The Age of Reason

Grade Level or Special Area: 6th grade
Written by: Sarah Hayden, Sherman, TX
Length of Unit: 6 lessons, 9 days approximately

I. ABSTRACT

In this unit, students will examine the lives and accomplishments of the central historical figures of the European Enlightenment. Using reason and observation, these thinkers made great leaps in the understandings of science, philosophy, and government. Students will identify and describe influential ideas from the Enlightenment and analyze how these ideas spread to the United States. Featured in this unit are a variety of graphic organizers as well as a connection to 6th grade science topics of gravity and planetary motion.

II. OVERVIEW

A. Concept Objectives

1. The student understands the contributions of individuals and groups from various cultures to selected historical and contemporary societies. (TEKS 6.2)
2. The student understands relationships that exist among world cultures. (TEKS 6.17)

B. Content from the *Core Knowledge Sequence*

1. Faith in science and human reason, as exemplified by (p. 139)
    a. Isaac Newton and the laws of nature
    b. Descartes: "cogito ergo sum"
2. Two ideas of "human nature": Thomas Hobbes and John Locke (p. 139)
    a. Hobbes: the need for a strong governing authority as a check on "the condition of man… [which] is a condition of war of everyone against everyone"
    b. Locke: the idea of man as "tabula rasa" and the optimistic belief in education; argues against doctrine of divine right of kings and for government by consent of the governed
3. Influence of the Enlightenment on the beginnings of the United States (p. 139)
    a. Thomas Jefferson: the idea of "natural rights" in the Declaration of Independence
    b. Montesquieu and the idea of separation of powers in government
4. Science Biographies: Isaac Newton (p. 154)
5. Gravity: an attractive force between objects (p.153)
    a. Newton's law of universal gravitation: Between any two objects in the universe there is an attractive force, gravity, which grows greater as the objects move closer to each other
    b. How gravity keeps the planets in orbit

C. Skill Objectives

1. The student is expected to explain the significance of individuals or groups from selected societies. (TEKS 6.2A)
2. The student is expected to describe the influence of individual and group achievement on selected historical or contemporary societies. (TEKS 6.2B)
3. The student is expected to identify different points of view about an issue or topic. (TEKS 6.21D)
4. The student is expected to analyze how culture traits spread. (TEKS 6.17C)

5. The student is expected to give examples of scientific discoveries and technological innovations, including the roles of scientists and inventors, that have transcended the boundaries of societies and have shaped the world. (TEKS 6.20A)
6. The student is expected to describe characteristics of limited and unlimited governments. (TEKS 6.11A)
7. The student is expected to incorporate main and supporting ideas in written communication as well as use standard grammar, spelling, sentence structure, and punctuation. (TEKS 6.22B&E)
8. The student is expected to listen to learn by taking notes, organizing, and summarizing spoken ideas. (Language Arts TEKS 6.1D)
9. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.

III. BACKGROUND KNOWLEDGE

A. For Teachers

1. Fieser, James and Bradley Dowden. *The Internet Encyclopedia of Philosophy*, [online]. Available URL: http://www.utm.edu/research/iep/, 2008.
2. Gleick, James. *Isaac Newton*. New York: Pantheon Books, 2003. 0-375-42233-1.
3. Hirsch, Jr., E.D., ed. *What Your Sixth Grader Needs to Know*. New York: Bantam Dell, 2006. 978-0-385-33732-8.

B. For Students

1. Main ideas behind the Declaration of the United States: the responsibility of government to protect the "unalienable rights" of the people and natural rights: "Life, liberty, and the pursuit of happiness" (p.95)
2. The separation and sharing of powers in American government: three branches of government (p.95)
3. Copernicus and Galileo: Conflicts between science and church (p. 114)
4. Plato and Aristotle (p.139)

IV. RESOURCES

A. Pearson History & Geography books for 6th grade
B. overhead projector (optional)
C. dictionaries (one per every one or two students)
D. computer(s) with internet connection

V. LESSONS

Lesson One: The Age of Enlightenment and Isaac Newton (2 days)

A. *Daily Objectives*

1. Concept Objective(s)
   - **a.** The student understands the contributions of individuals and groups from various cultures to selected historical and contemporary societies. (TEKS 6.2)
2. Lesson Content
   - **a.** Faith in science and human reason, as exemplified by Isaac Newton and the laws of nature
   - **b.** Science Biographies: Isaac Newton
   - **c.** Gravity: an attractive force between objects

d. Newton's law of universal gravitation: Between any two objects in the universe there is an attractive force, gravity, which grows greater as the objects move closer to each other

e. How gravity keeps the planets in orbit

3. Skill Objective(s)

a. The student is expected to explain the significance of individuals or groups from selected societies. (TEKS 6.2A)

b. The student is expected to describe the influence of individual and group achievement on selected historical or contemporary societies. (TEKS 6.2B)

c. The student is expected to give examples of scientific discoveries and technological innovations, including the roles of scientists and inventors, that have transcended the boundaries of societies and have shaped the world. (TEKS 6.20A)

d. The student is expected to listen to learn by taking notes, organizing, and summarizing spoken ideas. (Language Arts TEKS 6.1D)

e. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.

