

Welcome Teachers and Administrators!

With great excitement, we present this year's All Pikes Peak Reads curriculum! There have been many changes in the lesson structure this year. Primarily, we have simplified the lessons, with three over-riding goals:

1. To provide teachers with lessons that are manageable with regard to both time and materials;
2. To create lessons that are relevant to the Colorado State Standards; and
3. To create lessons that engage students in the Space subject overall and with the chosen books in particular.

If you catch yourself wishing for more material, you will find it on the PPLD website (www.ppld.org/appr). At this site, you can get a calendar of all of the APPR events that run from September 20-October 30, including information about visits from David Silver of the Heinlein Society and Homer Hickam, author of *Rocket Boys*. You will also find links to sites that give more information about the authors and the books chosen for APPR this year (www.heinleinsociety.org www.homerhickam.com).

Also at the PPLD website, you can download any and all APPR lessons. In other words, if you are teaching at the 6-8 level and need to differentiate for a struggling student, you can go right to the 3-5 level. If you need to differentiate for an advanced student, check out the 9-12 work. (In fact, all APPR lessons are free and available to the public.)

Another exciting feature of this year's curriculum is that the K-5 lessons are designed to allow for an **all-school read!** (A hearty thank-you goes to APPR writer Kelly Moeller for this awesome idea!) The K-2 lessons align very nicely with those written for the 3-5 students. We hope that this structure allows for a community experience with such things as book discussion groups, shared activities, science fairs, and school-wide displays of student work.

Writing standards-based lessons that are engaging for students throughout the Pikes Peak region is no easy task! You may find spots where we miss the mark, but we truly hope that the new lesson format will serve you and your students. Feel free to send feedback directly to those of us involved in the writing and editing of the work (see info below), or send your feedback to PPLD.

Best of luck in Space this year!
Cheri Colburn

Lesson Structure

Where possible, the lessons are arranged so that the first page contains the standards, the lesson overview, and the lesson objectives—a fairly comprehensive preview of the lesson. Here is a description of each of those elements:

State standards

Every lesson begins with Colorado State standards for the targeted subject areas (either ELA and Social Studies or Math and Science). Next comes Art or Music standard and the Writing standard that the lesson addresses. The art and music information is provided to appeal to all types of learners; the writing information is provided to allow for writing-across-the-curriculum opportunities. Along with the standards, benchmarks are identified. You may notice that for better fit on the page, we often removed “for example” statements from the standards/benchmarks.

Lesson Overview

This section provides a brief summary of the lesson. The overview is step-by-step, but it is very general.

Learning Objectives

This section articulates the connection between the lesson activities and the standards being addressed.

The Lesson: Before, During, and After

Lessons are divided into three sections. The **Before** section provides information about the APPR books. (For example: “Students read (or listen to) pages 1-30 in the nonfiction book *Space*.”) This section also introduces any vocabulary that may prove problematic. (Vocabulary is not leveled with regard to literacy/grade levels but is instead focused on comprehension.) Finally, the Before section identifies materials that should be on hand and teacher prep work that will need to be completed prior to beginning the lesson.

The **During** section provides a step-by-step breakdown of the activity. Some teacher scripting and expected student responses are included. These features are designed to be pragmatic. We have included them where we thought they might be useful, but you won’t find them at every step in every activity. (Teacher scripting is printed in italics to distinguish it from the rest of the lesson.)

The **After** section usually provides some kind of whole-group activity designed to help summarize and deepen the learning and to allow for sharing of student products.

Differentiation

This section suggests simple ways that the lesson can be differentiated for advanced students and for struggling students.

ELL Feature

Here we note how the lesson already addresses the learning needs of English Language Learners or how it can be differentiated for ELLs.

Other Space Titles

The hope here is that students will want to investigate the subject of Space more deeply. If they do, they can find other space titles that should be manageable for students at the lesson level. Notes are provided that describe the suggested books.

Space Websites

Again, we are hoping students will want to delve deeper. These websites provide more Space content. A description of the website is provided.

Notes from the Writing Team

Dee Vazquez: APPR Co-Chair

Each year as we look at the wealth of information we can use to build projects and study modules for our program, we encounter wonderful people who wish to contribute and fantastic resources that we can include. It is our wish that you would find exactly what you need to become involved in the Read: in the classroom, in your home, or in your community group. Please take a moment and share your thoughts or your experiences with us. You will find a form on the All Pikes Peak Reads web page or email us directly at appr@ppld.org.

Cheri Colburn: Managing Editor

I have worked for several years in the educational publishing industry, and during that time, I've worn many hats—copy editor, content editor, writer, and managing editor. With the APPR project, I have worn each of these hats at different times. It has been a pleasure to work with the fine people involved in this project and to help to develop the new lesson structure for APPR. I truly hope the new approach will allow for region-wide participation in All Pikes Peak Reads. I'd love to hear from you! Please send comments, questions, and suggestions for next year to: colburnwordsmithing@hotmail.com

Kelly Moeller: Math and Science

"What I did on my summer vacation" has taken on a whole new meaning this year! As an 11-year veteran of science teaching at Timberview Middle School in Academy District 20, I have learned a lot about the writing side of curriculum development. I hope you find the math/science lessons easy to use, with very few alterations necessary. Please drop me a line, kelly.moeller@asd20.org, to let me know much your kids enjoyed the activities. I am excited to attend the special events planned for All Pikes Peak Reads!

