Getting to the Core

5th Grade Mini-Unit of Study

Astronomy

Teacher Guide

Unit Title:	**Galileo**

Grade Level/Course:	**5th grade ELA**	**Time Frame: 2 weeks**

Big Idea *(Enduring Understanding)*:

Understanding our universe is an ongoing process.

Essential Questions:	How do astronomers acquire information about the universe? How has our understanding of the solar system changed? How did different cultures relate to the universe?

Instructional Activities: Activities/Tasks

21st Century Skills:	**Learning and Innovation:** *Critical Thinking & Problem Solving* *Communication & Collaboration* *Creativity & Innovation* **Information, Media and Technology:** *Information Literacy* *Media Literacy* *Information, Communications & Technology Literacy*

Essential Academic Language:	**Tier II** astronomical heavenly bodies apparatus constellation methodical satellite defy/defiance refracting telescope reflecting telescope concave convex universe galaxies optical telescope magnification demolish unsettling refrain unconvinced hardened inquisition galaxy nebulae cosmology celestial bodies	**Tier III** intercepts revolutionize primary secondary antenna trance naked eye primitive myriad pendulum obscure employ clambered devised sharp-eyed peering astonishment bewilderment indispensable vastness chaotic propelled cooperation turbulent obstacle degrade decays international obstacle

What pre-assessment will be given? Extended Anticipatory Guide	**How will pre-assessment guide instruction?** Teacher will be able to assess students' prior knowledge of telescopes.

End of Unit Performance Task: Students will create an informational brochure on the four types of telescopes.

Standards:	**Assessment of Standards (include formative and summative)**

Content Standard(s): **Next Generation Science: Earth's Place in the Universe** **5-ESS1.A The Universe and its Stars:** the sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. **5-ESS1.B Earth and the Solar System:** The orbits of Earth around the sun and of the moon around Earth, together with the rotation of	

Earth about an axis between its North and South poles, cause observable patterns. these include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.	

Common Core Learning Standards Taught and Assessed (*include one or more standards for one or more of the areas below. Please write out the complete text for the standard(s) you include.)*	**What assessment(s) will be utilized for this unit? *(include the types of both formative assessments (F) that will be used throughout the unit to inform your instruction and the summative assessments (S) that will demonstrate student mastery of the standards.)***	**What does the assessment tell us?**

Bundled Reading Informational Text Standard(s):		
5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. 5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. 5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*. 5.5. Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. 5.6 Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.	F: During annotation of text, vocabulary strategies will be used to determine the meaning of academic language. F. Students will create a sequencing/flow map of events in "Galileo". F: Assessed informally through discussions, quick writes, and teacher observation. F: Students will engage in discussions based on the events in the story, demonstrating their understanding of the text.	Are students understanding unfamiliar language by using vocabulary strategies and collaborative talk during the close read? Can students recognize text structure and create an appropriate Thinking Map to demonstrate their

5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. 5.8 Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). 5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. 5.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.	F: Assess formally and informally through conversation and participation F: Students will engage in discussions based on the events in the story, demonstrating their understanding of the text. F: Answer text dependent questions during the reading of informational passages.	thinking? Do students correctly answer questions in pairs/groups, citing evidence to support their answers? Can students express in writing, the connection between the expository texts and the literature? Can students connect the informational text to the literature? Are students able to read and comprehend grade level text?

Bundled Foundational Skill(s) Standard(s): ***(K-5 only)*** 5.3 Know and apply grade level phonics and word analysis skills in decoding words. a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g. roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.	F: Assessed informally during reading of text independently, with a partner, and whole class F: Listen and respond to individual and collaborative groups. F: Students closely read passages and discuss answers with partners/groups. S: Students respond to journal prompt demonstrating understanding of text.	Are students able to read and comprehend grade level text?

<u>Bundled Writing Standard(s):</u> 5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose. b. Provide reasons that are supported by facts and details. c. Link opinion and reasons using word phrases. d. Provide a concluding statement or section related to the opinion presented. 5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly and group related information in paragraphs and sections including formatting, illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c.Link ideas within categories of information using words and phrases. d. Use precise language and domain specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented. 5.4 Produce clear and coherent writing (including multiple-paragraph texts) in which the development and organization are appropriate to task, purpose, and audience. 5.5 With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. 5.6 With some guidance and support from adults, use technology, including the internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in	S: Students respond to reflections/ journal prompts demonstrating understanding of text. F. Students will write informational text comparing/contrasting two telescopes. F: Students write an argumentative piece defending their claim on the author's opinion of the conflict between Galileo and the Roman Catholic Church, citing evidence from the text to support their claim. F. Students will collaboratively write a paragraph that details the growth of understanding of the universe from the 1600s to today. S. Students will write an informational report on four types of telescopes.	Can students effectively express their opinions in writing? Can students support their ideas in writing using evidence from the text? Can students write effective informative/ explanatory text, conveying their ideas and information clearly and concisely?

a single setting. 5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes, paraphrase, and categorize information, and provide a list of sources. 5.9 Draw evidence from literary and informational text to support analysis, reflection, and research. a. Apply grade 5 reading standards to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on details in the text [e.g., a character's thoughts, words, or actions]."). b. Apply grade 4 reading standards to informational text (e.g., " explain how an author uses reasons and evidence to support particular points in a text"). 5.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.		

Bundled Speaking and Listening Standard(s): 5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information about the topic to explore ideas under discussion. b. Follow agreed upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and line to the remarks of others. d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.	F: Students participate in collaborative conversation around a given topic. F: Students work in partners to answer text dependent questions.	Are students able to work in groups and communicate their ideas effectively? Can students use linguistic patterns appropriately when needing additional support to answer questions and communicate ideas?

5.2. Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. 5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. 5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.		

