

SYMPHONY
IN
SPACE

Education Guide

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ACADEMIC CONTENT CONNECTIONS

All of us are accustomed to hearing music; we are less accustomed to *listening* to music. The process of listening is **active** and allows us analyze, question and enjoy the elements of music on a deeper level than simple passive hearing. Composers have specific motivations for writing music and, just as an author writes from a particular point of view or a painter creates an image from a specific vantage point, a composer creates sounds reflecting his or her unique perspective of the world around them. This guide examines the connections between music, science, film and language arts with the hope that you and your students will learn to listen with a perceptive ear; through active listening, music is transformed into a text, worthy of the same inquiry and analysis that a good book merits.

The guide will examine individual works programmed on The Phoenix Symphony's *Symphony in Space!* education concert and the specific techniques composers use to portray their personal experience. It includes study guides and several lesson plans to reinforce the aforementioned concepts with the goal of a holistic concert experience for students. When taught as a whole, this guide aligns with the following Arizona Academic Content Standards:

Arizona Music Standards:

MU1/2-S3C2-PO1: Express personal reactions to a music performance through words and drawings

MU1/2/3-S2C1-PO3: Recognize composers' motivations for creating music

MU3-S2C1-PO4: Describe changes in mood while listening to music

MU5-S3C2-PO1: Use established criteria (e.g., dynamics) to evaluate performances and compositions

MU5/6-S3C1-PO3: Identify AB, ABA, canon and rondo forms when presented in performed and/or recorded music

MU5-S3C1-PO4: Identify musical examples by genre

Arizona Science Standards:

SC5-S6C3-PO1: Identify the known planets of the solar system

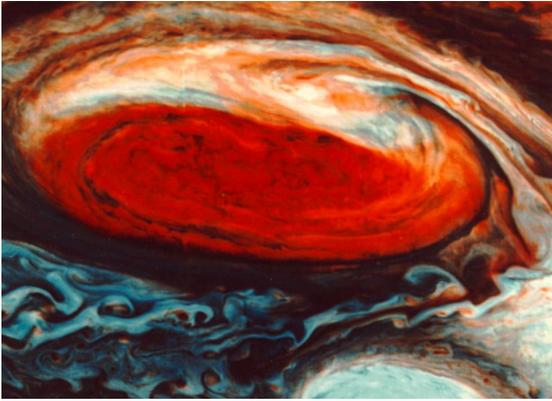
SC5-S6C3-PO2: Describe the distinguishing characteristics of the known planets in the solar system

SC5-S5C1-PO1: Identify that matter is made of smaller units called molecules and atoms

MUSIC IN SPACE

Music gives a soul to the universe, wings to the mind, flight to the imagination, and life to everything.

-Plato



Jupiter's Great Red Spot

Music can paint a picture, tell a story and describe the indescribable. It is no wonder, then, that composers have used music to portray celestial phenomenon like the changing of the seasons, the twinkle of the stars, the moon's nightly visits and the majestic features of the planets. But how does one write music that sounds like the stars? Or the seasons? Or the planets? In other words, how can music depict life experience?

Composers throughout history have answered these questions in different ways. **Antonio Vivaldi's** landmark work "Winter" from *The Four Seasons* utilizes plucked *pizzicato* notes in the high strings to mimic icy rain. **Richard Strauss'** epic tone poem *Also sprach Zarathustra* contains a rising brass fanfare that depicts

the rising of the sun, a regular but remarkable phenomenon. The English composer **Gustav Holst** gives life to our celestial neighbors in one of his most famous works, *The Planets*.

The Planets is a seven-**movement** work. A **movement** is a part of a larger piece that can also be performed by itself. Each movement represents a different planet and has an appropriate subtitle. These subtitles reflect the astrological signs they were named for, as interpreted by Holst: **Mars**, the Bringer of War; **Venus**, the Bringer of Peace; **Mercury**, the Winged Messenger; **Jupiter**, the Bringer of Jollity; **Saturn**, the Bringer of Old Age; **Uranus**, the Magician; and **Neptune**, the Mystic. This guide will focus on two of the most memorable movements from *The Planets* suite: *Mars* and *Jupiter*, which will be performed at *Symphony in Space!*



Focus on a Composer: Gustav Holst (1874—1934)

Gustav Holst knew he wanted to be a composer at a very young age. Despite a few physical ailments—he had neuritis and asthma—he played trombone and piano and began composing at the age of twelve. He attended the Royal College of Music on composition scholarship. It was there that he met his lifelong friend, the composer Ralph Vaughn Williams. In addition to composing, Holst dedicated much of his life to teaching music. He also had an amateur interest in astrology, which prompted him to write the *Planets Suite*.