Travis Duncan: ELA and Social Studies

The first building I ever walked into in Colorado Springs was the East Library, right after the kick-off of the first All Pikes Peak Reads. *To Kill a Mockingbird* displays and information about APPR were everywhere. Attending book discussion groups and other APPR-related programs was great way to meet people in town. Now, seven years later, I consider it a real privilege to have been involved in shaping the curriculum guide for this year's APPR. I'd love to hear your comments and questions. E-mail me at travisduncan23@gmail.com. (Travis wrote in alongside and with the assistance of his wife, Frances Gomez, who is currently enrolled at the University of Colorado, Colorado Springs in the school counseling program. She has studied comprehensive curriculum instruction, and her contributions were essential to the quality lessons that Travis produced. You can contact Frances Gomez at: fgomez@tangle.com.)

9-12 Curriculum ELA and History

Lesson 1: Evaluate Your Education

ELA (and Writing) Standard 2: Students write and speak for a variety of purposes and audiences.

History Standard 2: Students know how to use the processes and resources of historical inquiry.

2.3: Students apply knowledge of the past to analyze present-day issues and events from multiple, historically objective perspectives.

Art Standard 4: Students relate the visual arts to various historical and cultural traditions.

Lesson 2: Wormfaces or Knights-Errant?

ELA Standard 4: Students apply thinking skills to their reading, writing, speaking, listening, and viewing.

History Standard 5: Students understand political institutions and theories that have developed and changed over time. 5.3: Students know how political power has been acquired, maintained, used, and/or lost throughout history.

Writing Standard 2: Students write and speak for a variety of purposes and audiences.

Lesson 3: Humanity on Trial

ELA Standard 6: Students read and recognize literature as a record of human experience.

History Standard 4: Students understand how science, technology, and economic activity have developed, changed, and affected societies throughout history. 4.3: Students understand the historical development and know the characteristics of various economic systems.

Writing Standard 2: Students write and speak for a variety of purposes and audiences.

Art Standard 4: Students relate the visual arts to various historical and cultural traditions.

Math and Science

Lesson 1: Solar System Travel Brochure

Math Standard 1: Students develop sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

Science Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space (*Focus: Geology, Meteorology, Astronomy, Oceanography*).

Writing Standard 5: Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources.

Music Standard 4: Students will listen to, analyze, evaluate, and describe music.

Lesson 2: Toilet Paper Solar System

Math Standard 2: Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.

Science Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space (*Focus: Geology, Meteorology, Astronomy, Oceanography*).

Writing Standard 5: Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources.

Music Standard 4: Students will listen to, analyze, evaluate, and describe music.

Lesson 3: Rocket Altitude

Math Standard 5: Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

Science Standard 1: Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

Writing Standard 2: Students write and speak for a variety of purposes and audiences.

Art Standard 4: Students relate the visual arts to various historical and cultural traditions.

All Pikes Peak Reads

9-12 ELA and History

Lesson 1: Evaluate Your Education

Texts: *Have Space Suit – Will Travel* by Robert A. Heinlein
The Space Tourist's Handbook by Eric Anderson

ELA (and Writing) Standard

Standard 2: Students write and speak for a variety of purposes and audiences.

Benchmarks

- conveying technical information in a written form appropriate to the audience;
- supporting an opinion using various forms of persuasion (factual or emotional) in speaking and writing;
- incorporating material from a wider range of sources in their writing and speaking;
- selecting a focused topic and drafting, revising, editing, and proofreading a legible final copy;
- writing in various specialized fields such as career and academic interest areas
- experimenting with stylistic elements such as voice, tone, and style.

History Standard

Standard 2: Students know how to use the processes and resources of historical inquiry.

2.3: Students apply knowledge of the past to analyze present-day issues and events from multiple, historically objective perspectives.

Benchmarks:

- identifying historical contexts of contemporary issues;
- using historical information to interpret and evaluate decisions or policies regarding contemporary issues.

Art Standard

Standard 4: Students relate the visual arts to various historical and cultural traditions.

Benchmarks:

- describing the functions, meanings, and significance of works of art within various cultures;
- creating works of art based on comparison and evaluation of various historical and cultural contexts; and
- evaluating, analyzing, and interpreting works of art as related to the history and culture of various people.

Lesson Overview

1. Students discuss the historical context in which *Have Space Suit – Will Travel* was written.
2. Students work in groups of four to make a list of the most important problems facing our society today.
3. Students discuss whether they are being prepared to tackle those problems in the education they are receiving.
4. Students choose one societal problem and write an essay which either criticizes or defends their current education.

Learning Objectives

1. use text to self strategies to understand the reading
2. identify historical context of education
3. evaluate education by writing an essay that uses factual and emotional persuasion

Before

1. Students read pages 1-80 in *Have Space Suit Will Travel*.
2. Students read pages 85-117 of *The Space Tourist's Handbook*,
3. Students look at images of some of the weaponry developed during the Cold War/Space Race years: <http://blog.800hightech.com/cold-war-gallery-images-weapons-mass-destruction-wmd/3542/>
4. **Preview vocabulary**
From *Have Space Suit – Will*
Dangling participle (pg. 6): a participle or participial phrase, often found at the beginning of a sentence, that appears from its position to modify an element of the sentence other than the one it was intended to modify, as in *Plunging hundreds of feet into the gorge, we saw Yosemite Falls*.
Oblate spheroid (pg. 46): a rotationally symmetric ellipsoid having a polar axis shorter than the diameter of the equatorial circle whose plane bisects it. The oblate spheroid is the approximate shape of many planets and celestial bodies, including Saturn and Altair, and – to a lesser extent – the Earth.
Occam's razor (pg. 46): A rule in science and philosophy stating that entities should not be multiplied needlessly. This rule is interpreted to mean that the simplest of two or more competing theories is preferable and that an explanation for unknown phenomena should first be attempted in terms of what is already known. Also called *law of parsimony*.
Sans peur et sans reproche (pg. 63): without fear and without reproach
Mirabile visu (pg. 69): wonderful to behold
5. **Gather materials**
White board and markers
Writing material for students