Bundled Language Standard(s): 5.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Use interrogative, relative pronouns (who, whose, whom, which, that) and relative adverbs (where, when, why) b. Form and use the progressive verb tenses. c. Use modal auxiliaries to convey various conditions. d. Order adjectives within sentences according to conventional patterns. e. Form and use prepositional phrases. f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons. g. Correctly use frequently confused words. 5.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. use correct capitalization b. use commas and quotation marks to mark a direct speech and quotations from a text. c. use a comma before a coordinating conjunction in a compound sentence. Spell grade appropriate words correctly, consulting references as needed. 5.3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. choose words and phrases to convey ideas precisely. b. choose punctuation for effect. differentiate between	F: Discuss vocabulary strategies during close reading and viewing of video. F: Discuss vocabulary strategies during close reading and viewing of video. F: Participate in collaborative conversations and express ideas clearly and effectively. F: Respond to reflections/journal prompts as assigned by teacher F: Write collaboratively to demonstrate their understanding of text.	Can students determine the meaning of unknown words by using close reading strategies, vocabulary strategies, and during partner discussion? Can students effectively communicate their ideas effectively? Can students use correct grammar and punctuation when writing?

contexts that call for formal English and situations where informal discourse is appropriate. 5. 4.Determine or clarify the meaning of unknown and multiple meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies. a. Use context as a clue to the meaning of a word or phrase. b. Use common grade appropriate Greek and Latin affixes and roots as clues to the meaning of a word. c. Consult reference materials, both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases. 5.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. c. Demonstrate understanding of words by relating them to their opposites and to words with similar but not identical meanings. 5.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions emotions, or states of being.		

Resources/Materials:	**<u>Complex Texts to be used</u>** **Informational Text(s) Titles: OCR Text "Telescopes", Telescopes PowerPoint, "The Making of the Hubble Telescope" Science Text pps. 310-311** **Literature Titles: OCR Text "Galileo"** **Primary Sources:** **Media/Technology: Online Gooru unit materials,** Video: "How Do Telescopes Work" https://www.youtube.com/watch?v=AYQRMUJzGyg "Galileo's Telescope" Video http://www.youtube.com/watch?v=K6AHDhmJXKo Video: *Breathtaking New Images of the Moon* http://www.youtube.com/watch?v=sjkPeexEdyI Video: Best of Hubble-22 Years of Incredible Images https://www.youtube.com/watch?v=z_ISPDTpJrk

	Other Materials: Student Journal

Interdisciplinary Connections:	**Cite several interdisciplinary or cross-content connections made in this unit of study (i.e. math, social studies, art, etc.)** Science

Differentiated Instruction:	**Based on desired student outcomes, what instructional variation will be used to address the needs of English Learners by language proficiency level?** **QTEL strategies, 3 moments in a lesson, and appropriate scaffolds will be recommended based on the needs of students.**	**Based on desired student outcomes, what instructional variation will be used to address the needs of students with special needs, including gifted and talented?** **Special Needs: Materials offered in the differentiation folder on Gooru** **GATE: Materials offered in the differentiation folder on Gooru**

Fifth Grade Mini Unit "Galileo"

Lesson One: Day 1	Lesson One: Day 2	Lesson Two: Day 3	Lesson Two: Day 4	Lesson Two: Day 5
Day One **<u>Preparing the Learner</u>** Extended Anticipatory Guide Scan & Skim Text OCR pp. 114-117 to predict what it is about **<u>Interacting with the Text/Concept</u>** "Telescopes" PowerPoint View and read twice. Chart the information on a whole class process. First viewing of "How Telescopes Work" to get the "gist" and understand the structure of the video **Lesson Closure** Reflect on the Big Idea and Essential Questions: Based upon our reading, what Essential Questions could be answered? How does our learning connect to the Big Idea?	**Day Two** **<u>Interacting with the Text/Concept</u>** Unencumbered read of OCR "Telescopes" pages 114-117 Second read with text dependent questions Add new information to the process grid Second viewing of "How Telescopes Work" with note-taking guide. Add new information to the process grid **Lesson Closure** Using the process grid, students will select two types of telescopes to compare/contrast using linguistic patterns provided Students will write a 4 or 5 paragraph informational piece comparing and contrasting 2 telescopes. (It will be completed for homework or during science content time.	**Day One** **<u>Preparing the Learner</u>** Collaborative Conversation: Think-Pair-Share What types of telescopes have you learned about? How have telescopes helped to expand our understanding of the universe? Galileo Video (first view unencumbered) **<u>Interacting with the Text/Concept</u>** First read of OCR, "Galileo" text, pages 102-105. Students will use the "Read with a Pencil" guide to take note during this read. Second read with text dependent questions **Lesson Closure** Students will begin a sequencing/flow map for the section of the text (pages 102-105)	**Day Two** **<u>Interacting with the Text/Concept</u>** Galileo Video (with note taking guide) Think-Pair-Share answers Add any new information to the process grid First read of OCR, "Galileo" text, pages 106-111. (Read with a Pencil) Second read with text dependent questions **Lesson Closure** Group Quick Write: What is the author's position on the conflict between Galileo and the Roman Catholic Church? What evidence from the text leads you to believe that?	**Day Three** **Lesson Opening** Review the Quick Write from previous lesson. Lead students in a discussion about the author's use of emotive words to support his opinion. Put two or three under the document camera to edit, focusing on conventions. **<u>Interacting with the Text/Concept</u>** Vocabulary Focus: a collaborative activity using the Frayer Model. Students will work in expert groups to create a poster of their assigned vocabulary word. Each group will present their information to the entire class. Class will take notes on a foldable. **Lesson Closure** Vocabulary Review: Word Chats-Students will practice with three word chats.

Lesson Two: Day 6	Lesson Three: Day 7	Lesson Four: Day 8 & 9 Assessment		
Day Four **Lesson Opening** Students re-read "Galileo" text pages 105 – 108 and their notes from the video. **Interacting with the Text/Concept** First Read Science text pages 310 – 311 Second read with text dependent questions. With a partner, identify how the two types of information compare and contrast using a Thinking Map. View *Breathtaking View of the Moon* to find information that supports the Galileo and Science text. **Extending Understanding** Collaborative Writing Activity, Think-Pair-Write-Share: 1600s to today.	**Day One** **Preparing the Learner** First viewing of **Interacting with the Text/Concept** Unencumbered first read *Best of Hubble-22 Years of Incredible Images* First read of "The Making of the Hubble Telescope" Second read with text dependent questions **Extending Understanding** Double Entry Journal Extended Anticipatory Guide Reflection: Based on your new understandings, what EQs can be answered? How does this relate to the BI?	**Day One** **Preparing the Learner** Collaborative Conversation: Lead students in a discussion about brochures and their purpose. **Interacting with the Text/Concept** Introduce the Task and Purpose Review the Rubric and Format Make a Draft of the Panels Construct the Brochure **Extending Understanding** Brochures may be shared in a variety of ways.		