B. *Materials*

1. a ball

2. Pearson History & Geography books for 6th grade

3. copies of Newton and Descartes Notes Organizer (Appendix A) for students

4. overhead transparency, or chart paper, displaying Newton and Descartes Notes Organizer (Appendix A)

5. overhead projector (optional)

6. Newton and Descartes Notes Organizer Key (Appendix B)

7. copies of Isaac Newton in His Own Words… And Yours! (Appendix C) for students

8. Isaac Newton in His Own Words… And Yours! Key (Appendix D)

9. dictionaries (one per every one or two students)

10. Newton the Scientist Notes (Appendix E)

11. computer(s) with internet connection

C. *Key Vocabulary*

1. Age of Enlightenment—a period in history during the 1600s and 1700s in Europe in which thinkers relied on reason and experience to uncover the basic laws of nature, human society, and government

2. value—something that is desirable or important to a group of people

3. gravity—the force of attraction between two objects

4. orbit—the path one object takes when it revolves around another body

5. optics—the study of the behavior and movement of light

6. calculus—a branch of mathematics dealing with the study of rates of change

7. principles—laws or rules that govern how something works

8. scientific method—the system used to uncover knowledge; steps include asking a question or hypothesizing, observing and experimenting, and drawing a conclusion

9. hypothesize—a scientific guess or assumption to be tested

10. legacy—something passed down to a future generation

11. force—a push or a pull in a direction

12. mass—the amount of matter in an object

13. proximity—closeness

14. inertia—the property of objects to either remain at rest or stay in motion in a straight line if not acted upon by an outside force

15. acceleration—the rate at which speed changes over time

D. *Procedures/Activities*

Day One:

1. Ask students to silently observe as you toss a ball in the air a couple times. Then, direct students to list as many questions as they can about what happened in their learning logs. (*For example: What causes the ball to go up? What causes it to go down?*) Encourage them that there are no right or wrong questions!

2. After a few minutes, students may share their questions with a small group and/or with the entire class.

3. Share with students that they will be learning about an historical period called the Age of Enlightenment that began in Europe and eventually spread to the United States. During this period, scientists highly valued observation and asking questions. They relied on their reason to discover truths about the world and about human beings. The scientist and thinker in today's lesson, Isaac Newton, filled a whole notebook with questions about the world around him, which led him to make some pretty amazing discoveries.

4. Together with the students, read and discuss the Age of Enlightenment (sections "Into the Light" and "Setting the Scene") on pages 98-99 in the Pearson History and Geography books.

5. After reading and discussing, ask students to work in small groups or individually to list the values of the Enlightenment in their learning logs. After a few minutes, students may share their lists with the entire class. (The lists should include: relying on observation, experiment, and your own reason; giving up dependence on previous sources of authority like monarchs, the Church, and Greek and Roman thinkers; asking questions.)

6. Direct students to read about Isaac Newton and his ideas in the Pearson book, pages 99-102. During reading, students may work in small groups or the teacher may lead the entire class to complete the notes organizer for Newton (Appendix A). If the students do work in small groups, make sure to check that they recorded the main points from the notes organizer key (Appendix B). Remind students to keep the notes organizer for future use!

7. Ask students to write and respond to this question in their learning logs: **How did Isaac Newton's life and work fit in with the values of the Enlightenment?**

8. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class.

Day Two:

9. Allow students to use dictionaries to complete "Isaac Newton in His Own Words… And Yours!" (Appendix C). Students may work with partners or in small groups to complete this activity. Afterwards, check it over with students using the key (Appendix D).

10. Direct students to take notes from Newton the Scientist (Appendix E). View the animations and video clips. Depending on the technology resources in your classroom, you may display these to the entire class or assign small groups to view them. (NOTE: The discussion of the science topics of gravity and orbits in this lesson is not comprehensive. If you wish to fully integrate these science topics, see an idea in the Culminating Activities section after the lessons.)

E. *Assessment/Evaluation*

1. Journal entry: Students should respond in their learning logs to the questions **What do you think is Isaac Newton's greatest contribution to the world? Why?** Teacher may informally assess for understanding based on the student's reasoning.

Lesson Two: René Descartes (1 day)

A. *Daily Objectives*

1. Concept Objective(s)
    a. The student understands the contributions of individuals and groups from various cultures to selected historical and contemporary societies. (TEKS 6.2)
2. Lesson Content
    a. Faith in science and human reason, as exemplified by Descartes: "cogito ergo sum"
3. Skill Objective(s)
    a. The student is expected to explain the significance of individuals or groups from selected societies. (TEKS 6.2A)
    b. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.

B. *Materials*

1. Pearson History & Geography books for 6th grade
2. copies of Newton and Descartes Notes Organizer (Appendix A) from previous lesson
3. overhead transparency, or chart paper, displaying Newton and Descartes Notes Organizer (Appendix A) from previous lesson
4. overhead projector (optional)
5. Newton and Descartes Notes Organizer Key (Appendix B)
6. copies of Newton vs. Descartes Venn Diagram (Appendix F) for students
7. copies, or an overhead transparency, of Venn Diagram Rubric (Appendix G)
8. poster board or piece of chart paper

C. *Key Vocabulary*

1. modern—referring to the most recent time period
2. philosophy—the study of human thought about the meaning of life and the natural world
3. mnemonic device—a tool to aid memory

D. *Procedures/Activities*

1. Ask students to think about how they know that certain things are true. For instance, how do they know that onions will make you cry when you cut them, or that it is dangerous to run with scissors, or that too much fattening food is bad for your body?
2. Explain to students that while young children must rely on adults for knowledge about the world, as people get older they rely more and more on their own observation and reason. Remind students that during the Enlightenment, thinkers like René Descartes in today's lesson placed high value on NOT depending on authority for knowledge but using their own observation and reason to figure things out.
3. Direct students to read about René Descartes and his ideas in the Pearson book, pages 103-104. During reading, students may work in small groups or the teacher may lead the entire class to complete the notes organizer for Descartes (Appendix A). If the students do work in small groups, make sure to check that they recorded the main points from the notes organizer key (Appendix B). Remind students to keep the notes organizer for future use!

