
- XII. Write the upper case symbol for the number 15 as a Roman numeral: **XV**

Appendix I, page 1
Unit Final Exam

Name: _____ Class: _____

Answer the following questions by circling the correct answer:

1. Who gave the planets their “current” names?
 - a. The ancient Romans
 - b. The ancient Greeks
 - c. The ancient Egyptians
 - d. The Vikings

2. Who did the ancient Romans think Uranus was:
 - a. The god of war
 - b. The ruler of all gods
 - c. The bringer of peace
 - d. The magician

3. Who did the ancient Romans think Jupiter was:
 - a. The magician
 - b. The ruler of all gods
 - c. The ruler of the underworld
 - d. The bringer of old age

4. Who did the ancient Romans think Mars was:
 - a. The mystic
 - b. The god of war
 - c. The bringer of old age
 - d. The ruler of the underworld

Answer the following questions with a short response:

5. What is the order of planets in our solar system? For instance, the Earth is the third planet from the Sun. Name and number each planet, starting with the planet closest to the Sun? (9 points: One point for each planet)

6. Is Venus generally warmer or colder than the Jupiter?

7. Describe the weather on Mars.

8. Name a planet next to Saturn. Answer: The order of planets is:

9. Which composer wrote *The Planets Suite* more than 90 years ago?

Fill in the blanks below:

10. Write the upper case symbol for the number 3 as a Roman numeral: _____

11. Write the upper case symbol for the number 5 as a Roman numeral: _____

Appendix I, page 2
Unit Final Exam (continued)

Name: _____ Class: _____

12. Write the upper case symbol for the number 8 as a Roman numeral: _____
13. Write the upper case symbol for the number 10 as a Roman numeral: _____
14. Write the upper case symbol for the number 14 as a Roman numeral: _____
15. Write the lower case symbol for the number 1 as a Roman numeral: _____
16. Write the lower case symbol for the number 15 as a Roman numeral: _____
17. Write the lower case symbol for the number 2 as a Roman numeral: _____
18. Write the lower case symbol for the number 9 as a Roman numeral: _____
19. Write the lower case symbol for the number 20 as a Roman numeral: _____
20. A whole note plus a whole note equals how many beats? _____
21. Four quarter notes plus two half notes equals how many beats? _____
22. Two quarter notes plus one half notes equals how many beats? _____
23. How many eighth notes does it take to equal a quarter note? _____
24. What is the numerator (how many beats) in $4/4$ -meter? _____
25. What is the numerator (how many beats) in $3/4$ -meter? _____
26. What is the numerator (how many beats) in $5/4$ -meter? _____
27. What is the numerator (how many beats) in $6/4$ -meter? _____
28. What is the numerator (how many beats) in $2/4$ -meter? _____
29. What is the denominator in $3/4$ -meter? _____
30. What is the denominator in $5/8$ -meter? _____
31. What is the denominator in $2/2$ -meter? _____
32. What is the denominator in $9/8$ -meter? _____

Appendix J

Unit Final Exam (Key)

40 points: Score one point per question except for #5, which is a nine-point question

1. Who gave the planets their current names? **“a” The ancient Romans**
2. Who did the ancient Romans think Uranus was: **“d” The Magician**
3. Who did the ancient Romans think Jupiter was: **“b” The ruler of all gods.**
4. Who did the ancient Romans think Mars was: **“b” The god of war.**
5. What is the order of planets in our solar system? For instance, the Earth is the third planet from the Sun. Name and number each planet, starting with the planet closest to the Sun? (9 points: One point for each correct planet) **(1) Mercury, (2) Venus, (3) Earth, (4) Mars, (5) Jupiter, (6) Saturn, (7) Uranus, (8) Neptune, and (9) Pluto**
6. Is Venus generally warmer or colder than the Jupiter? **Warmer**
7. Describe the weather on Mars. **Hot, dry, windy, dusty, red, rocky, violent, furious, even volcanic – allow credit if two of these words are answered.**
8. Name a planet next to Saturn. **Jupiter or Uranus**
9. Which composer wrote *The Planets Suite* more than 90 years ago? **Gustav Holst.**
10. Write the upper case symbol for the number 3 as a Roman numeral: **III**
11. Write the upper case symbol for the number 5 as a Roman numeral: **V**
12. Write the upper case symbol for the number 8 as a Roman numeral: **VIII**
13. Write the upper case symbol for the number 10 as a Roman numeral: **X**
14. Write the upper case symbol for the number 14 as a Roman numeral: **XIV**
15. Write the lower case symbol for the number 1 as a Roman numeral: **i**
16. Write the lower case symbol for the number 15 as a Roman numeral: **xv**
17. Write the lower case symbol for the number 2 as a Roman numeral: **ii**
18. Write the lower case symbol for the number 9 as a Roman numeral: **ix**
19. Write the lower case symbol for the number 20 as a Roman numeral: **xx**
20. A whole note plus a whole note equals how many beats? **8**
21. Four quarter notes plus two half notes equals how many beats? **8**
22. Two quarter notes plus one half notes equals how many beats? **4**
23. How many eighth notes does it take to equal a quarter note? **2**
24. What is the numerator (how many beats) in 4/4-meter? **4**
25. What is the numerator (how many beats) in 3/4-meter? **3**
26. What is the numerator (how many beats) in 5/4-meter? **5**
27. What is the numerator (how many beats) in 6/4-meter? **6**
28. What is the numerator (how many beats) in 2/4-meter? **2**
29. What is the denominator in 3/4-meter? **4**
30. What is the denominator in 5/8-meter? **8**
31. What is the denominator in 2/2-meter? **2**
32. What is the denominator in 9/8-meter? **8**