Unit: 2 **Lesson: 1**	**Grade Level/Course: 5th**	**Duration: Two Days**

Big Idea: Understanding our universe is an ongoing process.
Essential Question:

1. How do astronomers acquire information about the universe?
2. How has our understanding of the solar system changed?
3. How did different cultures relate to the universe?

Common Core and Content Standards	**RI 5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. **RI 5.2** Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. **RI 5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*. **RI 5.5** Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. **RI 5.6** Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. **RI 5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. **RI 5.10** By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. **W 5.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., *in contrast, especially*). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented. **W 5.4** Produce clear and coherent writing (including multiple-paragraph texts) in which the development and organization are appropriate to task, purpose, and audience. **W 5.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. **W 5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. **W 5.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sit ting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **SL 5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. **SL 5.2** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. **L 5.1** Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. **L 5.2** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. **L 5.3** Use knowledge of language and its conventions when writing, speaking, reading, or listening. **L 5.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 5 reading and content,* choosing flexibly from a range of strategies. **L 5.6** Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships.

Materials/ Resources/ Lesson Preparation	Telescopes PowerPoint (found in GOORU Teacher Materials) Video: "How Do Telescopes Work" https://www.youtube.com/watch?v=AYQRMUJzGyg OCR Text: "Telescopes" pp. 114-117 Whole Class Process Grid & Student Journal Process Grid

Objectives	**Content:** Students will determine the characteristics of four different types of telescopes using text, a PowerPoint, and video.	**Language:** Students will gather information from a PowerPoint, a video, and text to learn about how telescopes work and demonstrate their understanding in writing.

Depth of Knowledge Level	**X Level 1: Recall** **X Level 2: Skill/Concept** **X Level 3: Strategic Thinking** ▫ **Level 4: Extended Thinking**

College and Career Ready Skills	**X 1. Demonstrating independence** **X 2. Building strong content knowledge** **X 3. Responding to varying demands of audience, task purpose, and discipline** **X 4. Comprehending as well as critiquing** **X 5. Valuing evidence** ▫ **6. Using technology and digital media strategically and capably** ▫ **7. Coming to understand other perspectives and culture**

Common Core Instructional Shifts	**X Building knowledge through content-rich nonfiction texts** **X Reading and writing grounded from text** **X Regular practice with complex text and its academic vocabulary**

Academic Vocabulary		**KEY WORDS ESSENTIAL TO UNDERSTANDING**	**WORDS WORTH KNOWING**

	PROVIDES TEACHER SIMPLE EXPLANATION	magnification	intercepts revolutionize
	STUDENTS FIGURE OUT THE MEANING	astronomical refracting telescope reflecting telescope concave convex universe galaxies optical telescope	primary secondary antenna

Pre-teaching Considerations	Collaborative Academic Norms

CCSS Foundational Standards (K-5 only)	Continue Open Court Green Section

Lesson Delivery

Instructional Methods	**Check method(s) used in the lesson:** ▫ **Modeling** ▫ **Guided Practice** **X Collaboration** **X Independent Practice** ▫ **Guided Inquiry** **X Reflection**

Lesson Continuum

Preparing the Learner	**<u>Day 1</u>** **1. Extended Anticipatory Guide** (Teacher Directions follow the lesson plan) ● Purpose: to activate students' background knowledge that is relevant to the content of the texts they will be reading and introduce them to key concepts and language. ● Have students complete the **Extended Anticipatory Guide** in their Student Journal. See Teacher Directions. **2. Scan and Skim the Text (OCR "Telescopes" pages 114-117)** ● Have students independently scan the text, remind them to look at the text features to help them predict. (look at focus questions, diagrams, headings, and captions) ● Have students write their predictions on the table in the Student Journal. They need to explain what text feature helped them get that information. ● Think-Pair-Share, share whole class. ● Ask: What evidence makes you think that?

Interacting with the Text/Concept	**1. Telescopes PowerPoint** ● Whole Class: Review the PowerPoint, calling upon individual students to read each slide as you go through the entire presentation. ● Introduce the process grid and explain to students that they will be reading the information on the PowerPoint slides again to find information to add to the process grid. ● Discuss the categories of information they will be looking for as they reread the slides with their partner/group. ● Have students turn to the process grid in their Student Learning Journal. ● Read-Think-Pair-Share: Students will read silently as you go through the presentation one slide at a time. They will think about what information from that slide is relevant to the process grid, discuss it with their partner, share with their group, then share whole group. *Not every slide has information that must be charted. ● Add this information to your class process grid as students add the information to their own in the Student Learning Journal. ● You will repeat this process with each slide in the PowerPoint, adding new information to the process grid after each slide. **2. "How Telescopes Work" First Viewing: Unencumbered** ● Inform students that they will be viewing the video the first time to try to get the "gist" of the information and to look at how information is structured in the video. ● Think-Pair-Share the following questions: 1. How was the information in the video organized? *(It first talked about what telescopes are able to do and showed how it is done. Then it talked about two different types of telescopes: refractive and reflective.* 2. What are the key ideas presented in this video? *(Telescopes magnify and brighten the objects that we look at, and two types of telescopes are refractive and reflective.)* 3. How does the information in the video compare to the information from the PowerPoint? *(The video talks about two types of telescopes, but the PowerPoint gives information on four.)* **3. Lesson Closure: Reflect on the Big Idea and Essential Questions** Based upon our reading, what Essential Questions could be answered? How does our learning connect to the Big Idea? Big Idea: Understanding our universe is an ongoing process. Essential Question: 1. How do astronomers acquire information about the universe? 2. How has our understanding of the solar system changed? 3. How did different cultures relate to the universe? **<u>Day 2</u>** **1. OCR Text: "Telescopes" First Read: Unencumbered pages 114-117** Read the text to confirm or negate your predictions about this text. Select one of the following based on the level of your students ● Read independently ● Read with a partner ● Read in a group ● Read it aloud to them **2. Second Read: Close Read with Text Dependent Questions:** Students will reread the text. Questions may be posted under a document camera or on chart paper. The text is

available in the Student Journal for students to mark as they find their evidence. Students may work in collaborative groups to find the answers and cite evidence from the text. Share answers whole group.