Holst thought that the *Planets* unnecessarily overshadowed much of his other compositions; he believed that "the artist is born again and starts anew with ever new work."

The Planets: Mars

BRINGER OF WAR

Mars has been associated with war and battle for centuries. In Roman mythology, Mars was the second-most important deity and the god of war and the military. He is almost always depicted holding a spear in art and sculpture. The influence of this famous deity is felt even today: when we use words like “martial,” they are in reference to Mars’ associations with the military.



The planet Mars seems to reflect some of those same austere characteristics: its barren red surface can be attributed to the great amount of iron oxide, or rust, on its surface. Mars is the next-furthest planet from the sun after Earth, which means its temperature is very cold. Its surface is heavily marred and cratered by asteroid impacts, just like the moon’s surface. Mars has two moons of its own, and even they have war-like names: Phobos (meaning “fear”) and Deimos (meaning “terror”).

Most people would agree that Gustav Holst’s *Mars* certainly invokes fear and terror. Let’s listen to the music and identify the specific sounds and techniques that Holst uses to give his piece this frightening quality. To begin, Holst uses a march-like rhythm throughout *Mars*. This repetitive rhythm, played first by the strings and percussion, paints the picture of an army marching to war. The strings are asked to play **col legno**, meaning “with the wood,” creating a distinctively harsh sound.

Musical Terms

Col legno—Italian phrase meaning “with the wood”

Mood—the general feeling one gets from music; it could be different from person to person.

Dynamics—how loud or how soft the music is.

Crescendo/Decrescendo—a gradual increase or decrease in volume, like turning the volume knob on your car stereo.

As the movement progresses, Holst adds a snare drum, which was often used to keep troops in step as they marched to battle. These instruments give the movement a dark **mood**, or general feeling, just as an author can create a certain mood in a story by using descriptions and dialogue. The piece is also characterized by several changes in **dynamics**. **Dynamics** are the changes in volume in a piece. “Mars” has two very long **crescendos**, or increases in volume. There are also a few **decrescendos**, or decreases in volume.

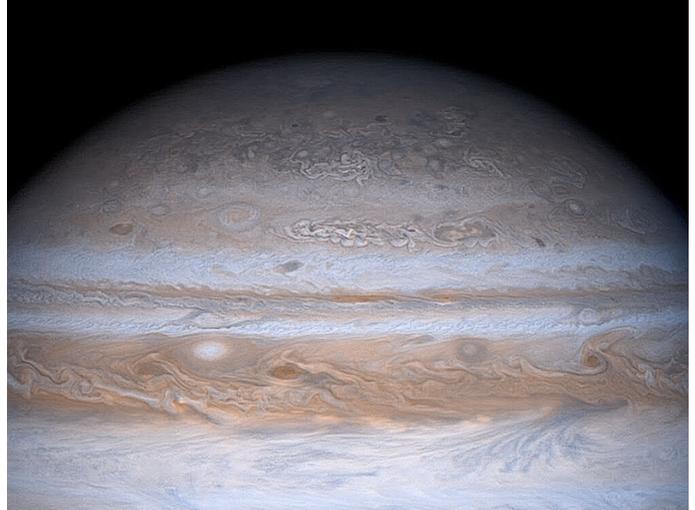
So, to review, how does Holst paint the picture of war and battle, the astrological representation of Mars? He uses a specific repetitive rhythm—the march. He uses specific instruments (brass and the snare drum) which are commonly associated with the military. He employs special techniques, like **col legno**, to give instruments an interesting **timbre**, and **crescendos** to slowly build intensity, which creates excitement. Finally, he uses very loud **dynamics** to portray the intensity of battle.