During

1. Explore the Concept of Historical Context

- Say: *Think about the context in which Have Space Suit - Will Travel was written. It was published in 1958, one year after the Russians launched Sputnik, creating a fear that the USSR was winning the Space Race, and by proxy, the Cold War.*
- *You're too young to have lived through the Cold War, though you may have heard your parents talk about it or seen movies from the '80s that reference it. It was a continuing state of political tension and economic tension between the USSR and the United States that emerged after World War II. The Space Race was one byproduct of The Cold War and the launch of Sputnik triggered a fearful response in the U.S. because, the logic went, if a country can put a satellite over your head, they can put a missile there as well.*
- *You live in an historical context as well. Get into groups of four and discuss the historical context of your lives now. What are the most important issues you believe are facing our country? The world? Make a list with your group.*

2. Evaluate Your Education

- Say: *The subject matter and even the title of Have Space Suit – Will Travel suggests that with preparation, you'll go further than you ever thought possible. But on pages 4 through 9, Clifford's dad says that school does not prepare you for "serious" subjects: engineering, science or pre-med. Do you agree with the assessment that these are the only serious fields of study?*
- Say: *Think about the issues facing the country and our world today that you've just listed with your group. Discuss what you believe are the most important subjects a person can study and why.*

- **Essay:** Students write an essay that (1) identifies what they believe to be the most critical issues facing the world today, (2) turns a critical eye toward the education they're receiving. Do they believe it to be adequate? In what ways is it preparing them—or failing to prepare them to address the critical issues they've identified.

After

As time allows, have students read their essays to the class. Have students evaluate what good points were made, as well as what could have made their argument stronger. Did anyone spot any fallacies in their argument?

Differentiation

Advanced students can write an essay that requires research into standardized testing and the origins of the education they're receiving. Struggling students can focus their essays on just one topic.

ELL Feature

Validate ELLs' experiences by encouraging them to share any educational experiences and insights resulting from their native cultures.

Other Space Titles

Dumbing Us Down: The Hidden Curriculum of Compulsory Schooling

John Taylor Gatto

Publisher: New Society Publishers

ISBN-13: 9780865714489

Thirty years as a public school teacher in New York City led John Gatto to the conclusion that compulsory schooling's main function is to teach young people to follow orders like cogs in a machine.

America and the World: Conversations on the Future of American Foreign Policy

David Ignatius, Zbigniew Brzezinski, Brent Scowcroft

Publisher: Basic Books

ISBN-13: 9780465015016

Brzezinski and Scowcroft, two of the most well-respected figures in American foreign policy, offer their views on the challenges the country faces abroad.

Space Websites

<http://www.coldwar.org/index.html>

Summary: The Cold War Museum Web site enables users to browse the site by decade, offering corresponding images and articles that allows for a more in-depth and comprehensive understanding of the factors that shaped the Cold War.

<http://www.servintfree.net/~aidmn-ejournal/publications/2001-11/PublicEducationInTheUnitedStates.html>

Summary: This site offers a good introduction to the history of public education in the United States.

All Pikes Peak Reads

9-12 ELA and History

Lesson 2: Wormfaces or Knights-Errant?

Texts: *Have Space Suit – Will Travel* by Robert A. Heinlein
Community: The Structure of Belonging by Peter Block

ELA Standard

Standard 4: Students apply thinking skills to their reading, writing, speaking, listening, and viewing.

Benchmarks

- recognizing an author's point of view, purpose, and historical and cultural context;
- knowing what constitutes literary quality based on elements such as the author's point of view, the author's selection of significant details, theme development, and the author's reflection of events and ideas of his or her lifetime; and
- critiquing the content of written work and oral presentations.

History Standard

Standard 5: Students understand political institutions and theories that have developed and changed over time.

5.3: Students know how political power has been acquired, maintained, used, and/or lost throughout history.

Benchmarks

- explaining how military conquest and invasion have been used to assume, maintain, and extend political power throughout history;
- analyzing the impact of major revolutions on the realignment of political power throughout the modern world;
- describing and analyzing the major events in the expansion of the political power of the United States;
- analyzing the causes and events of major wars of the contemporary era and the resulting changes in the distribution of political power; and

Writing Standard

Standard 2: Students write and speak for a variety of purposes and audiences.

9-12 Benchmarks

- supporting an opinion using various forms of persuasion (factual or emotional) in speaking and writing;
- incorporating material from a wider range of sources (for example, newspapers, magazines, interviews, technical publications, books) in their writing and speaking;
- selecting a focused topic and drafting, revising, editing, and proofreading a legible final copy;

Lesson Overview

1. Students discuss the historical context in which *Have Space Suit – Will Travel* was written.
2. Students work in groups of four to list today's most important social problems.
3. Students discuss whether their education is preparing them to address the issues they've identified.
4. Students choose one societal problem and write an essay that either criticizes or defends the education they are receiving.