4. Ask students to write and respond to this question in their learning logs: **Why do you think Descartes was called the father of modern philosophy?**
5. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class.
6. Introduce the concept of a mnemonic device as a memory aid when learning new information. Allow students to provide you with examples of mnemonic devices they have used to help them learn something new. (For example, using the first letters of the words in the sentence "My very excellent mother just served us nine pizzas." can help you remember the order of the planets in the Solar System.) Tell students that they can use sayings to help them remember the Enlightenment thinkers and their ideas from this unit.
7. Review with students that René Descartes is probably most famous for believing that you should doubt everything and for saying "I think, therefore I am." To remember Descartes and his ideas, students can use the mnemonic device "I stink, therefore I'm Spam®." Direct students to write the mnemonic device somewhere prominently on their notes organizer, perhaps in the space under Descartes' name.
8. Many adaptations of the saying "I think, therefore I am." exist in the world, especially as cute marketing-type slogans. (For instance, "I shop, therefore I am.") Ask students to make up their own adaptations or find them in the environment. Begin recording them on a poster board or piece of chart paper in your classroom and continue to collect them throughout the unit.

E. *Assessment/Evaluation*

1. Newton vs. Descartes Venn Diagram (Appendix D): Students complete Venn diagram activity comparing and contrasting the lives and work of Isaac Newton and René Descartes. Evaluate Venn diagrams according to Venn Diagram Rubric (Appendix E). Be sure to show students the rubric ahead of time so they know how they will be assessed. Students may use the Pearson books and notes from their learning logs.

Lesson Three: Thomas Hobbes (1 day)

A. *Daily Objectives*

1. Concept Objective(s)
   a. The student understands the contributions of individuals and groups from various cultures to selected historical and contemporary societies. (TEKS 6.2)
2. Lesson Content
   a. Two ideas of "human nature": Hobbes: the need for a strong governing authority as a check on "the condition of man… [which] is a condition of war of everyone against everyone"
3. Skill Objective(s)
   a. The student is expected to explain the significance of individuals or groups from selected societies. (TEKS 6.2A)
   b. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.

B. *Materials*

1. Pearson History & Geography books for 6th grade
2. copies of Hobbes and Locke Notes Organizer (Appendix H) for students
3. overhead transparency, or chart paper, displaying Hobbes and Locke Notes Organizer (Appendix H)

4. overhead projector (optional)
5. Hobbes and Locke Notes Organizer Key (Appendix I)

C. *Key Vocabulary*

1. enforce—to carry out or make happen
2. persecuted—being harassed or injured because of belief
3. political—related to government
4. leviathan—a sea monster from the Bible that was all-powerful
5. social contract—an agreement reached between a government and its citizens
6. pessimist—someone who believes the worst will happen

D. *Procedures/Activities*

1. Ask students to write and respond to this question in their learning logs: **What would you think our country would be like if there were no rules or no one to enforce the rules?**
2. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class.
3. Tell students that they will be learning about a philosopher from the 1600s named Thomas Hobbes who thought about this question a lot. He concluded that humans need strict rules and a strong government to enforce those rules.
4. Students read about Thomas Hobbes and his ideas in the Pearson book, pages 105-107. During reading, students may work in small groups or the teacher may lead the entire class to complete the notes organizer for Hobbes (Appendix F). If the students do work in small groups, make sure to check that they recorded the main points from the notes organizer key (Appendix G). Remind students to keep the notes organizer for future use!
5. Review with students that Thomas Hobbes is probably most famous for his pessimistic views on human nature. To remember Hobbes and his ideas, students can use the mnemonic device "Hobbes thought people were hogs." Direct students to write the mnemonic device somewhere prominently on their notes organizer, perhaps in the space under Hobbes' name.

E. *Assessment/Evaluation*

1. Journal entry: Students should respond in their learning logs to the questions **What parts, if any, of Hobbes' ideas do you agree with? What parts, if any, do you disagree with? Explain.** Teacher may informally assess for understanding based on the student's reasoning.

Lesson Four: John Locke (2 days)

A. *Daily Objectives*

1. Concept Objective(s)
   a. The student understands the contributions of individuals and groups from various cultures to selected historical and contemporary societies. (TEKS 6.2)
2. Lesson Content
   a. Two ideas of "human nature": Locke: the idea of man as "tabula rasa" and the optimistic belief in education; argues against doctrine of divine right of kings and for government by consent of the governed
3. Skill Objective(s)
   a. The student is expected to explain the significance of individuals or groups from selected societies. (TEKS 6.2A)

b. The student is expected to describe the influence of individual and group achievement on selected historical or contemporary societies. (TEKS 6.2B)

c. The student is expected to identify different points of view about an issue or topic. (TEKS 6.21D)

d. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.

B. *Materials*

1. Pearson History & Geography books for 6th grade

2. copies of Hobbes and Locke Notes Organizer (Appendix H) from previous lesson

3. overhead transparency, or chart paper, displaying Hobbes and Locke Notes Organizer (Appendix H) from previous lesson

4. overhead projector (optional)

5. Hobbes and Locke Notes Organizer Key (Appendix I)

6. copies of A Tale of Two Political Philosophers (Appendix J) for students

7. A Tale of Two Political Philosophers Key (Appendix K)

C. *Key Vocabulary*

1. right—something that a person can rightfully claim is due to them

2. Parliament—the elected governing body of England

3. optimist—someone who believes the best will happen

4. natural rights—the rights that a person is born with

5. revolution—a sudden and complete change in organization of government

6. glorious—wonderful, magnificent

D. *Procedures/Activities*

Day One:

1. Ask students to write this title in their learning logs: **The Rights of All Human Beings**. Then, ask students to list as many rights that they think the government is responsible for protecting.

2. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class.

3. Tell students that they will be learning about another political philosopher from the 1600s named John Locke. He believed that everyone is born with rights to life, liberty, and property. (This may prompt them to think about the words of the American Declaration of Independence, but if the connection is not immediately made, you may ask if these words sound familiar. Of course, Jefferson changed the wording to "life, liberty, and the pursuit of happiness." This topic will be discussed more in depth in Lesson Six.)