page 114-115

- Describe how most telescopes work, citing evidence from the text. Highlight or underline where you found it in the text. *Most of them work in the same basic way. They produce a real image of something inside the telescope tube. Then the eyepiece lens views this image and magnifies it just like a magnifying glass.*
- What is the major difference in parts between a refracting telescope and a reflecting telescope? Verify your answer using the diagrams. *The major difference between the two telescopes is that a refracting telescope uses lenses whereas the reflecting telescope uses mirrors.*
- Name two advantages of the reflecting telescope. *Two advantages of the reflecting telescope are that the real image forms beneath the mirror or to the side, making it more convenient for viewing and the primary mirror can be very wide which allows it to collect a lot more light making faint objects visible.*

page 116-117

- Explain how a radio telescope works. *It collects radio waves from objects in the universe and reflects them to a focus point above the center of the dish where an antenna intercepts the radio waves and turns them into a weak electric signal. The signal is then sent to a computer and the computer forms an image.*
- What is the major difference between a radio telescope and optical telescopes like the refracting and reflecting? *The radio telescope uses radio waves from space to get an image and the optical telescopes use light.* Note: Help students make the connection that a mirror reflects, hence the name "reflecting" telescope.
- What is the big advantage of a space telescope? *It will operate outside of Earth's atmosphere in the total clarity of space, so it will be able to see seven times further into the universe than telescopes on the ground.*
- Add any new information to the process grid.
- Give students time to share their information from the grid with a partner.

3. "How Telescopes Work" Second Viewing with Annotation Guide

- Have students turn to the Video Clip Annotation Guide in their Student Learning Journal
- Preview the questions with them before watching the video to establish a purpose for viewing
- As students view each section, they should be given adequate think time and independently write their answers on the guide
- Students should discuss their answers with their group after taking notes
- Share answers whole group
- Students should add any new information to their guide
- Have students discuss with their group the information from the video that they feel should be added to the process grid
- Add any new information to the process grid
- Quick Write: Go back to the Scan and Skim prediction chart and add any new information to the bottom of the table that was not part of your original prediction.

Extending Understanding	**Writing** (4 Paragraph and 5 Paragraph FLEE Maps follow the lesson) ● Using the Thinking Maps Resource page found in the Student Journal, have students discuss which Thinking Map they would use to compare/contrast something. ● Students will choose two telescopes from the four they have studied to write a 4-5 paragraph report comparing and contrasting the telescopes they have chosen. ● Students will use the three resources from this lesson (video, PowerPoint, and OCR text) to find evidence to support their writing by creating a compare/contrast map. ● Lead students in a discussion about how they might organize their thinking and writing. (See FLEE Map examples) ● Review the writing plan that you have chosen with your students. ● Review the rubric that is in their Student Journal so that they are clear on the expectation. ● On the paper provided in their Student Journal, they will create their own FLEE Map. They should not be given a pre-printed map. ● Students may start this in class and finish it over the next several nights for homework or during science content time. ● Provide students with time to revise and edit each other's work.

Differentiated Instruction:	**English Learners:** ● Language for Agreeing/Disagreeing ● Compare/Contrast Sentence Frames	**Students Who Need Additional Support:** ● Language of for Agreeing/Disagreeing ● Compare/Contrast Sentence Frames ● Pre-Printed FLEE Map	**Accelerated Learners:** ● Five Paragraph Writing Plan

Lesson Continuum

Lesson Reflection

Teacher Reflection Evidenced by Student Learning/ Outcomes	

Lesson 1 **Extended Anticipatory Guide** 

Statements	Opinion Agree	Opinion Disagree	Evidence and Source
1. Astronomers have always used telescopes to learn about the universe.			
2. Our understanding of the solar system has changed.			
3. Throughout time, people have always been recognized and rewarded for making new discoveries or advancements.			
4. The main purpose of a telescope is to magnify objects in the sky.			

Language for Agreeing	Language for Disagreeing
● I agree with the statement that _____ because _____. ● I agree with you that _____ because _____. ● I have a similar opinion. I believe _____.	● I disagree with the statement _____ because _____. ● I respectfully disagree with you. I believe that _____ because _____. ● I have a different opinion. I believe _____.

Lesson 1

Scan and Skim the Text

pages 114-117

What do you predict this text will be about?	
What text features helped you to make your predictions?	
Quick Write: What else did you learn after reading the text?	

Lesson 1

Telescopes Process Grid

Type of Telescope	 History	Key Parts	Advantages	Disadvantages

Lesson 1

Telescopes Process Grid (Answer Key)

Type of Telescope	History	Key Parts	Advantages	Disadvantages
Refracting	-1608 Hans Lippershey invented the first - 1609 Galileo created his version to observe the universe -1611 Kepler improved the design.	primary objective lens tube adjustable eyepiece	-rugged, long-lasting design -easy to use -rarely needs cleaning -has steady, sharp images	-more expensive per inch -heavier, longer and bulkier -less suited for viewing deep sky objects -may have color distortion
Reflecting	-Early 1600s, discussed by Galileo and other scientists -1668, Sir Isaac Newton developed the first -1722, Hadley improved design and made it popular with astronomers	primary mirror tube diagonal secondary mirror eyepiece	-less expensive because mirrors are easier to make -compact and portable -great for viewing deep sky objects	-open tube design allows things to get into the tube -more fragile -mirrors need to be cleaned and realigned -the larger ones get really bulky and expensive
Radio	-1933, Karl Jansky investigated noise from space -1937, Grote Reber built the first radio telescope in his backyard	dish central antenna amplifiers tuner data recorders computers mechanical systems	-less affected by things in the air than optical telescopes: refractor/reflecting -doesn't need a dome to protect it -can be used at any time in any weather because it doesn't need light -can see through gas and debris -relatively simple technology	-radio pollution or other types of radio waves may interfere -expensive to build and maintain -clarity can be bad unless the telescope is large
Space	-1940s Lyman Spitzer first conceived of the idea -1970s NASA and EESA began designing	Outside Parts: solar arrays, communications antennas, aperture door to protect the	-gets clearer pictures -operates 24 hrs./day -more productive	-expensive to design and launch -difficult to maintain and upgrade -often it can't be