Learning Objectives

1. Use text to self strategies to understand the reading
2. Identify historical context of education
3. Evaluate education by writing an essay that uses factual and emotional persuasion

Before

1. Students read through page 163 in *Have Space Suit Will Travel*.
2. Supplemental reading: pages 45-46 of *Community: The Structure of Belonging*
3. Students peruse photos and captions from *The Eternal Jew*, published by the Nazi Party in 1937: <http://www.jewishvirtuallibrary.org/jsource/Holocaust/eternal.html>
4. **Preview vocabulary**
 - From *Have Space Suit – Will Travel*
 - Dexedrine (pg. 93): the trade name for Dextroamphetamine in the US. It was approved to treat narcolepsy, attention disorders, depression, and obesity beginning in the 1930s. It was determined to pose a high potential for abuse, and it was eventually classified (in the 1970s) as Schedule II, the most restrictive category possible for a drug with valid medical uses.
 - Bonestelled (pg. 108): Chesley Bonestell, a science fiction artist and illustrator who helped inspire the American space program.
 - Knight-errant (pg. 111): a wandering knight; a knight who traveled widely in search of adventures, to exhibit military skill, to engage in chivalric deeds, etc.
 - Canard (pg. 113): a false or baseless, usually derogatory story, report, or rumor.
 - Bedraggled (pg. 113): limp or soiled, as with rain or dirt.
 - Supercilious (pg. 126): haughtily disdainful or contemptuous, as a person or a facial expression.
 - Carnotite (pg. 129): a yellow, earthy, hydrous potassium uranium vanadate: an ore of uranium.
 - Cudgeling (pg. 133): a short, thick stick used as a weapon; club.
 - Isostatic (pg. 133): Isostasy refers to the equilibrium in the earth's crust such that the forces tending to elevate landmasses balance the forces tending to depress landmasses.
5. **Gather materials**
6. White board and markers
7. Writing material for students

During

Establish/Explore Historical Context

1. Say: *On page 123 in Have Space Suit – Will Travel, Clifford compares the tactics of the wormfaces to those of the Allied forces in World War II. Who can remind the class what he says? (U.S.A. = Pluto, England = the Moon, France and Germany = Earth). Most of you probably know at least a little bit about World War II. When you think of World War II, what comes to mind? (Hitler and the Holocaust)*
2. *World War II is often called “the good war” in the US because the aggression and atrocities committed by Hitler and Nazi Germany were so great that many Americans feel that the war was morally justified. The line feels so clear cut, that political leaders and pundits regularly compare leaders of nations that have competing interests with the United States to Hitler. It was done with Saddam Hussein in the build-up to the invasion of Iraq. It’s been done with Kim Jong-il of North Korea and Mahmoud Ahmadinejad in Iran, to name only a few. Have Space Suit – Will Travel is a book that makes it relatively easy to tell between the peaceful and the warmongers. However, Heinlein does show that not all humans are compassionate. Which characters are examples of humanity’s worst side? (Skinny and Fats)*
3. *Who remembers why Skinny and Fats betray the human race? (They believe they can’t win against the wormfaces, and they also believed they would be paid in uranium for their services.)*

4. Have students get into groups for a brainstorm about comparisons between U.S. military actions and *Have Space Suit – Will Travel*. Ask: *Is the comparison better suited to World War II, or do you see parallels with modern conflicts?*
5. **Essay:** Have students write an essay that compares and contrasts the current war in Iraq in the terms laid out in *Have Space Suit – Will Travel*. Students should choose a side and argue it. Did Iraq act like the wormfaces, building up weapons of mass destruction with the intent of attack? Did the United States act as knights-errant, just as Clifford, PeeWee and the Mother Thing did? Or were those roles reversed? Students should cite at least three news sources in their article. Have students think critically when choosing sources. It may be helpful for students to think of the media in terms of the selection from *Community: The Structure of Belonging*, e.g. “News is what somebody somewhere wants to suppress; all the rest is advertising.”

After

As time allows, have students read their essays to the class and evaluate the points made by each essay. Note the spectrum in opinions that arise in just one class. Discuss whether this spectrum is represented in the media.

Differentiation

Advanced students can debate their viewpoints in front of the class. Struggling students can focus their comparison on only one character.

ELL Feature

Use small groups to ease anxiety ELLs may experience when asked to produce English responses during whole-class instruction.

Other Space Titles

The War Within: A Secret White House History 2006-2008

Bob Woodward

Publisher: Simon & Schuster Adult Publishing Group

ISBN-13: 9781416558972

Bob Woodward's fourth book about the Bush presidency examines the wars in Afghanistan and Iraq, taking a tough look at the legal overreaching of Bush's anti-terror campaign.

Who Owns the Moon?

Virgiliu G. Pop

Publisher: Springer-Verlag New York, LLC

ISBN-13: 9781402091346

This work examines the viability of property rights on celestial bodies, especially those rights concerning land and mineral ownership.

Space Websites

<http://thinkprogress.org/iraq-timeline/>

Summary: This timeline of the Iraq War provides a critical look at government and media spin.

<http://www.cnn.com/2008/TECH/space/05/19/moon.land/index.html>

This CNN article titled “Who Owns the Moon?” addresses a complicated question from the perspective of international law.

All Pikes Peak Reads

9-12 ELA and History

Lesson 3: Humanity on Trial

Texts: *Have Space Suit – Will Travel* by Robert A. Heinlein
Community: The Structure of Belonging by Peter Block

ELA Standard

Standard 6: Students read and recognize literature as a record of human experience.

Benchmarks

- reading, responding to, and discussing novels, poetry, short stories, non-fiction, content-area and technical material, plays, essays, and speeches;
- developing and supporting a thesis about the craft and significance of particular works of literature, both classic and contemporary, from a variety of ethnic writers.

History Standard

Standard 4: Students understand how science, technology, and economic activity have developed, changed, and affected societies throughout history.

4.3: Students understand the historical development and know the characteristics of various economic systems.

Benchmarks

- explaining the historical development of the economic system of the United States;
- analyzing the history of the relationship between economics systems and the role of governments throughout history;
- describing characteristics of specific economic systems and how these systems have existed in different ways at different times throughout history; and

Writing Standard

Reading and Writing Standard 2: Students write and speak for a variety of purposes and audiences.