4. Students read about John Locke and his ideas in the Pearson book, pages 108-110. During reading, students may work in small groups or the teacher may lead the entire class to complete the notes organizer for Locke (Appendix F). If the students do work in small groups, make sure to check that they recorded the main points from the notes organizer key (Appendix G). Remind students to keep the notes organizer for future use!

5. Ask students to write and respond to this question in their learning logs: **Why do you suppose the Glorious Revolution in England was called "glorious"?**

6. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class.

Day Two:

7. Ask students to write and respond to these two questions in their learning logs: **How did John Locke's ideas influence the Glorious Revolution in England? What do you think Hobbes thought of the Glorious Revolution?**
8. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class. These questions should serve to review student learning from Lessons Three and Four.
9. Review with students that John Locke is probably most famous for believing that all people are born with natural rights and that if the government does not protect these rights, people can and should overthrow the government. To remember Locke and his ideas, students can use the mnemonic device "Locke is the key to revolution." Direct students to write the mnemonic device somewhere prominently on their notes organizer, perhaps in the space under Locke's name.

E. *Assessment/Evaluation*

1. A Tale of Two Political Philosophers (Appendix J): Students complete graphic organizer contrasting Hobbes' and Locke's ideas. Students may be assessed using A Tale of Two Political Philosophers Key (Appendix K). Students may use the Pearson books and notes from their learning logs.

Lesson Five: Baron de Montesquieu (2 days)

A. *Daily Objectives*

1. Concept Objective(s)
   a. The student understands the contributions of individuals and groups from various cultures to selected historical and contemporary societies. (TEKS 6.2)
   b. The student understands relationships that exist among world cultures. (TEKS 6.17)
2. Lesson Content
   a. Influence of the Enlightenment on the beginnings of the United States
   b. Montesquieu and the idea of separation of powers in government
3. Skill Objective(s)
   a. The student is expected to describe the influence of individual and group achievement on selected historical or contemporary societies. (TEKS 6.2B)
   b. The student is expected to analyze how culture traits spread. (TEKS 6.17C)
   c. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.
   d. The student is expected to describe characteristics of limited and unlimited governments. (TEKS 6.11A)

B. *Materials*

1. Pearson History & Geography books for 6th grade
2. copies of Montesquieu Notes Organizer (Appendix L) for students
3. overhead transparency, or chart paper, displaying Montesquieu Notes Organizer (Appendix L)
4. overhead projector (optional)
5. Montesquieu Notes Organizer Key (Appendix M)
6. copies of "Branches of Government" chart-reading activity from *Time for Kids* website
7. copies of Enlightenment Thinkers Review (Appendix N) for students
8. Enlightenment Thinkers Review Key (Appendix O)

C. *Key Vocabulary*

1. influence—winning of devotion or allegiance that affects another person's behavior or attitude
2. noble—someone born into a high ranking family
3. separation of powers—the organization of government so that one group does not have all the power
4. abuse—improper treatment
5. limited government—government that is organized so that power is spread amongst groups and no one group or person can abuse power
6. unlimited government—government that is organized so that power is not spread amongst groups and one person or group can abuse power
7. U.S. Constitution—the document in which the United States' government is organized

D. *Procedures/Activities*

Day One:

1. Ask students to write and respond to this question in their learning logs: **Who is someone who has influenced you? How has he or she influenced you?**
2. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class.
3. Tell students that they will be learning about yet another political philosopher named Baron de Montesquieu. He believed in being careful to limit the power of the government to protect citizens from abuse. His ideas greatly influenced Americans when they were writing the laws of our country.
4. Students read about Montesquieu and his ideas in the Pearson book, pages 111-112. During reading, students may work in small groups or the teacher may lead the entire class to complete the notes organizer for Montesquieu (Appendix L). If the students do work in small groups, make sure to check that they recorded the main points from the notes organizer key (Appendix M). Remind students to keep the notes organizer for future use!
5. While filling in the notes organizer in this lesson, make sure to take special note of the concept of limited government with students. Also, ask them to deduce the meaning of unlimited government, the opposite of limited government.
6. Students may complete the "Branches of Government" chart-reading activity from the *Time for Kids* website (located at: http://www.timeforkids.com/TFK/class/pdfs/2005F/050916_wr1.pdf). Informally, check over answers and reasoning with students.

Day Two:

7. Ask students to write and respond to this question in their learning logs: **Do you think the U.S. is a limited or unlimited form of government? Why?**
8. After a few minutes of individual response time, students may share their responses with a small group and/or with the entire class. This question should serve to review student learning about limited and unlimited governments from the previous day.

E. *Assessment/Evaluation*

1. Enlightenment Thinkers Review (Appendix N): Students complete activity to identify and describe Enlightenment thinkers' main ideas. Students may be assessed using Enlightenment Thinkers Review Key (Appendix O). Students may use the Pearson books and notes from their learning logs.

Lesson Six: Influence on America (1 day)

A. *Daily Objectives*

1. Concept Objective(s)
    a. The student understands relationships that exist among world cultures. (TEKS 6.17)
2. Lesson Content
    a. Influence of the Enlightenment on the beginnings of the United States
    b. Thomas Jefferson: the idea of "natural rights" in the Declaration of Independence
3. Skill Objective(s)
    a. The student is expected to describe the influence of individual and group achievement on selected historical or contemporary societies. (TEKS 6.2B)
    b. The student is expected to analyze how culture traits spread. (TEKS 6.17C)
    c. The student is expected to incorporate main and supporting ideas in verbal and written communication as well as use standard grammar, spelling, sentence structure, and punctuation. (TEKS 6.22B&E)
    d. The student is expected to read to learn by taking notes, organizing, and summarizing written ideas in content area texts.