	and building one -1990 Hubble was launched into orbit	optics, insulation, and an outer thermal blanket Inner Parts: master control system computers, batteries for power, pointing control system	-gets more useful data than ground-based telescopes -collects energy that can't be seen through Earth's atmosphere	fixed -could be hit by space debris -has to carry its own power source -limited by the size that can be launched

Lesson 1

Reflection

Based upon our reading, what Essential Questions could be answered? How does our learning connect to the Big Idea?

Big Idea: Understanding our universe is an ongoing process.
Essential Question:

1. How do astronomers acquire information about the universe?
2. How has our understanding of the solar system changed?
3. How did different cultures relate to the universe?

Lesson 1 Telescopes

from *The Way Things Work*
by David Macaulay

Telescopes

A telescope gives a close-up view of a distant object, which, in the case of an astronomical telescope viewing a far-off planet or galaxy, is very distant indeed. Most telescopes work in the same basic way, which is to produce a real image of the object inside the telescope tube. The eyepiece lens then views this image in the same way as a magnifying glass. The viewer looks at a very close real image, which therefore appears large. The degree of magnification depends mainly on the power of the eyepiece lens.

Refracting Telescope

In a refracting telescope, an objective lens forms the real image that is viewed by the eyepiece lens. The image is upside down, but this is not important in astronomy.

Reflecting Telescope

In a reflecting telescope, a large concave primary mirror forms the real image that is then viewed by an eyepiece lens. Usually, a secondary mirror reflects the rays from the primary mirror so that the real image forms beneath the mirror or to the side. This is more convenient for viewing.

Reflecting telescopes are important in astronomy because the primary mirror can be very wide. This enables it to collect a lot of light, making faint objects visible. Collecting light from an object is often more important than magnifying it because distant stars do not appear bigger even when magnified.

Radio Telescope

Many objects in the universe send out radio waves, and a radio telescope can be used to detect them. A large curved metal dish collects the radio waves and reflects them to a focus point above the center of the dish, rather as the curved mirror of a reflecting telescope gathers light waves from space. At this point, an antenna intercepts the radio waves and turns them into a weak electric signal. The signal goes to a computer. Radio telescopes detect very weak waves, and can also communicate with spacecraft.

By detecting radio waves coming from galaxies and other objects in space, radio telescopes have discovered the existence of many previously unknown bodies. It is possible to make visible images of radio sources by scanning the telescope or a group of telescopes across the source. This yields a sequence of signals from different parts of the source, which the computer can process to form an image. Differences in frequency of the signals give information about the composition and motion of the radio source.

Space Telescope

The Hubble space telescope is part optical telescope and part satellite. It promises to revolutionize astronomy because it operates outside the atmosphere, which hampers any observations made from the ground. The space telescope orbits the earth, observing distant stars and galaxies in the total clarity of space. It can peer seven times further into the universe than we can see from the ground, and can also detect very faint objects. The telescope may be able to "see" far back in time by observing ancient light waves from the most distant galaxies. Among these may be light waves produced just after the big bang that blew the universe into existence some 15 billion years ago.

Lesson 1

Second Read: Close Read with Text Dependent Questions: This page is to be used with the document camera.

page 114-115

- Describe how most telescopes work, citing evidence from the text.

- What is the major difference in parts between a refracting telescope and a reflecting telescope? Verify your answer with the diagram.

- Name two advantages of the reflecting telescope.

page 116-117

- Explain how a radio telescope works.

- What is the major difference between a radio telescope and optical telescopes like the refracting and reflecting?

- What is the big advantage of a space telescope?

Lesson 1, Day 2: How Telescopes Work" Video Clip Annotation

What are two of the most important points of a telescope?	
A refractive telescope uses two types of lenses. What does each one do?	
What does a reflective telescope use?	
What is one advantage of a reflective telescope?	

Lesson 1 Day 2:

'How Telescopes Work" Video Clip Annotation (Answer Key)

What are two of the most important points of a telescope? **1:07**	*The two most important points of a telescope are to magnify an object and to brighten an object.*
A refractive telescope uses two types of lenses. What does each one do? **3:56**	*The thicker, curved lens magnifies, and the larger lens brightens.*
What does a reflective telescope use? **6:47**	*A reflective telescope uses a large and a small mirror with a lens.*
What is one advantage of a reflective telescope? **7:32**	*One advantage of a reflective telescope is:* ● *you can get a larger lens for a cheaper price so it is cost effective* ● *you can see objects in the sky*

Lesson 1 Day 2 Writing: Sentence Frames for Compare and Contrast

By comparison it is _____.

In comparison it is _____.

The things they have in common are _____.

They are similar because _____.

Both are the same because _____.

Their shared/common attributes are _____.

They are similar in that _____.

The differences between _____ and _____ are_____.

A distinction between _____ and _____ might be _____.

It is _____-er than _____.

It is the _____-est of all of them.

It is _____-er than _____, but _____-er than _____.

A_____is _____-er than a _____.

_____and _____ are similar because they both (are/have)_____.

They are different because _____ is _____ and _____is _____.

The way they are alike is that they both are/have _____, but what's different is that _____ are/have _____.

A notable difference (key distinction) between _____and _____is _____.

Neither _____ nor_____ have/contain/demonstrate/show _____.

_____is/tends to be _____, whereas _____ is _____

4 Paragraph Flee Map

Introductory Paragraph:

What, What About Them, Why Are They Important, Thesis Statement naming the two telescopes
Example: Telescopes have allowed us to see farther into the universe than we could with the naked eye. This is important because we have learned a lot about our solar system and beyond. Two types of telescopes are _____ and _____.