9-12 Benchmarks

- supporting an opinion using various forms of persuasion (factual or emotional) in speaking and writing;
- incorporating material from a wider range of sources in their writing and speaking;
- selecting a focused topic and drafting, revising, editing, and proofreading a legible final copy;

Art Standard

Standard 4: Students relate the visual arts to various historical and cultural traditions.

Benchmarks

- describing the functions, meanings, and significance of works of art within various cultures;
- evaluating, analyzing, and interpreting works of art as related to the history and culture of various people.

Lesson Overview

1. Students discuss the impact of economic and political systems in *Have Space Suit – Will Travel*, especially as they pertain to the Cold War.
2. Students write a short response regarding whether humanity should be defended or prosecuted based on our responses to economic and political systems during the Cold War.
3. Students enact a mock trial, defending or prosecuting humanity.
4. Students write a short response that imagines a future in which humanity can take lessons from history and lessons about community-building to an intergalactic level.
5. If time allows, reference posters by Aleksander Rodchenko, paintings by Wassily Kandinski, the Pepsi logo and Jackson Pollock. The former being artists under the Socialist regime, the latter being designs associated with Capitalism and U.S individualism. This is a good site to get students started: <http://www.creativereview.co.uk/cr-blog/2008/august/constructivism-the-ism-that-just-keeps-givin>

Learning Objectives

1. Use text to world strategies to understand how *Have Space Suit – Will Travel* relates to historical events and figures
2. Identify how economic and political systems shape foreign policy and affect humanity's ability to cause harm, on the planet and in outer space
3. Explore how economic and political systems affect human beings' ability to cause harm, to themselves and intergalactic, as it pertains to *Have Space Suit – Will Travel*

Before

1. Students finish reading *Have Space Suit – Will Travel*.
2. Students read pages 163-175 of *Community: The Structure of Belonging*
3. **Preview vocabulary**
4. From *Have Space Suit – Will Travel*
 - Captious (pg. 166): apt to notice and make much of trivial faults or defects; faultfinding; difficult to please.
 - Buffeting (pg. 196): a violent shock or concussion.
 - Hadrian's Wall (pg. 206): An ancient Roman wall, 118.3 km (73.5 mi) long, across northern England. Built by the emperor Hadrian c. A.D. 122-126 and extended by Severus a century later, the wall marked the northern defensive boundary of Roman Britain. Fragmentary ruins of the wall remain.
 - Eboracum (pg. 206): ancient name of York, England.
 - Lustrations (pg. 206): to purify by a propitiatory offering or other ceremonial method.
 - Cuirass (pg. 220): Also called corselet. defensive armor for the torso comprising a breastplate and backplate, originally made of leather.
5. **Gather materials**
 - White board and markers
 - Writing material for students

During

Historical Context

1. Say: *During the trial that occurs on 219-234 of Have Space Suit – Will Travel, "the voice" declares that humanity is not being tried by a court of justice, but by a security council, to see if we're a threat to the survival of alien races. Their motto is "Three Galaxies, One Law." The novel was written during the Cold War between the United States and the Soviet Union. To understand the question of whether humanity might really be a threat to alien races, it's helpful to think about the novel's historical context. Consider the economic forces driving the Cold War and the beliefs underlying these systems: (**The Soviet Union and Communism:** The economic system in which the government has control of all property and means of production, abolishing the notion of individual ownership of goods. The underlying belief: all people are worthy of having certain basic needs met. Greed is the underlying value for desiring ownership for any property, goods or services beyond what is good for society's whole). (**The United States and Capitalism:** The economic system in which people compete economically for ownership of goods and services. Underlying belief: the services/labor of some people is more valuable than that of other people. The reward for providing more valuable services is wealth and ownership).*
2. Ask: *How did these ideologies shape and define the Cold War?* (The U.S. strived to expand economic possibilities and opportunities by influencing other nations to be capitalist—and therefore to become nations that would buy U.S. goods.)
Explain the Marshall Plan: The Marshall Plan was created after WWII and was the attempt of the U.S. to sway other countries to adopt free market systems.

How did these ideologies and systems of belief affect the way human beings treated each other? According to the resulting conflict between U.S and the U.S.S.R., did human beings pose a threat to one another? Could these policies pose a threat to hypothetical intergalactic species (like the aliens in Have Space Suit – Will Travel)?

3. Break students into two groups: those who believe humanity posed a threat to alien life forces and those who believe humanity posed no threat.

Each group of students should develop a written argument for whether or not the U.S posed a threat to alien species and will reenact the trial on pages 219 to 234 of Have Space Suit – Will Travel. The jury will consist of one student from each camp and the teacher. Three students from each side will present the arguments.

4. *After five-minute presentations of argument from each side, have the jury conclude which side presented the best argument. If no side was a winner, simply have the jury restate the best and most direct arguments simply and quickly.*

After

As time allows, have students write short answer responses to the trial. Do they think humanity won? Considering the selection from *Community: The Structure of Belonging*, how can humanity take lessons of building community to relate on an intergalactic level?

Differentiation

Advanced students can debate their viewpoints in front of the class. Struggling students can write about different economic systems.

ELL Feature

Use small groups to ease anxiety ELLs may experience when asked to produce English responses during whole-class instruction.

Other Space Titles

Beyond Resistance! Youth Activism and Community Change by Pedro Noquero, Shawn Ginwright, Julio Cammarota

Publisher: Taylor & Francis, Inc. (ISBN-13: 9780415952514)

This book discusses how globalization and deindustrialization contribute to job loss and marginalization. It also discusses ways that public policy can address social justice and equity.