B. *Materials*

1. Pearson History & Geography books for 6th grade
2. copies of Declaration of Independence Excerpt (Appendix P) for students
3. overhead transparency, or chart paper, displaying Declaration of Independence Excerpt (Appendix P)
4. overhead projector (optional)
5. copies, or an overhead transparency, of Thank You Letter Rubric (Appendix Q)

C. *Key Vocabulary*

1. Declaration of Independence—the document in which the United States declared independence from England

D. *Procedures/Activities*

1. Distribute copies and display a portion of the Declaration of Independence (Appendix P) for students. Ask students to recall who wrote these words (Thomas Jefferson).
2. As you read and discuss with students, help decipher some of the tough wording so that students can understand the meaning of the document. Ask them to identify ideas from their study of Enlightenment thinkers. Ensure that they point out ideas of natural rights and cause to overthrow an unjust ruler. Ask students to recall the originator of these ideas (John Locke).
3. Students read about Thomas Jefferson and his ideas in the Pearson book, pages 115-116. During reading, students may work in small groups or the teacher may lead the entire class to answer the following question in their learning logs: **How did Enlightenment ideas influence Thomas Jefferson?**
4. After responding to this question, students may share their responses with a small group and/or with the entire class.

E. *Assessment/Evaluation*

1. Thank You Letters: Students will choose to write a letter to either John Locke or Baron de Montesquieu thanking them for how their ideas influenced America. Evaluate letters according to Thank You Letter Rubric (Appendix Q). Be sure to show students the rubric ahead of time so they know how they will be assessed. Students may use the Pearson books and notes from their learning logs.

VI. CULMINATING ACTIVITIES

A. Students may work in small groups to complete posters highlighting one of the Enlightenment thinkers studied in this unit. The emphasis on the project should be how these thinkers' ideas influenced the world. Evaluate the project using the Poster Rubric found at the Holt, Rinehart, and Winston Social Studies webpage (http://go.hrw.com/ndNSAPI.nd/gohrw_rls1/pKeywordResults?sr9%20rubrics). Be sure to show students the rubric ahead of time so they know how they will be assessed.

B. After briefly discussing Newton's Three Laws of Motion and planetary motion, students may study the concepts of gravity and inertia more deeply through an interactive software program. The Science Court series from Tom Snyder productions allows students to investigate science topics by challenging misconceptions from the world of science in an entertaining presentation. The software program can be used for whole group or small group instruction, and it includes hands-on experiments as well as assessments. The Inertia and Gravity titles in the Science Court series would complement the study of Newton's Three Laws of Motion and orbits from Lesson One. The information for purchasing this program may be found at: http://www.tomsnyder.com/.

C. Students may form teams to debate the philosophies of Thomas Hobbes and John Locke. Depending on time and student experience with debates, you may choose from a variety of formats. A good resource for planning and assessing student debates is the Education World article "It's Up for Debate!" found at: http://www.educationworld.com/a_lesson/lesson/lesson304.shtml.

VII. HANDOUTS/WORKSHEETS

A. Appendix A: Newton and Descartes Notes Organizer
B. Appendix B: Newton and Descartes Notes Organizer Key
C. Appendix C: Isaac Newton in His Words… And Yours!
D. Appendix D: Isaac Newton in His Words… And Yours! Key
E. Appendix E: Newton the Scientist Notes
F. Appendix F: Newton vs. Descartes Venn Diagram
G. Appendix G: Venn Diagram Rubric
H. Appendix H: Hobbes and Locke Notes Organizer
I. Appendix I: Hobbes and Locke Notes Organizer Key
J. Appendix J: A Tale of Two Political Philosophers
K. Appendix K: A Tale of Two Political Philosophers Key
L. Appendix L: Montesquieu Notes Organizer
M. Appendix M: Montesquieu Notes Organizer Key
N. Appendix N: Enlightenment Thinkers Review
O. Appendix O: Enlightenment Thinkers Review Key
P. Appendix P: Declaration of Independence Excerpt
Q. Appendix Q: Thank You Letter Rubric

VIII. BIBLIOGRAPHY

A. Books

1. *Core Knowledge Sequence.* Charlottesville, VA: The Core Knowledge Foundation, 1999. 1-890-517-20-8.
2. Descartes, René and F.E. Sutcliffe, ed. *Discourse on Method and the Meditations.* London: Penguin, 1968. 0-14-044206-5.
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Appendix A
Newton and Descartes Notes Organizer

	Life	Work	Legacy
Isaac Newton (1642-1727)			
René Descartes (1596-1650)			

Appendix B
Newton and Descartes Notes Organizer Key

	Life	Work	Legacy
Isaac Newton (1642-1727)	-father died and separated from his mother -lonely childhood; gave him lots of time to observe nature and experiment -loved to read -asked a lot of questions about nature and how things work (actually filled a whole notebook with his questions) -sometimes even hurt himself to discover answers -shy of people	-laws of gravity and motion (EX: how moon orbits Earth) -properties of light (optics) -invented calculus -published *Principia Mathematica* (or *Principles of Mathematics*), which tied math to the natural world -built on previous thinkers' work, but took it a step farther -believed in observation and asking questions of the world around you	-defined scientific method of study: hypothesize/ask questions, observe, draw conclusions -showed it was possible to use scientific reasoning to explain how things work -gave others confidence to use reason and observation for all areas of study, including science, math, even government
René Descartes (1596-1650)	-mother died in childhood, lived with grandmother -spent a lot of time alone as a child, used the time to think and study -traveled as a young man, eventually to Holland where he experienced freedom of thought	-published *Discourse of Method*, described his method of thinking -believed you should doubt and question everything -"I think, therefore I am" (in Latin, *cogito ergo sum*) meaning he only knew he existed because he knew he was thinking -believed in observation and reason to discover truths about the world	-considered father of modern philosophy -influenced other thinkers, like Isaac Newton, to use reason and not accept what others said to be true

Appendix C
Isaac Newton in His Words… And Yours!