The Planets: Jupiter

BRINGER OF JOLLITY

In ancient Roman mythology, Jupiter was king of the gods and the ruler of the sky. Jupiter is said to bring happiness in astrology, and the planet certainly lives up the majesty of these associations: fifth planet from the Sun, it is the largest of all the planets in our solar system, and the third-brightest object in the night sky after the moon and Venus.

Jupiter, one of the four gas giants (the other three are Saturn, Uranus and Neptune), is known for its Great Red Spot, a massive storm two or three times the size of Earth and hundreds of years old. Jupiter has 67 moons; a few are as large as planets! Everything concerning Jupiter is big—just as a planet named for the king of the Roman gods should be.



In contrast to *Mars*, Holst's *Jupiter* is a much more hopeful and benevolent movement, reflecting Holst's astrological reading of Jupiter. Whereas *Mars* invokes images of armies marching to war, *Jupiter* is joyful and even dance-like. Several sections of *Jupiter* give the listener these happy feelings; the beginning is a quick, lively dance that quickly morphs into a beautiful hymn, which is one of the most memorable moments in the entire *Planets* suite. But which compositional techniques does Holst employ to give the listener such a happy feeling?

To begin, Holst uses a different **instrumentation** than he does in *Mars*. Instead of military drums, he substitutes metal instruments like the triangle and cymbals, giving the whole piece a brighter feeling. The glockenspiel, a set of tuned metal bars, also plays a predominant role in the movement. To reflect the BIG nature of the planet Jupiter, Holst uses brass instruments in a BIG way—they play a prominent role in the entire movement. Furthermore, Holst uses a certain **meter**, or basic underlying counting structure, to give the movement the desired jolly mood. A section of Jupiter is in triple meter, which creates a waltz-like bounce in the music. Finally, Holst concludes with one of the most famous **melodies**, or main tunes, he ever wrote; the composer eventually set words from a poem by Cecil Spring-Rice to this famous melody and named it *Thaxted*, after a village where Holst lived for many years. The resulting patriotic song has become one of the most well-known and popular in England.



But what about Pluto? And Earth?

When Gustav Holst wrote the *Planets Suite* between 1914 and 1916, Pluto had yet to be discovered. When it was finally found by Clyde Tombaugh in 1930, four years before Holst's death, Holst expressed little interest in writing another movement for the planet. However, the English composer Colin Matthews, an expert on Holst, did write a eighth movement entitled "Pluto, the Renewer" in 2000. In 2006, the International Astronomical Union (IAU) excluded Pluto from its definition of a planet, which would have been welcome news to Holst. Earth was not included in *The Planets* because it doesn't have an astrological symbol—the original inspiration for the piece.

The Four Seasons:

“Winter”



The Four Seasons (Italian: *Le quattro stagioni*) is a set of four violin **concertos** by Antonio Vivaldi, written in 1723. A **concerto** is a piece that features a solo instrument with accompaniment from an orchestra. These pieces, which first became popular during the Baroque era (from around 1600-1750), are usually written in three parts. Each of the four seasons represented in Vivaldi's work (“Spring,” “Summer,” “Autumn,” and “Winter”) all have three **movements**.

The four concertos were not originally referred to as *The Four Seasons*; in fact, they weren't even considered “real” music at the time. They were viewed as gimmicks, intended to entertain, but not as serious pieces.

The Four Seasons is a wonderful example of **program music**, that is, instrumental music that intends to represent something extra-musical, like a story. In the case of *The Four Seasons*, each concerto has both a corresponding season as well as a sonnet about that particular season; here is a part of the sonnet that many scholars think Vivaldi wrote for “Winter” and that corresponds with the first movement:

To tremble from cold in the icy snow,
In the harsh breath of a horrid wind;
To run, stamping one's feet every moment,
Our teeth chattering in the extreme cold

If you listen carefully to the first movement of “Winter,” *Allegro non molto*, you can hear the instruments imitate each and every line of the poem.



Focus on a Composer: Antonio Vivaldi (1678-1741)

Antonio Vivaldi was a prolific composer, writing over 350 concertos for solo instruments in his lifetime. He garnered the nickname “Red Priest” due to his ordained status and his bright red hair (hidden by a wig in the picture on the left); Vivaldi worked for many years at the Hospice of Compassion, an orphanage for girls in Venice, Italy. He did achieve some fame in his life and even became a favorite of the Holy Roman Emperor Charles VI, who gave him a gold medal and knighted him after hearing Vivaldi's concerto *La Cetra*.