Class Theory and History: Capitalism and Communism in the U.S.S.R. by Resnick and Wolff

Publisher: Taylor & Francis, Inc. (ISBN-13: 9780415933186)

This work looks at the history of the Soviet Union and concludes that a true communist class structure never existed there. The book then discusses the future of capitalism and communism.

Space Websites

<http://www.energybulletin.net/node/46741>

Summary: This Web site is related to energy, but gives good tips on how to create change in your community, whatever the issue.

<http://www.gizmag.com/orbital-debris-space-junk/10999/>

This article, titled "Toilet training the space community," is a good introduction to thinking about community stewardship in outer space.

All Pikes Peak Reads

9-12 Math and Science

Lesson 1: Solar System Travel Brochure

Texts: *Have Spacesuit - Will Travel* by Robert A. Heinlein
The Space Tourists Handbook by Eric Anderson and Joshua Piven

Math Standard

Standard 1: Students develop sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

9-12 Benchmarks

- 1. demonstrate meanings for real numbers, absolute value, and scientific notation using physical materials and technology in problem-solving situations.

Science Standard

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space (*Focus: Geology, Meteorology, Astronomy, Oceanography*).

9-12 Benchmarks

- 17. the scales of size and separation of components of the solar system are complex

Writing Standard

Reading and Writing Standard 5: Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources.

9-12 Benchmark

- using available technology to access information, conduct research, and produce a carefully documented product.

Music Standard

Standard 4: Students will listen to, analyze, evaluate, and describe music.

9-12 Benchmark

- Describing and evaluating music performance using musical terminology

Lesson Overview

1. Students will research facts about an object in our solar system.
2. Students will create a travel brochure for their solar system object.

Learning Objectives

1. Students will learn through research and describe characteristics of their assigned solar system object.
2. Students will use scientific notation to describe their solar system object.

Before

1. Students read *The Space Tourist's Handbook*.
2. Assign each student or group to study one object in space: the 8 planets, Pluto, our sun, Earth's moon, comets, asteroids, other dwarf planets, named moons of other planets, etc.
3. Schedule at least one library day for research and one computer lab day for making travel brochures. (Rough drafts can be homework or in-class work.)
4. Microsoft's Publisher program has several brochure templates. If possible, have the IT instructor teach students how to use this program. (This lesson also addresses several Educational Technology Information Literacy standards.)
5. Ask your librarian to pull Solar System resource books.

6. Bookmark solar system websites:
 - <http://nssdc.gsfc.nasa.gov/planetary/factsheet/index.html>
 - <http://www.nineplanets.org/>
 - <http://pds.jpl.nasa.gov/planets/>
7. Make one copy for each student of the Travel Brochure Student Guide, below.
8. Bring in some travel brochures as examples.
9. Music Activity (Optional): Theme song
Many travel companies have signature music. If you ran a solar system vacations business, what would be your theme song? Use <http://www.hobbyspace.com/Music/music2.html#list> for a sample of song titles if you need some ideas.

During

1. Say: *In The Space Tourist's Handbook we learned that someday soon it may be possible for anyone, not just astronauts or the very wealthy, to travel to space. Travel to planets in our solar system may not be far behind! Today we are going to research different places to travel in our solar system and create a travel brochure.*
2. Give each student a copy of the Travel Brochure Student Guide sheet
3. Allow time for students to research information and create a travel brochure.

After

- Students present their travel brochures to the class.

Differentiation

To differentiate this lesson for higher level students have them include how long, travelling at the speed of light, to get to their object or, assign higher level students objects farther away from the sun or more obscure objects. To differentiate for lower level students reduce the amount of information they need to research and include or, assign lower level students objects closer to the Sun.

ELL Feature

On the Back Right Panel ELL students can list those object's properties rather than writing a descriptive paragraph.

Other Space Titles

Between Planets by Robert A. Heinlein

ISBN-13: 9781416555643

Publisher: Baen Books

When Mars and Venus seek independence from Earth an interplanetary war breaks out. Don Harvey, a Martian student studying on Earth, is caught in the middle.

Space Tourism: Adventures in Earth Orbit and Beyond by Michael Van Pelt

ISBN-13: 9780387402130 Publisher: Springer-Verlay New York, LLC

Space Websites

One of private space travels cutting edge promoters is Sir Richard Branson. Visit the website to learn more about how you can book your own space ride.

www.virgingalactic.com

Travel Brochure Student Guide

Objective: Students research an object in the solar system and create a travel brochure about that object.

Brochure Information: The tri-fold brochure will have 6 panels for information. This guide provides guidelines for the minimum information on each panel. Add more information if you like. (Display large numerical information using scientific notation.)

- Back Left Panel: Name of solar system object, picture of the object, your name(s)
- Back Center Panel: Bibliographic information, a minimum of 3 sources must be used and properly cited.
- Back Right Panel: An exciting introduction of the object and what a tourist could experience at that object; weave the following information into your descriptive paragraph: atmosphere (weather activity), gravity, temperature (daily maximum and minimum), and length of day.
- Front Left Panel: Name of who discovered the object, possibly a picture of that person, description of how the object got its name, and a description of visible features. If working in groups include information about the object's moon(s).
- Front Center Panel: A minimum of two additional pictures of the object with descriptive captions.
- Front Right Panel: Object information including: mass, diameter, density, escape velocity, distance from Sun, orbital period, and orbital velocity.

All Pikes Peak Reads

9-12 Math and Science

Lesson 2: Toilet Paper Solar System

Texts: *Have Spacesuit - Will Travel* by Robert A. Heinlein
The Space Tourists Handbook by Eric Anderson and Joshua Piven

Math Standard

Standard 2: Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.