Directions: Read through these quotes from Isaac Newton about science and his discoveries. Using a dictionary, rephrase the quotes in your own words making sure to keep Newton's meaning.

EXAMPLE:
"…I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."
Truth is like a great ocean just waiting to be discovered.

"And I shall not mingle conjectures with certainties."
_____

"The best and safest method of philosophizing seems to be, first, to inquire diligently into the properties of things and to establish those properties by experiments, and to proceed later to hypotheses for the explanation of things themselves."
_____
_____
_____
_____

"If I have seen further it is by standing on the shoulders of giants."
_____
_____

"To explain all nature is too difficult a task for any one man or even for any one age. 'Tis much better to do a little with certainty and leave the rest for others that come after you."
_____
_____
_____

"For I see not what there is desirable in public esteem, were I able to acquire and maintain it. It would perhaps increase my acquaintance, the thing which I chiefly study to decline."
_____
_____
_____

You can learn a lot from reading people's thoughts in their own words! On the back of this paper, write at least two sentences describing what you learned about Isaac Newton from his quotes.

Appendix D
Isaac Newton in His Words… And Yours! Key

Directions: Read through these quotes from Isaac Newton about science and his discoveries. Using a dictionary, rephrase the quotes in your own words making sure to keep Newton's meaning.

EXAMPLE:
"…I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."
Truth is like a great ocean just waiting to be discovered.

"And I shall not mingle conjectures with certainties."
I will not mix up guesses with what I know to be true.

"The best and safest method of philosophizing seems to be, first, to inquire diligently into the properties of things and to establish those properties by experiments, and to proceed later to hypotheses for the explanation of things themselves."
The best way of thinking of the natural world seems to be this: 1. ask lots of questions about how things work and then conduct experiments to discover the answers to these questions, and 2. put together ideas to explain how these things work.

"If I have seen further it is by standing on the shoulders of giants."
If I have accomplished a lot it is only because of other people's work before me.

"To explain all nature is too difficult a task for any one man or even for any one age. 'Tis much better to do a little with certainty and leave the rest for others that come after you."
Nobody should be expected to explain everything in nature. It's much better to focus on discovering a few truths and leaving everything else for others to discover after you.

"For I see not what there is desirable in public esteem, were I able to acquire and maintain it. It would perhaps increase my acquaintance, the thing which I chiefly study to decline."
I don't see what's so great about being popular, even if I could get popular and stay popular. It might increase the amount of people who would talk to me, but that's the last thing I want.

You can learn a lot from reading people's thoughts in their own words! On the back of this paper, write at least two sentences describing what you learned about Isaac Newton from his quotes.

Appendix E
Newton the Scientist Notes

Newton's Universal Law of Gravitation:
Gravity is a force that attracts two objects to each other. All objects have gravity.
The force, or pull, of gravity depends on two things:

The masses of the objects
The proximity (closeness) of the objects

Newton's Laws of Motion:

1. Inertia: An object at rest will stay at rest; an object in motion will stay in motion.
2. Acceleration (speed) occurs when a force acts on an object.
3. For every action, there is an opposite and equal reaction.

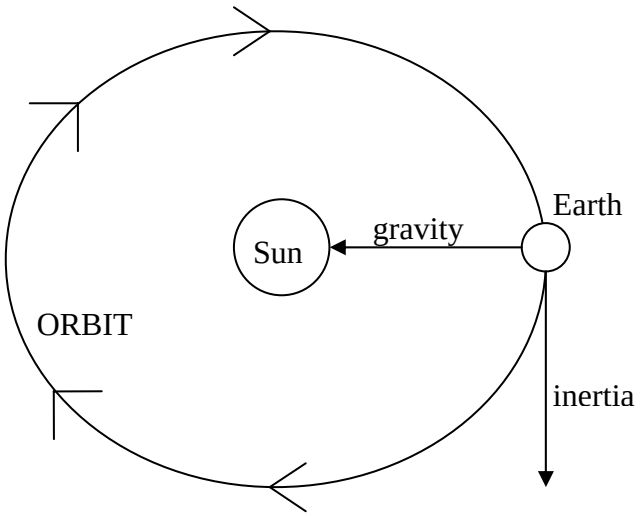
Let's watch some animations to illustrate Newton's Laws of Motion.
http://teachertech.rice.edu/Participants/louviere/Newton/

Interesting, but what does this have to do with planets orbiting the Sun?
http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/How_Do_We_Stay_in_Space.html