Although he lost some prestige later in life, Vivaldi is now one of the most well-known Baroque composers. *The Four Seasons* remains his most popular work.

Assessment:

Musical Terms Review

Choose the best definition from the choices provided:

1. **Dynamics** are _____.
 A) instruments made of metal
 B) short pieces of music
 C) how loud or soft music is
 D) groups of singers
2. A **concerto** is _____.
 A) a special color of a sound
 B) a mood in a piece
 C) the biggest group of musicians
 D) a piece that features a solo instrument with accompaniment
3. A **crescendo** is _____.
 A) a piece that features a solo instrument
 B) a gradual decrease in volume
 C) a gradual increase in volume
 D) the special color of a sound
4. A **decrescendo** is _____.
 A) a gradual decrease in volume
 B) a particular combination of instruments
 C) the emotional reaction of a listener to music
 D) a part of a larger piece of music that can stand alone
5. **Timbre** is _____.
 A) the special color of a sound
 B) a gradual increase in volume
 C) the basic underlying counting structure
 D) falling wood
6. The term **instrumentation** means _____.
 A) the basic underlying counting structure
 B) a particular combination of instruments
 C) a gradual decrease in volume
 D) music that tells a story
7. A piece's **mood** is _____.
 A) a gradual increase in volume
 B) the tune
 C) a general feeling
 D) a soloist with accompaniment
8. A musical **movement** is _____.
 A) a part of a larger piece that can stand alone
 B) the tune
 C) when everyone gets up between pieces
 D) a basic underlying counting structure
9. A **melody** is which part of music?
 A) The part you would sing or hum
 B) The drums
 C) The beat
 D) How loud or soft the music is
10. **Col legno** is an Italian word that means _____.
 A) With the leg
 B) On the way
 C) With the wood
 D) Upside-down

Lesson Plan: Music & Science

“Planetary Discovery”

Grades 3-5

Time: One or more full class periods

Arizona Music Standards:

MU3-S2C1-PO4: Describe changes in mood while listening to music

MU5-S3C2-PO1: Use established criteria (e.g., dynamics) to evaluate performances and compositions

Arizona Science Standards:

SC5-S6C3-PO1: Identify the known planets of the solar system

SC5-S6C3-PO2: Describe the distinguishing characteristics of the known planets in the solar system

Objectives:

TSW research and list characteristics of planets in the solar system.

TSW identify specific musical elements in Holst’s *The Planets* suite that correspond with planet traits.

TSW relate physical planetary characteristics to musical characteristics.

Materials:

Writing materials; research materials (especially online) concerning the planets; a recording of Holst’s *The Planets* (*Mars* and *Jupiter* are available here: <http://www.phoenixsymphony.org/education-and-community/symphony-for-the-schools-listening-practice>)

Prerequisites:

This lesson would work well toward the end of a unit on the solar system or celestial objects. If possible, students should be familiar with some of the musical terms outlined on page 8 of this guide (e.g., dynamics, crescendo).

Procedure:

Introduction

Holst originally wrote *The Planets* (1914—1916) to correspond to the astrological influence of the planets rather than the physical planets themselves. At that time, scientists knew relatively little about the planets in terms of specific traits and characteristics. Though Holst did not intend each movement to represent a planet’s attributes, his music nonetheless allows us to draw connections and similarities between the music he wrote and the physical planets for the purposes of musical and scientific understanding.

Development

Students should begin by researching each planet in our solar system. They can either divide into planetary groups or provide one or several facts about each planet, including information on its terrain (if any), temperature, size, color, chemical makeup, etc., depending on the ability of the students. Then, as a class, the students can review each planet. Just as a planet has specific characteristics that can be identified, a piece of music has particular attributes, chosen by the composer, that give it identity. Students should then listen to one or more of the movements from *The Planets*, taking notes on musical attributes of each movement, including **tempo**, **dynamics**, **mood**, **timbre**, **instrumentation**, as well as their general thoughts on the music.