9-12 Benchmarks

- 1. model real-world phenomena using functions, equations, inequalities and matrices.

Science Standard

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space (*Focus: Geology, Meteorology, Astronomy, Oceanography*).

6-8 Benchmarks

- 17. the scales of size and separation of components of the solar system are complex

Writing Standard

Reading and Writing Standard 5: Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources.

9-12 Benchmark

- using organizational features of printed text such as citations, end notes, and bibliographic references to locate relevant information;

Music Standard

Standard 4: Students will listen to, analyze, evaluate, and describe music.

9-12 Benchmarks

- describing and evaluating music performance using musical terminology;
- explaining characteristics that distinguish musical styles.

Lesson Overview

1. Students will convert the distance between the sun and other objects in the solar system from kilometers to units of toilet paper squares.
2. Students will construct a model of the solar system using a roll of toilet paper.

Learning Objectives

- Students will model the real-world phenomenon of the scaled size and separation of components of the solar system.

Before

1. Students read (or listened to) the first 7 chapters of *Have Spacesuit – Will Travel*.
2. Gather materials: School issued toilet paper works well for this activity, 1 roll (250 sheets) per group, ask the custodian for toilet paper rolls.
3. Felt tip markers work well; ball point pens may tear the toilet paper.
4. Find a long space to unroll the toilet paper (for example: the gymnasium, a long hallway that won't have a lot of student traffic during class time, a sidewalk, the track, etc.). You will need approximately 24 meters (80 feet).

5. Make one copy for each student of the attached Toilet Paper Solar System Student Sheet.
6. Students can find the distances and do the conversions as **homework or in class**. The NASA planetary fact sheet, <http://nssdc.gsfc.nasa.gov/planetary/factsheet/index.html>, lists the average distance from the sun for each planet. If doing all work in class make several copies of the fact sheet or schedule time in the computer lab for student access to the website.
7. All Pikes Peak Read 9-12 Lesson 1 Planetary Travel Brochure (Optional)
8. Music Activity (Optional): Instrumental Space Music
9. Play instrumental music in the background while students are working. On October 17, 2009 The Colorado Springs Philharmonic will perform music from science fiction movies including "Independence Day", "Armageddon", and "Cocoon". You could offer extra credit to students that attend this concert.

During

1. Say: *Remember when Kip, Pee-wee and the Mother Thing were taken to Pluto? Kip was astonished that they could make it that far, that quickly. On pages 117 and 118 Kip described a method to remember the order and distances of the planets in our solar system.*
2. Say: *Today we are going to construct a model of the distances between the sun and the planets using a roll of toilet paper.*
3. Give each student a copy of the Toilet Paper System Student Sheet
4. Allow time for students to research information and do conversions.
5. Allow time for students to construct the model.
6. Optional Activity ** When students are finished constructing their models, use one model for a class presentation activity of the solar system travel brochures from Lesson 1. Starting at the sun, groups will present information about their solar system object in order from nearest to farthest.

Planet	Distance from Sun (x 10⁶ km)	Squares of Toilet Paper
Mercury	57.9 x 10 ⁶ km	2.4
Venus	108.2 x 10 ⁶ km	4.4
Earth	149.6 x 10 ⁶ km	6.0
Mars	227.9 x 10 ⁶ km	9.2
Jupiter	778.6 x 10 ⁶ km	16.6
Saturn	1433.5 x 10 ⁶ km	31.2
Uranus	2872.5 x 10 ⁶ km	55.4
Neptune	4495.1 x 10 ⁶ km	115.0
Pluto (dwarf planet)	5870.0 x 10 ⁶ km	234.8

After

- Students will share their reflections aloud with the class.

Differentiation

To differentiate this lesson for higher level students have them include other objects in the solar system (for example: Earth's moon, Ceres, Io, Halley's Comet, etc.). To differentiate for lower level students reduce the number of conversions they need to complete. Assign lower level students planets closer to the sun.

ELL Feature

ELL students can state the results of the nearest and farthest planetary object in the Reflection area rather than using descriptive language.

Other Space Titles

Contact by Carl Sagan

ISBN-13: 9780671004101

Publisher: Simon and Schuster Adult Publishing Group

Radio astronomer Ellie Arroway receives a message to build a machine. The age-old debate between religion and science are examined elegantly in this novel by *Cosmos* author, Carl Sagan.

Spacesuits: Within the Collections of the Smithsonian National Air and Space Museum by Amanda Young

ISBN-13: 9781576874981

Publisher: powerhouse Books

This book chronicles the development of spacesuits starting in the 1930s. Never before published photos and diagrams provide a unique look at this amazing time in history.

Space Websites

The information presented on this page from the Skywatch website provides more information regarding the scaled size of the objects in the solar system. This could be used to develop another lesson to incorporate with the presentation of the Toilet Paper Solar System.

<http://www.sky-watch.com/articles/howfar.html>

Toilet Paper Solar System

Objective: Students will construct a model of the solar system to display the scaled distances between planets.

Materials:

1 Roll Toilet Paper per lab group

Calculator

Marker

Procedure:

1. List the names of the 8 planets in our solar system and Pluto (because Kip was taken to Pluto by Wormface)
2. Find and record the distance from the sun to each planet and record in the data table.
3. Convert the distance from the sun to each planet into units of toilet paper squares using the following conversion factor: **1 square = 25×10^6 km.** Record to the nearest tenth of a toilet paper square.
4. Check your answers with the teacher.
5. Carefully unroll your toilet paper marking the planets at the appropriate squares.