1 Topic Sentence/Introductory Sentence

Explain how the two telescopes are alike citing evidence from the various texts

4 supporting sentences

1 Topic Sentence

Explain how the two telescopes are different citing evidence from the various texts

4 supporting sentences

You may not need transitions at the beginning of each paragraph, but you will need them within paragraphs.

Closing Paragraph 2-3 sentences

Restate or summarize the main points

Reflect on the significance of the information learned

5 Paragraph Flee Map

Introductory Paragraph:

What, What About Them, Why Are They Important, Thesis Statement naming the two telescopes **Example:**
Telescopes have allowed us to see farther into the universe than we could with the naked eye. This is important because we have learned a lot about our solar system and beyond. Two types of telescopes are _____ and _____.

Describe one telescope using evidence from the various texts.

Include:

1 topic or introductory sentence

4 supporting sentences

Describe the other telescope using evidence from the various texts.

Include:

1 topic or introductory sentence

4 supporting sentences

Compare/Contrast the similarities and differences of the two telescopes.
Include:

1 topic or introductory sentence

4 supporting sentences

You may not need transitions at the beginning of each paragraph, but you will need them within paragraphs.

Closing Paragraph 2-3 sentences

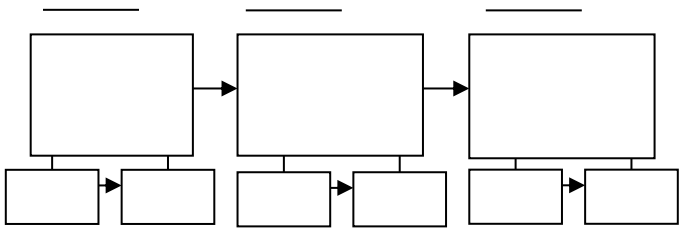
Restate or summarize the main points

Reflect on the significance of the information learned

Compare and Contrast the Two Telescopes Using a Thinking Map

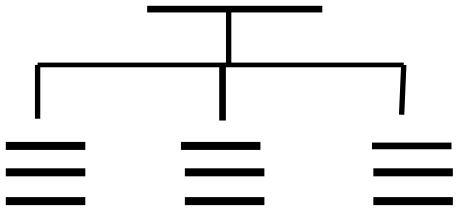
Which Thinking Map matches the structure of the text that the author used?

Flow Map: "How To", Sequence, Chronological order (time)



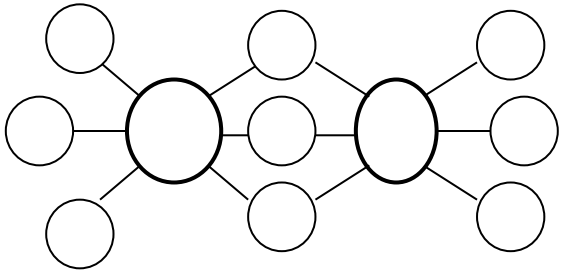
Words you might see: first, second, third, then, next, after, later, finally, at last, before, in the end, earlier

Tree Map: Main Idea and Details, Classifying and Categorizing



Words you might see: all about, types, kinds; (there is a main statement and then details that support the main idea that informs.)

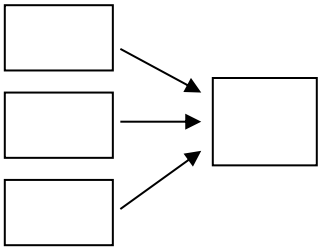
Double Bubble Map: Compare and Contrast



Words you might see: **Same**: also, as well, similarly, so, too, as well

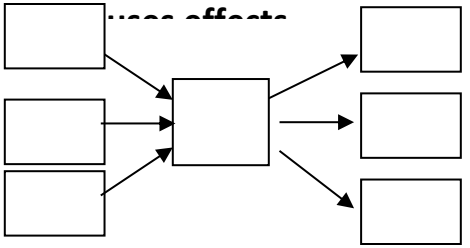
Multi-Flow Map: Cause/Effect or "To Explain Why"

Many causes lead to one effect



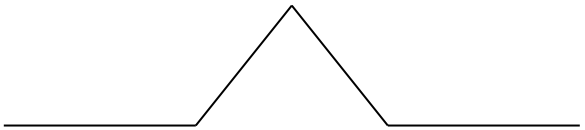
Words: because, one reason, another reason, for instance, in fact, for example, since, such as, of course, that is, actually

causes leads an event that



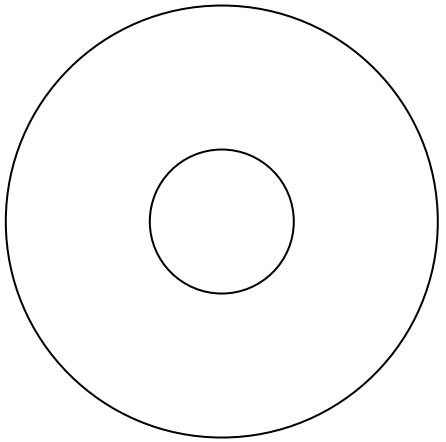
Words: so, as a result, because of this, hence, then, therefore, thus, accordingly, because of ____, we have _____.