Guided Practice

As an example, listen to the *Mars* movement of *The Planets*. Using the information provided on page 5, explain the various ways that the music *Mars* and the planet Mars are similar. Then apply this process to the rest of the planets in the solar system. Conclude by comparing and listing the findings of various groups or individuals and by arriving at a class consensus (e.g., “The eerie choir heard at the ending of *Neptune* slowly **decrescendos**, which represents the distance of the planet from the sun”). Also compare the mood of each movement to other movements (e.g., *Mars* sounded scary and intense, while mercury sounded light and airy).

Lesson Plan: Music & Science

“Building Blocks”

Grades 4-6

Time: 30-50 minutes

Arizona Music Standards:

MU5/6-S3C1-PO3: Identify AB, ABA, canon and rondo forms when presented in performed and/or recorded music

MU5-S3C1-PO4: Identify musical examples by genre

Arizona Science Standards:

SC5-S5C1-PO1: Identify that matter is made of smaller units called molecules and atoms

Objectives:

- TSW identify ritornello form, a predecessor of the rondo form
- TSW be introduced to the building blocks of matter: atoms and molecules
- TSW relate and compare the structure of matter to musical form

Materials:

A recording of Vivaldi's *Four Seasons*, “Winter,” 1st movement (about 3’30”), available here:

[http://en.wikipedia.org/wiki/File:10 - Vivaldi Winter mvt 1 Allegro non molto - John Harrison violin.ogg](http://en.wikipedia.org/wiki/File:10_-_Vivaldi_Winter_mvt_1_Allegro_non_molto_-_John_Harrison_violin.ogg);

An illustration of a water molecule (H₂O); a T-chart on the board or overhead to be completed as a class

A Note to the Teacher:

This lesson is designed to introduce the building blocks of matter, atoms and molecules, through the perspective of musical form. It begins with an exploration of the musical form called the **ritornello**. The ritornello works well to illustrate and reinforce ABA (etc.) musical form, or the idea of repeating sections intertwined with contrasting material, as well as the parallels between musical and scientific structure. In addition, the ritornello is the predecessor of the rondo form, so this lesson would work well if the school's music teacher is about to teach the rondo.

Procedure:

Introduction

Most music, whether on the radio or in a classical concert hall, is comprised of different sections. These sections combine and repeat in interesting ways to create a song or a composition. In order to analyze music, we use letters to label these musical sections; when we have a new section of music, we label it with a new letter. In ritornello form, a popular form in the Baroque period of classical music (1600-1750), the ritornello (Italian for “short return”) comes back several times over the course of the piece with contrasting sections in between.

To illustrate this, the teacher should write the following diagram on the board or overhead. Then have the class listen to the first 0:38 seconds of “Winter” from *The Four Seasons* by Vivaldi. This first section is the basic ritornello that occurs throughout the piece, which is sometimes elaborated on to keep the listener's interest.

- 0:00 **A**, ritornello
- 0:38 **B** (solo section)
- 1:00 **A**, ritornello (extension)
- 1:24 **C** (solo section)
- 2:02 **A**, ritornello
- 2:22 **D** (solo section)
- 3:02 **A**, ritornello extension

Then, starting from the beginning, listen to the entire piece, pointing to each section as it occurs. Explain that, one could label the form of this piece ABACADA, where each A represents a ritornello and every other letter is a new contrasting solo section. At the end of the first listening, ask the students if they could hear the ritornello return over and over, and if they heard the contrasting solo sections in-between. If they had trouble, feel free to skip around the track and review the different sections. It might also be helpful to watch a video of the piece on YouTube so that they can see the soloist and the orchestra go back and forth.

Lesson Plan: Music & Science

“Building Blocks” (continued)

Grades 4-6

Development

Then segue into the science lesson: all matter—that is, all liquids, gases, solids and plasma—is made of smaller bits, just as music is made of smaller sections. The small pieces of matter are called **atoms**. Atoms, which are too small to see, line up in an orderly way and are represented by a single letter, like “H” or “K,” just as musical sections are labeled “A” or “B.” When two or more atoms combine and join together, they create a **molecule**, just as sections of music come together to create music. For example, water molecules are called H₂O. This means a water molecule has two H atoms (two Hydrogen atoms) and one O atom (one Oxygen atom). When put together, it looks like this [illustrate with H₂O model or illustration]. Just as with music, there are many different ways to put atoms together to form molecules.