Data Table:

Planet	Distance from Sun (x 10^6 km)	Squares of Toilet Paper

Reflection: Describe the insights you gained doing this activity.

All Pikes Peak Reads

9-12 Math and Science

Lesson 3: Rocket Altitude

Texts: *Have Spacesuit - Will Travel* by Robert A. Heinlein
The Space Tourists Handbook by Eric Anderson and Joshua Piven

Math Standard

Standard 5: Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

9-12 Benchmarks

1. measure quantities indirectly using techniques of algebra, geometry, or trigonometry;
2. select and use appropriate techniques and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements;

Science Standard

Standard 1: Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

9-12 Benchmarks

- select and use appropriate technologies to gather process, and analyze data and to report information related to an investigation

Writing Standard

Reading and Writing Standard 2: Students write and speak for a variety of purposes and audiences.

9-12 Benchmarks

- writing in various specialized fields such as career and academic interest areas

Art Standard

Standard 4: Students relate the visual arts to various historical and cultural traditions.

9-12 Benchmark

- creating works of art based on comparison and evaluation of various historical and cultural contexts

Lesson Overview

1. Students will construct an altitude measuring device.
2. Students launch a rocket and measure the altitude using two positions.
3. Following the launch, students will communicate logical conclusions based on evidence.

Learning Objectives

1. Students will construct and use an altitude measuring device
2. Students will construct a display of data
3. Students will use trigonometric functions to measure altitude

Before

1. Students read *Have Spacesuit – Will Travel* or *The Space Tourists Handbook*.
2. Students assembled a rocket from a kit like Estes© www.estesrockets.com or Apogee© www.apogeerockets.com; depending on the rocket, assembly may take anywhere from 1-3 class periods.
3. Teacher has appropriately prepared the launch site; see the above mentioned websites for instructions.
4. Mark two spots for students to stand to take the altitude reading. The two spots should be in line with the wind on either side of the launch site. One spot will be

known as Position A and the other Position B. Measure the distance from Position A through the launch site to Position B,

5. Preview vocabulary:

apogee: the farthest distance an object is or can be. Say: *When we launch your rockets the highest point they reach in the sky is their apogee.* Draw the parabolic curve of a rocket's flight path on the board and indicate that the apogee is at the top of the curve.

6. Gather materials: See student lab sheet

7. Student Lab Sheet Measuring Altitude; run one copy for each student.

8. Visual Art Activity Create a Mission Patch

9. Mission patches can be viewed at www.nasa.gov; in the search box for that website, use 'mission patch'. The Apollo 11 and the Challenger patches can be found there.

During

1. Say: *Today we will measure the altitude reached when we launch the rockets we built. First we will build an altitude measuring device. You and a classmate will collect data of the angles perceived when the rocket is at its apogee.*
2. Give each student a lab sheet and direct them to the supplies to construct their altitude measuring devices.
3. Check students' data tables.
4. Assist students as needed making calculations for their rockets' altitude.

After

Students will write their results and conclusions and turn in for teacher evaluation.

Differentiation

To differentiate this lesson for higher performing students offer leadership positions as peer assistants for students that are struggling. Provide lower performing students with a template of the data table.

ELL Feature

The use of manipulatives is an ELL strategy—students internalize the objectives when they physically measure the angle.

Other Space Titles

Code Scarlet by Melody Vansandt

ISBN-13: 9781413789027

Publisher: Publish America

The heroine, Scarlet Harrison, has just graduated from high school and is now faced with decisions about her past that may affect the future of mankind.

Rockets by Ron Miller

ISBN-13: 9780822571537

Publisher: Lerner Publishing Group

Miller traces the historic past of the rocket from weaponry to space travel. This book is part of the "Space Innovations" series.

Space Websites

This site is for rocket enthusiasts. You can subscribe to their magazine but you will be able to find videos, pictures and links to other sites.

www.libertylaunchsystems.com/

Lab Sheet: Measuring Altitude

Objective: Students construct and use an altitude measuring device.

Materials:

Drinking Straw	20 cm string
Protractor	Tape
Large eraser	Calculator

Procedure for construction:

1. Tape the straight edge of the protractor to the straw.
2. Attach one end of the string through the center of the protractor and to the straw, don't squeeze the straw shut when tying the string
3. Attach the eraser to the other end of the string to act as a weight.

Procedure:

1. Hold the device so that the straw is on top and the protractor is on the bottom.
2. The string should be able to swing freely; if the straw is tilted skyward the eraser will move toward you. If you hold the straw perfectly level the string should hang at the 90° mark on the protractor.
3. Record the **baseline** (distance from Position A through the launch site to Position B).
4. Go to Position A, stand at the mark made by the teacher, look through the straw and follow the rocket to its apogee.
5. When the rocket reaches apogee use your finger to hold the string against the protractor. Record this number, it is known as **Angle A**.
6. At the same time, a classmate will go to Position B, stand at the mark made by the teacher, look through the straw and follow the rocket to its apogee.
7. When the rocket reaches its apogee your classmate will use her finger to hold the string against the protractor. Record this number, it is known as **Angle B**.
8. **Angle C** is found by adding Angles A and B then subtracting that value from 180.

Data collection:

1. Construct a data table on the backside of this sheet to record the following information: Angles A, B, and C; Sine of Angles A, B, and C.
2. Teacher must approve your data table prior to collecting data.

Analysis: Calculate the altitude of your rocket using the following formula:

$$\text{altitude} = \frac{\text{baseline} \times \sin A \times \sin B}{\sin C}$$

Results: State the altitude of your rocket launch.

Conclusion: Is your altitude similar to the altitude range described on the package? Discuss why your rocket did or did not reach the altitude range as described.