Bridge Map: **Seeing Relationships** – **how things remind you of something else**



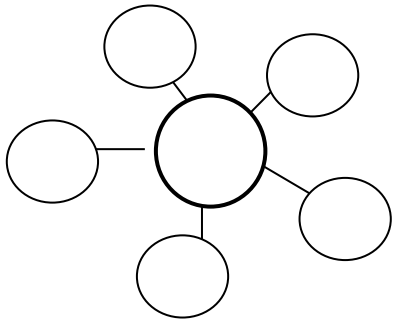
Words you might see: just like, as ___ as, same as, looks like, reminds,

Circle Map: **Defining**



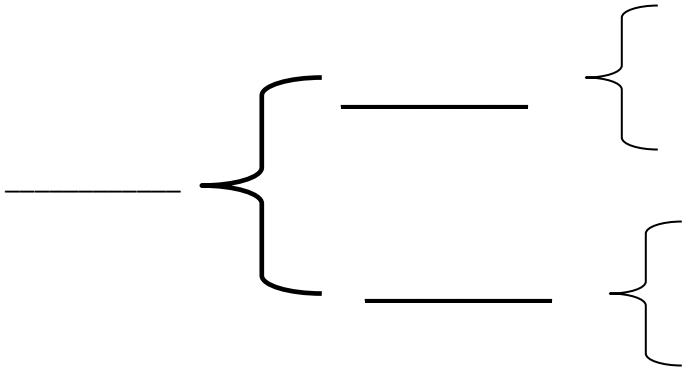
Words you might see: can be defined, is a, has, definition

Bubble Map: **Describing a person or place**



Words you might see: can be describes, is, has, (lots of adjectives!)

Brace Map: **Whole to Parts**



Words you might see: parts of, has the following, has (must be physical things that are parts of a whole)

FLEE Map for Comparing and Contrasting Telescopes

SAUSD Common Core Lesson Planner

Unit: 2 **Astronomy** **Lesson: 2**	**Grade Level/Course: 5th**	**Duration:** Four days

Big Idea: Understanding our universe is an ongoing process.
Essential Question:

1. How do astronomers acquire information about the universe?
2. How has our understanding of the solar system changed?
3. How did different cultures relate to the universe?

Common Core and Content Standards	**Next Generation Science: Earth's Place in the Universe** **5-ESS1.A The Universe and its Stars:** the sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. **5-ESS1.B Earth and the Solar System:** The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. these include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. **RI 5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. **RI 5.2** Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. **RI 5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*. **RI 5.5** Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. **RI 5.6** Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. **RI 5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. **RI 5.10** By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. **W 5.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., *in contrast, especially*). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented. **W 5.4** Produce clear and coherent writing (including multiple-paragraph texts) in which the development and organization are appropriate to task, purpose, and audience. **W 5.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

	W 5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. **W 5.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sit ting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **SL 5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. **SL 5.2** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. **L 5.1** Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. **L 5.2** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. **L 5.3** Use knowledge of language and its conventions when writing, speaking, reading, or listening. **L 5.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 5 reading and content,* choosing flexibly from a range of strategies. **L 5.6** Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships.
Materials/ Resources/ Lesson Preparation	Student Journal: Note-Taking Guide, Copy of Science Text for Annotation "Galileo's Telescope" Video http://www.youtube.com/watch?v=K6AHDhmJXKo OCR Text: "Galileo" pages 102-110 & text dependent questions Paper for flow map 12" x 18" white paper or chart paper for Frayer Model Vocabulary words on cards 1 word / group Science Textbook pps. 310-311 Video: *Breathtaking New Images of the Moon* http://www.youtube.com/watch?v=sjkPeexEdyI

Objectives	**Content:** Students will gain an understanding of the history of the telescope using a text and a video.	**Language:** Students will observe videos, read and compare texts to learn about how telescopes work and how our understanding of the universe has changed. They will demonstrate their understanding through collaborative conversations and written responses.

Depth of Knowledge Level	**X Level 1: Recall** **X Level 2: Skill/Concept** **X Level 3: Strategic Thinking** **X Level 4: Extended Thinking**

SAUSD Common Core Lesson Planner

College and Career Ready Skills	**X 1. Demonstrating independence** **X 2. Building strong content knowledge** **X 3. Responding to varying demands of audience, task purpose, and discipline** **X 4. Comprehending as well as critiquing** **X 5. Valuing evidence** **X 6. Using technology and digital media strategically and capably** **X 7. Coming to understand other perspectives and culture**

Common Core Instructional Shifts	**X Building knowledge through content-rich nonfiction texts** **X Reading and writing grounded from text** **X Regular practice with complex text and its academic vocabulary**

Academic Vocabulary		**KEY WORDS ESSENTIAL TO UNDERSTANDING**	**WORDS WORTH KNOWING**
	TEACHER PROVIDES SIMPLE EXPLANATION	heavenly bodies apparatus constellation methodical satellite defy/defiance	convex, concave,trance naked eye primitive myriad pendulum
	STUDENTS FIGURE OUT THE MEANING	'demolish distance' unsettling refrain unconvinced hardened inquisition	obscure employ clambered devised sharp-eyed devised peering astonishment bewilderment

Pre-teaching Considerations	Collaborative Academic Norms

CCSS Foundational Standards (K-5 only)	Continue Open Court Green Section

Lesson Delivery

Instructional Methods	**Check method(s) used in the lesson:** **X Modeling** **X Guided Practice** **X Collaboration** **X Independent Practice** **□ Guided Inquiry** **X Reflection**

Preparing the Learner	**<u>Day 1</u>** **Collaborative Conversation: Think-Pair-Share** ● What types of telescopes have you learned about? ● How have telescopes helped to expand our understanding of the universe? **Galileo Video First Viewing:** Find information about Galileo on the process grid. Discuss with your partner/group: ● What did he do? ● When did he do it? Have students view the video to understand the importance of his invention.