Conclusion

The teacher should reinforce the idea that many things, including music and matter, are composed of much smaller parts. These smaller parts assemble together in some pattern to form a whole.

To reiterate the parallels between music and matter, have students fill out a T-chart as a class to compare and contrast the two. It might end up looking like this:

Musical Form	Matter
—Made of smaller parts called sections	—Made of smaller parts called atoms and molecules
—Sections can be repeated in patterns to form a whole	—Atoms can be repeated
—Sections can alternate in a pattern	—Atoms can have a pattern
—Sections are labeled with upper-case letters	—Atoms are labeled with upper-case letters
—Section letters are always written out (ABACADA)	—Atoms are sometimes numbered (H ₂ O)

Lesson Plan: Music

“Starry Night”

Grades K-2

Time: 30-35 minutes

Arizona Music Standards:

MU1/2-S3C2-PO1: Express personal reactions to a music performance through words and drawings

MU1/2/3-S2C1-PO3: Recognize composers’ motivations for creating music

Objectives:

- TSW learn the term “variation” as it pertains to music
- TSW understand that artists create their work from a unique perspective

Materials:

A picture of *The Starry Night* by Vincent van Gogh; a picture of the stars and sky at night; a recording of *Twinkle Variations* by Tony Matthews, available here:

www.tonymatthews.org/Audio/Twinkle%20Variations%20for%20Orchestra.mp3

Note to the Teacher:

This lesson explains the idea of artistic variation in music and art. It explores that concept using visual art and Tony Matthews’ piece *Twinkle Variations* (which is programmed for the February Symphony for the Schools concerts). Students will relate painters and composers as individuals who create works of art that reflect their world view and perspective.

Procedure:

Introduction

In order to introduce the idea of variation in music, use a visual example that depicts a real world situation, like Vincent van Gogh’s painting *The Starry Night*. Instead of trying to capture the night sky as a camera would, he used creative artistic techniques to paint a variation on the night sky—his own interpretation of the world around him. Compare a picture of the actual night sky to the sky in van Gogh’s painting (or the image and painting you’ve chosen). As a class, discuss how they look similar and how they are different, and if they do or do not like the artist’s variation on the painting.

Development

Just as painters often take a familiar scene and create a variation on that image, composers can take a **melody**, or the part of the song that you sing, and create musical **variations**. A musical **variation** is an original melody of a song that has been modified and reworked to create a new piece of music. Thus, the composer creates a new piece with his or her own unique musical perspective that is different from the original.

Listen to the beginning of a recording of *Twinkle Variations* by Tony Matthews (it should be the melody to *Twinkle, Twinkle, Little Star*), pausing after you’ve heard the simple melody (about 30 seconds). Now, explain to the students that they’ll be hearing the composer’s **variations** on *Twinkle, Twinkle*, and let the track play through. Some of the variations sound similar to the original **melody**, while some sound quite different. Students should be listening mainly for changes in **mood**, or the general feeling the music gives the listener. The composer accomplishes this by changing several musical elements, just as van Gogh changed the techniques with which he painted. This results in unique impressions, or variations, of the original melody.

The following page lists several variations and their starting times. As a class, listen to each variation and fill in the chart with words that appropriately describe the mood of the variation.

Guided Practice

After listening to the piece, students will paint their own variation on the night sky. They should choose a **mood** that their variation on the night sky will depict from the chart that was completed as a class. Remind them to create art that reflects their unique perspective.

Lesson Plan: Music

“Starry Night”

Grades K-2

The chart below is a visual organizer for *Twinkle Variations*. As a class, fill out the chart with words that describe the moods of each variation (not all variations in the piece are listed). We’ve provided an example chart at the end of the page as a general guideline for words and ideas you should be looking for.

Variation Start Time	Mood/Descriptive Words
0:25	
0:55	
1:24	
1:50	
2:23	
2:46	
3:15	
3:55	
5:20	

Example:

Variation Start Time	Mood/Descriptive Words
0:25	Playful, dainty, bright
0:55	Hopeful, serious
1:24	Proud, dancing, festive
1:50	Exciting, random
2:23	Scary, weird
2:46	Dancing, happy
3:15	Celebratory, exciting
3:55	Calm, sleepy
5:20	Peppy, upbeat, jazzy