

Integrating Latin with the Astronomy Content in the 6th Grade Sequence

Special Area: Connections (6th)

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Length of Unit: (Three lessons; at least 8 days of classtime)

I. ABSTRACT

This unit provides students with the Latin language background necessary to enrich their study of astronomy. The main goal of this unit is to help students realize that English words have etymological origins in Latin and in mythology. By knowing those origins, and integrating Latin language study into the science topic, students' appreciation and enthusiasm for both topics is increased.

II. OVERVIEW

A. Concept Objectives

1. Students will understand that scientists used references from universally-known mythology to name the phenomena they observed.
2. Students will understand that characteristics of planets and stars "caused" their naming (e.g., Mars, the red planet is named for the god of war.)
3. Students will learn the ordinal numbering system by learning the Latin ordinal numbers to describe the planets in order from the sun.
4. Students will appreciate the origins of words

B. Content from the *Core Knowledge Sequence*

1. Topic list, page 153: supernova, gravity, orbit, constellation, Andromeda, Orion
2. Vocabulary, page 134: ante, astron, bi, decem, duo, magnus, minus, monis, post, pre, primus, quartus, unus, video; page 159, erro
3. Ancient Rome, Roman gods and legends, page 139

C. Skill Objectives

1. Students will acquire dictionary skills by finding etymological entries.
2. Students will develop vocabulary skills by learning the method to determine which English words are derivatives of Latin.
3. Students will develop map reading skills by looking at planetary and lunar maps for Latin words.
4. Students will increase presentation skills by presenting research information to the class.

III. BACKGROUND KNOWLEDGE

A. For Teachers

1. The teacher needs to have a general background in ancient Greek/Roman mythology, and a general knowledge of the solar system.
2. The teacher needs to know the cardinal and ordinal numbering systems in Latin. (contained in the lesson material)

B. For Students

1. The students will have some mythology background from *Core Knowledge Sequence* topics in Grade 3.
2. The students will have on-going, coincidental astronomy information being presented in their regular science class.
3. The students will know the cardinal numbers in Latin from previous class work.

IV. RESOURCES

- A. Bullfinch, Thomas, *Myths of Greece and Rome* ISBN 0140056432
- B. Hamilton, Edith, *Mythology* ISBN 0446607258
- C. National Audubon *Society First Field Guide* ISBN 0590640852

V. LESSONS

Lesson One: Providing context from Astronomy topics for the question, “What is an etymology?”

A. Daily Objectives

- 1. Concept Objective(s)
 - a. Students will appreciate the origins of words.
- 2. Lesson Content
 - a. Names of the planets based on the characteristics of ancient Roman gods.
 - b. Origin of “solar” in solar system.
- 3. Skill Objective(s)
 - a. The students will consult entries in a dictionary to understand where an etymology is located.
 - b. The students will learn to read etymological abbreviations and understand their meanings.

B. Materials

- 1. Picture of the solar system with the planets grouped correctly in orbit around the sun.
- 2. Dictionaries
- 3. Students’ notebooks

C. Key Vocabulary

- 1. Etymology – history of a word, tracing it from its origin to its present form
- 2. Derivative – an English word obtained from an original source Language
- 3. Solar-Pertaining to the sun
- 4. Orbit – path of a celestial body as it revolves around a closed circle
- 5. Terrestrial planets – relating to or consisting of land, rather than gas or water
- 6. Jovian planets – relating to planets consisting of gas, like the planet Jupiter

D. Procedures/Activities

DAY ONE

- 1. Open class discussion by asking about the science unit being studied concurrently.
- 2. Ask in what system Earth belongs.
- 3. In response to “solar system,” ask why it is called that.
- 4. In response to “planets revolve around the sun,” or similar wording, ask, “why not the Sunny System, then?”
- 5. Have the children look up “solar” in their dictionaries.
- 6. Have one child read the definition.
- 7. Point out the entry after the definition, and have a child read it aloud.
- 8. Write “etymology” on the board and explain what a word origin is.
- 9. “Decode” the etymological entry for solar, explaining that L means Latin, etc.
- 10. Have the children record the word sol in the first column of their notebook.
- 11. Ask them if they know any other words that have “sol” in them. As they generate words (solar eclipse, solstice, parasol, etc.) assign a child to look up the word, its definition, and its etymology.
- 12. List the words on the board under the heading, “derivatives.”

13. Explain that some words *derive* from other languages, and that they are called derivatives. Studying Latin helps us to recognize the meaning of English words that are derivatives.
14. Ask which planets in our solar system are terrestrial and which are Jovian.
15. Ask if the children know any other words in English that start with or have “terr-” in them. As they generate the derivatives, list them on the board to be copied down later. Repeat with the root, “jov-“
16. Separate the children into as many groups as derivatives that were generated. Assign the words. Have them look up the words, their definitions, and their etymologies. One child acts as spokesperson for each group and reports its findings.
17. Reiterate after discussion that terrestrial planets are made of solid matter like Earth, whereas Jovian planets are gaseous like Jupiter. (After all, he derivatives, the children should be able to see the connections immediately, but if not, lead them through discussion to an understanding that “terr-“ words refer to earth.)
18. End the class by discussing why there is no Latin/Roman name for the Earth. Have children understand that because the ancients didn’t see the earth in the sky, they didn’t realize they, too, were on a planet. The word “planet” is a derivative of a Latin word, “planeta,” but that wasn’t coined by scientists until the Middle Ages. Tomorrow’s lesson will tell us what the ancient people thought about their home and the things they saw in the night time sky!