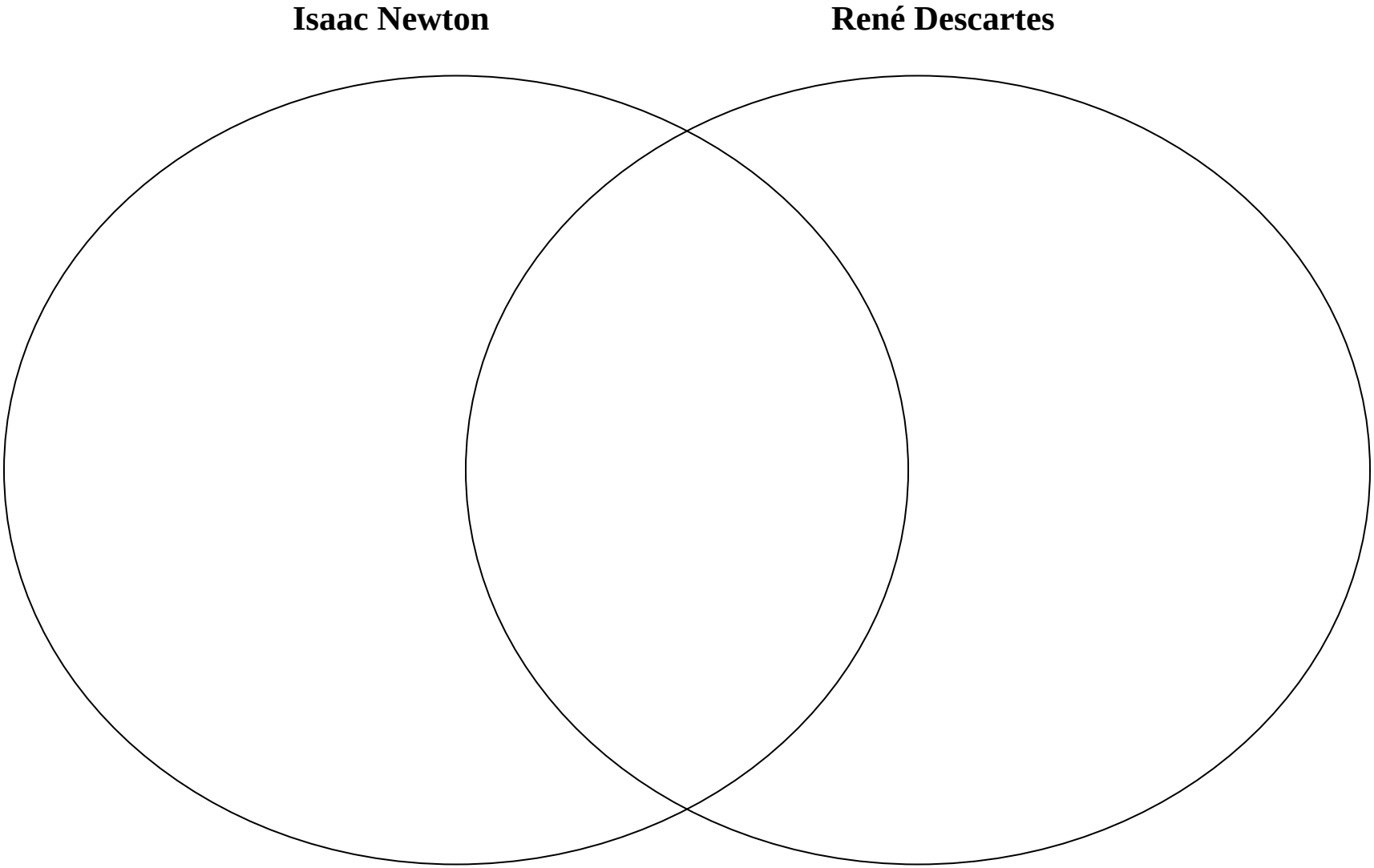
Basically, two forces are keeping planets in orbit:

1. inertia, which pulls the planet out into space
2. gravity, which pulls the planet toward the Sun

The two forces balance and cause orbit!



Appendix F
Newton vs. Descartes Venn Diagram



Venn Diagram Rubric

4	3	2	1
Information in the Venn diagram is **accurate and complete**, demonstrating a **full awareness of differences and similarities**. Information is **clearly organized** and presented with **easy-to-follow bulleted points**.	Information in the Venn diagram is **accurate and complete**, demonstrating a **focus on main points**. Information is **organized correctly** and presented with **clear, bulleted points**.	Information in the Venn diagram is **mostly accurate**, but **does not demonstrate a focus on main points**. Information is **mostly organized** and **presented with bulleted points**.	Information in the Venn diagram is **inaccurate** and demonstrates **little to no focus on main points**. Information is **unorganized** and is **not presented with clear, bulleted points**.

Appendix H
Hobbes and Locke Notes Organizer

	Life	Work	Ideas about Human Nature	Ideas about Government
Thomas Hobbes (1588-1679)				
John Locke (1632-1704)				

Appendix I
Hobbes and Locke Notes Organizer Key

	Life	Work	Ideas about Human Nature	Ideas about Government
Thomas Hobbes (1588-1679)	-good student -traveled in Europe -met many important people (Descartes, Prince Charles) -believed in using reason -had to flee England b/c supported king -eventually returned, but always persecuted for unpopular beliefs	-political philosopher -published *Leviathan*, named after a sea monster, b/c he thought gov't should be all-powerful	-thought people naturally cruel, greedy, and selfish -always try to gain power over each other -always at war with each other -could not live in peace with each other -pessimist	-people should make a social contract with the gov't -give up their personal freedoms in exchange for strict rules and strong enforcement -believed this was only way to have order and peace
John Locke (1632-1704)	-good student -studied science, medicine, also politics -believed in using reason -had to flee England b/c supported Parliament (elected leaders) -eventually returned and got to see his ideas make history (Glorious Revolution; later in U.S. and France)	-political philosopher -wrote *Essay Concerning Human Understanding* and other writings on gov't	-thought humans were like a blank tablet when they were born (*tabula rasa*) -shaped by their experiences -if they had good upbringing, people could be reasonable and moral -optimist -everyone born with natural rights: life, liberty, property	-people should make a social contract with the gov't -gov't should promise to protect people's natural rights -if the gov't fails, people can and should overthrow the gov't: REVOLUTION -Thomas Jefferson used words and ideas to write the Declaration of Independence

Appendix J
A Tale of Two Political Philosophers

Directions: Thomas Hobbes and John Locke had some very different ideas about human nature and government. Fill in the empty boxes to show the contrasting ideas of the philosophers.