DAY TWO

1. Write 2 columns on the board, headed “Latin Word” and “derivative” before the children arrive.
2. Review the definition and location of an etymology.
3. Remind the children about the end of class yesterday; that the ancient people didn’t know they were on a planet. Those ancient Romans looking up at the stars called the planets “wandering stars,” or “stella errans.” Ask the children if they see an English word in “errans.” Many will see “error” and a few might see “errant.” Lead the discussion until the children realize that to be in error is to “wander” from the truth. Explain that a wanderer, without a permanent home, is often called a vagrant. Explain that to be “vague” about something is to wander from the specific. “Vaga” is another Latin word that meant “planet.” Add these words to the columns on the board.
4. Ask which planets were known by the ancient people.
5. Starting with Mars, ask the children to tell you characteristics of that planet. When the response “red in color” is generated, ask them who the god, Mars was to the Romans. When they say, “the god of war,” ask if they see a connection between the color and the god—(they will come up with blood right away.)
6. Have the children look up the word, “martial.” Have them copy the word, its definition into their notebooks. Ask one child to re-tell the etymology of the word in his/her own words. Have the children copy that down.
7. Ask the children of what Venus was goddess. When they say, “beauty,” ask if they know that Venus is regarded as the most beautiful planet. Lead a discussion as to why it is so regarded.
8. Ask which planet has the fastest orbit. When the children respond, “Mercury,” ask them what responsibility the god, Mercury, had to the other Olympians. Lead the class in a discussion as to why the messenger god had to be speedy.
10. Have a child look up the word, “mercurial” and report its definition and etymology to add to the list.

11. Ask which planet is the biggest. (Jupiter)
 12. Ask who was the King of the gods, and then lead another short discussion as to why the ancients would name the biggest planet after the king.
 13. Explain that scientists who discovered the other planets followed the pattern of Roman mythology. Explain that myths are universally known to educated people, just as Latin was. Scientists, no matter what their country of origin, would grasp the significance of a discovery by its name. Have the children generate a list of characteristics of Pluto and Neptune and explain the names given them by scientists.
- E. *Assessment/Evaluation*
1. Have the children imagine that they have discovered another planet in the solar system. Drawing on their knowledge of mythology, have them name the planet because of its characteristics that are associated with one of the deities. Or, drawing on their knowledge of Latin adjectives, they may name the planet because of similar characteristics (e.g. Rubrarius Planet, from the Latin word “rubra,” meaning “red.”) Assign them to write a short paper (one-2 pages) explaining the planet they have discovered, the origin of its name, and its characteristics, and any history they would like to create for the planet. The papers will be graded for clarity in naming. The children will read their papers aloud to the class and be graded for their oral presentation according to audibility, and poise.

Lesson Two: The Ordinal Numbering System

- A. *Daily Objectives*
1. Concept Objective
 - a. Students will understand that characteristics of planets and stars “caused” their naming (e.g., Mars, the red planet is named for the god of war.)
 - b. Students will learn the ordinal numbering system by learning the Latin ordinal numbers to describe the planets in order from the sun.
 2. Lesson Content
 - a. Vocabulary roots (including some from CKS pg 134)primus-, secund-, tert-, quartus, quint-, sex-, sept-, octa-, non-,decem-
 3. Skills
 - a. Students will generate a list of derivatives of Latin ordinal numbers to reinforce their understanding of etymology
 - b. Students will list the planets in order from the sun
- B. *Materials*
1. Notebooks
 2. Dictionaries
- C. *Key Vocabulary*
1. primus-, secund-, tert-, quartus, quint-, sex-, sept-, octa-, non-,decem-
- D. *Procedures/Activities*
1. Before the students arrive, write the roots of the ordinal numbers on a hidden (flip) board.(prima, secunda, tertia, quarta, quinta, sexta, octava, nona, decima correspond to the English words first through tenth.)
 2. Remind the students that you said mythology was universally known to educated people. Ask them what universal means. After discussion, ask them what Latin number they see in the English word. (Unus)
 3. Have the children count to ten in Latin. (Unus, duo, tres, quattuor, quinque, sex, septem, octo, novem, decem)

4. Explain to them that counting numbers are called cardinal numbers. There is another system of numbering, when we put things in order. These numbers are called ordinal numbers, because they put things in order.
 5. Ask if their science teacher refers to the planets by their order from the sun. (They will say yes!)
 6. Separate the class into nine groups with dictionaries.
 7. Ask, what is the first planet? (Mercury.) Write *Quid est prima vaga? Mercury est prima vaga.* on the board. (Have them copy these sentences into their notebooks under the Board notes section.)
 8. Have the first group look up “prim-“ in the dictionary and generate a list of the words and their etymologies.
 9. Ask, what is the second planet? (Venus) Write, *Quid est secunda vaga? Venus est secunda vaga.*) Continue until all 9 planets have been identified. Assign each group to look up the root of the ordinal number word and its derivative as you go.
 10. Flip the chart you made before they arrived. Have a scribe from each group go to the board and list the derivatives. Depending on the lists generated, discuss the words and their etymologies. Be sure all students copy down all the lists.
- E. *Assessment/Evaluation*
1. Traditional paper and pencil test. Given the children the root words of the ordinal numbers in Latin down one column on a piece of paper. Across from each root, have them generate two English words that derived from the root. At the bottom of the paper, have them choose five words from the derivative list and use them in good English sentences that reflect the children’s understanding of their meaning.

Lesson Three: Moons of planets

- A. *Daily Objectives*
1. Concept Objectives
 - a. Students will understand that characteristics of planets and stars “caused” their naming (e.g., Mars, the red planet is named for the god of war.)
 2. Lesson Content
 - a. Students will recognize “luna” as the Latin root word for *lunar* derivatives.
 - b. Jovian moons, Io, Ganymede, Callisto and Europa
 - c. Mars’ moons, named for pain and panic, the companions of war
 - d. Pluto’s moon, Charon
 - e. Saturn’s moons, named for Titans
 - f. Neptune’s moons named for mythological figures of the Sea
 3. Skills
 - a. Students will use reading comprehension skills to understand the myths.
 - b. Students will use presentation skills to re-tell the myths to the class.
 - c. Students will create their own quizzes based on the materials they have presented.
- B. *Materials*
1. Myths
 2. Word processing program and 4 terminals
 3. Scratch paper
 4. Dictionaries
- C. *Key Vocabulary*

1. Names of the moons –Jupiter: Io, Ganymede, Europa, Callisto; Mars: Phobos and Deimos; Pluto: Charon; Neptune: Nereid, Triton; Saturn: Titan, Epimetheus
2. Names from mythology that are the same as the names of the moons. For example, Io is a human woman significant to the king of the gods, Jupiter.

D. *Procedures/Activities*

1. Write “luna” on the board and have children guess at its translation.
2. When “moon” is elicited, ask the class to generate words they know that might be derivatives. As the lunar words are voiced, write them on the board.
3. Ask if they fit the pattern of derivatives by having several letters the same as the Latin word, and have the same general meaning. Have them copy them into their notebooks.
4. Ask the children if they know that other planets have moons, too. Ask if they know the names of those moons and their origins. Remind them that educated persons universally understood the language of Latin and the “language” of mythology. When scientists discovered the moons, they named them in a pattern that made sense.
3. Separate the children into groups corresponding with the eleven moons above.
4. Provide each group with its relevant mythology.
7. Provide each group with instructions for their re-telling of the myths and for making up the quizzes. See E below.

E. *Assessment/Evaluation*

1. **The assessment here is the work required under procedures # 4-7 above.** Provide the four groups with copies sufficient for each child of the relevant stories. (I re-write from Bullfinch or Hamilton, leaving out the information I think is too mature for 6th graders. For example, I make Ganymede desirable to Jupiter because he is a strong shepherd-prince, and so will make a good cupbearer for the gods on Olympus.) The children are instructed to read all the myths in their packets. Then they must re-tell the myth(s) to each other until they reconstruct a version they all like. Then they go to the word processors and type up that version of the myth using their own words, not mine. They must identify the names of the main characters in the story on separate papers to hold up to the rest of the class. They must make an illustration on half-posterboard that depicts a scene from the myth. From their re-telling, they must create four questions for the class to answer about their myth. They turn the papers and drawings in to me; I assess them and have them re-write if necessary. One or more children from each group may present the oral portion of the retelling to the class. After the characters are identified and the drawing is shown, the story is told, and the group asks for questions from the audience. If there are none, or after answering those that occur, one child from the group hands out blank paper to the class. Each child in the class writes down his/her name and the name of the myth that has been told. Then one child from the group reads aloud the first comprehension question and allows two minutes for the class to write an answer. This process continues for the four questions. Then it is the next group’s turn. I grade the nine sets of quizzes. Each child in the class receives a grade for his/her comprehension of the other students’ presentations and a mark for his/her portion of his/her group’s presentation.

VI. CULMINATING ACTIVITY

Since we have spent many days discussing how Latin is the language for science, especially space-related science, at the end of our unit I ask the children to examine a map of Mars, Venus

or Earth moon's surface. Using Latin-English dictionaries, they must compile a list of Latin terms that are used to describe or name the terrains and their definitions. For extra credit, children may make a model of the planet with the areas labeled. Projects have been made most successfully from styrofoam with pins and flags stuck into the correct positions.

VII. HANDOUTS/WORKSHEETS

- A. None

VIII. BIBLIOGRAPHY

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