Thomas Hobbes		John Locke
EXAMPLE:		
People will always be at war with each other.	⟺	People who had good childhood experiences could be reasonable and kind to each other.
Humans are naturally cruel, greedy, and selfish.	⟺	
	⟺	Government exists to protect people's natural rights.
	⟺	Citizens should fight for their natural rights and freedoms when necessary.
People should always follow the leaders of their government in order to protect people from each other.	⟺	

On the back of this page write at least three sentences about what Hobbes and Locke have in common.

Appendix K
A Tale of Two Political Philosophers Key

Directions: Thomas Hobbes and John Locke had some very different ideas about human nature and government. Fill in the empty boxes to show the contrasting ideas of the philosophers.

Thomas Hobbes		John Locke
EXAMPLE:		
People will always be at war with each other.	⟺	People who had good childhood experiences could be reasonable and kind to each other.
Humans are naturally cruel, greedy, and selfish.	⟺	Humans are born like a blank slate, neither good nor bad.
Government should have strict rules and strong leaders.	⟺	Government exists to protect people's natural rights.
Citizens should give up their personal freedoms to the government.	⟺	Citizens should fight for their natural rights and freedoms when necessary.
People should always follow the leaders of their government in order to protect people from each other.	⟺	People have the right to overthrow the government if it's not protecting their rights.

On the back of this page write at least three sentences about what Hobbes and Locke have in common. Possible topics: both were good students, both had to flee England

for political reasons, both were political philosophers who wrote about their ideas, both believed in having a social contract

Appendix L
Montesquieu Notes Organizer

	Life	Work	Ideas about Government	Legacy
Baron de Montesquieu (1689-1755)				

Appendix M
Montesquieu Notes Organizer

	Life	Work	Ideas about Government	Legacy
Baron de Montesquieu (1689-1755)	-born in France -noble birth, wealthy -traveled Europe -studies lots of topics -believed in using reason	-political philosopher -published *Persian Letters* secretly b/c it criticized French gov't -published *Spirit of Laws* (life's work)	-believed in "separation of powers": not letting all the power go to one person or group in gov't (EX of limited gov't) -thought this would protect citizens from gov't abuse -suggested 3 branches of gov't: executive, legislative, and judicial	-writers of the U.S. Constitution read and used his ideas to set up our country's gov't

Appendix N
Enlightenment Thinkers Review

Directions: Read each statement below and then label each with the Enlightenment thinker who might have said it.

Newton Descartes Hobbes Locke Montesquieu

1. _____ I believe that people should be able to overthrow the government if it is not doing a good job of protecting their rights.

2. _____ Never accept anything as true until you can use reason to show it's true.

3. _____ Human beings will naturally treat each other badly.

4. _____ A child is not born good or bad. People act a certain way because of their experiences in life.

5. _____ Truth can be found by closely observing nature.

6. _____ A powerful government with a strong leader is the only way to make sure that there is safety and peace in a country.

7. _____ One part of the government should not have power over another. Each part should be separate from each other.

8. _____ I can prove I exist because I know I am thinking.

9. _____ You should ask lots of questions of the world around you!

10. _____ People are born with certain rights that they should never give up.

Directions: In the spaces below write your own statement of what the given Enlightenment thinkers might have said. Make sure your statements are different from the one above.

11. **Locke** _____

_____

12. **Hobbes** _____

_____

Appendix O
Enlightenment Thinkers Review Key

Directions: Read each statement below and then label each with the Enlightenment thinker who might have said it.

Newton Descartes Hobbes Locke Montesquieu

1. Locke_____ I believe that people should be able to overthrow the government if it is not doing a good job of protecting their rights.

2. Descartes_____ Never accept anything as true until you can use reason to show it's true.

3. Hobbes_____ Human beings will naturally treat each other badly.

4. Locke_____ A child is not born good or bad. People act a certain way because of their experiences in life.

5. Newton_____ Truth can be found by closely observing nature.

6. Hobbes_____ A powerful government with a strong leader is the only way to make sure that there is safety and peace in a country.

7. Montesquieu_____ One part of the government should not have power over another. Each part should be separate from each other.

8. Descartes_____ I can prove I exist because I know I am thinking.

9. Newton_____ You should ask lots of questions of the world around you!

10. Locke_____ People are born with certain rights that they should never give up.

Directions: In the spaces below write your own statement of what the given Enlightenment thinkers might have said. Make sure your statements are different from the one above.

11. **Locke** answers vary_____

_____

12. **Hobbes** answers vary_____

_____

Appendix P
Declaration of Independence Excerpt

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.—That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed,—That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security.—Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States.

Appendix Q
Thank You Letter Rubric

	4	3	2	1	0
Influential idea	The influential idea from the Enlightenment thinker is clearly stated and elaborated.	The influential idea from the Enlightenment thinker is clearly stated.	The influential idea from the Enlightenment thinker is stated.	The influential idea from the Enlightenment thinker is not stated so that it can be easily recognized.	No influential idea from the Enlightenment thinker is stated.
Effect on America	The effect on America is well-described with specific examples and why they are important.	The effect on America is well-described with specific examples.	The effect on America is described with at least one example.	The effect on America is unclearly described or does not include an example.	No effect on America is mentioned.
Originality	The writer uses a creative approach to make the whole letter original and interesting to read.	The writer uses creativity to make most of the letter original and interesting to read.	The letter has some interesting parts to read.	The letter is not very original. Anyone could have written it.	The writer made no attempt to make the letter interesting to read.

Grammar & Spelling	There are no errors in grammar and spelling.	There are only 1-2 errors in grammar and spelling, which do not distract the reader.	There are 3-4 errors in grammar and spelling, which do not distract the reader.	There are more than 4 errors in grammar and spelling, which distract the reader.	There are so many errors in grammar and spelling that the letter is difficult to read.