Interacting with the text	**OCR Text: "Galileo" First Read Unencumbered pages 102-105** (Students may use the "Read with a Pencil" page found in the Student Journal to make note of Key Words, Difficul Words, Questions, and/or Comments/Thoughts as they read.) **Purpose:** How did Galileo contribute to what we know about our solar system? How did people react to his discoveries? Select one of the following based on the level of your students ● Read independently ● Read with a partner ● Read with a group (based on student needs) ● Read it aloud to them **Second Read: Close Read with Text Dependent Questions pages 102-105** ● page 102 1. Describe why the "tube" was an exciting invention to Galileo. *The new tube made distant objects appear closer.* 2. What was Galileo's hypothesis, or prediction, about the two lenses? *When Galileo drew the two lenses, he made the hypothesis that if the concave lens was placed the right distance behind the convex lens, it would magnify light.* (Refer back to the PowerPoint slide on refracting telescopes. Have students draw and label the two types of lenses. ● page 103 3. de- means down + moliri means build or construct. If you put those together, they mean to destroy or break down. What did the author mean on page 103 when he wrote, "now he would make a tube to demolish the distance"? *The author meant that the power of the telescope is able to "break down" the distance between where a person is observing to what they are seeing in the telescope.* 4. Reread paragraphs 3-4. What evidence does the author provide that demonstrates Galileo's character? *Galileo was a problem solver and a creative thinker. The evidence includes the fact that he worked diligently until he was able to create the telescope. To find out how much it magnified, he was creative enough to cut different sized circles of paper to compare the size difference between what he could see with the naked eye and with the scope.* ● page 104 5. What evidence proved Galileo's hypothesis? *The Venetians "found that they could see ships sailing towards them a good two hours before they were visible to the naked eye."* 6. How did Galileo's findings motivate him even further? *He was motivated to improve/increase the magnification and go beyond the seas and explore the heavens.* ● page 105 7. What about the moon puzzled Galileo? *"He noticed that the boundary between light and dark on the moon's surface was wavy and uneven. Also, he saw bright spots of light dotted over the dark areas."* 8. What deductions, or new ideas based on evidence, did he make about the moon? Quoting evidence from the text, why did the author describe these deductions as "bold"? *He deduced that the "spots of light are mountain peaks bathed in sunlight." Also, he decided that the wavy line at the boundary between light and dark was there because of the mountains. These new ideas were bold because the author noted that, "Until then, no one had seriously supposed that the Moon might be something like the Earth," with landforms like mountains.* **Lesson Closure: Sequence of Events: Galileo Text pages 102-105**

Interacting with the text	Ask students what type of Thinking Map would work best for the structure of the Galileo text. ● Students will begin a Sequencing/ Flow Map entitled "Galileo's Discoveries" to orde the events for this section of the text. *Events should include: recreated the Dutch cylinder, made a telescope that magnified 3 times, made a telescope that magnified 30 times, discovered the landscape on the moon.* **<u>Day 2</u>** **Galileo Video Second Viewing with Note-taking Guide** **Purpose:** Watch the video a second time to see how the text from yesterday helps to support your understanding of the video. ● Students will watch the "Galileo" video a second time using a note-taking guide. ● Pause at each stopping point to give students time to Think-Pair-Share. ● Share answers whole group and add any relevant information to the process grid. **OCR Text: "Galileo" First Read Unencumbered pages 106-111** (Students may add to the Read with a Pencil page from the previous day's lesson.) **Purpose:** Read to find out how Galileo used the telescope to gain knowledge of the universe. Select one of the following based on the level of your student ● Read independently ● Read with a partner ● Read with a group (based on student needs) ● Read it aloud to them **Second Read: Close Read with Text Dependent Questions pages 106-111** Give students time to Think-Pair-Share, then share answers whole group. ● page 106-108 1. Through his invention of the stronger magnification of the telescope, what were Galileo's discoveries? *The constellation of Pleiades had 43 stars rather than seven. The Milky Way was a "crowded cluster" of stars. "The number of small stars is beyond determination." Jupiter has four moons that swing around it, just as the Earth has one.* ● pages 109-110 2. What discoveries did Galileo make about the sun, and how did they differ from the views of the time? *He traced the movement of the mysterious spots across the sun and deduced that the sun was spinning around on its own axis. This differed from the popular belief, specifically from the Church of Rome,which believed that celestial bodies should be without blemish, or spots.* 3. How did Galileo openly defy the Church? How was the defiance resolved? *"In 1623, a new pope was elected, and the Church hardened against Galileo. He received warnings, but would not give way." Galileo publicly defied the Church by publishing the "Dialogue on the Great World Systems", which stated that the Earth did not stand still, but circled the sun. The Church believed that the Earth did not move and was the center of the universe. The defiance was resolved by Galileo never again speaking publicly against the Church's beliefs.* **Lesson Closure-Group Quick Write (In Student Journal): Think-Pair-Write-Share** What is the author's position on the conflict between Galileo and the Roman Catholic Church? What evidence from the text leads you to believe that? (Scaffold: Look for where the author's emotion is revealed. These could be adjectives or strong verbs.)*The author has a positive view of Galileo. I can tell that the author sides with Galileo by what the author chose to write about. The author wrote about Galileo's many successes and discoveries starting from the recreation of the Dutch cylinder to the discovery that the Earth circled the sun. The author stated, "His discoveries made Galileo a much more*

important man" (p. 109). The author spoke of Galileo with positive phrases such as "(he) opened up a new vision of the heavens" (p. 109), he had a "brilliant argument in favor of his beliefs" (p. 110), and "the great astronomer was now seventy years old…" (p. 110). By choosing to write about Galileo's discoveries and using positive words and phrases to describe him, I can conclude that the author has a positive view of him.

Homework: Have students complete the sequencing map from the previous day , adding new events based upon today's reading.

Day 3

Lesson Opening

- Review the Quick Write from previous lesson. Lead students in a discussion about the author's use of emotive words to support his opinion. Put two or three under the document camera to edit, focusing on conventions.

Vocabulary: Collaborative Activity
Purpose: Students will use the Frayer Model vocabulary tool to better understand the complex concepts presented in the text and be able to use them in other contexts.

Possible words could be: constellation, satellite, convex, concave, naked eye, myriad, defianc demolish,

- Review the example of the quadrant in the Student Journal and model the strategy with one word. (Example follows lesson)
- Each group will be given a different vocabulary word to be written in the center of their poster
- They will then write details in the quadrants surrounding the concept using their text, their process grid, and a dictionary or their glossary.
- Each group will present their poster to the whole class
- Students will take notes on a foldable.

Lesson Closure: Word Chat

- **constellation:** *If the sentence describes a constellation, make your fingers be stars "twinkling" above your head. If does not, fold your arms across your stomach.*
  a. The slave used the Big Dipper to guide them northward.
  b. The North Star shines brightly in the sky.
  c. I can see shapes and designs in the night sky from many stars.
- **naked eye:** *If the sentence describes the naked eye, point to your eye. If does not, fold your arms across your stomach.*
  a. . Galileo used the telescope to see the moon.
  b. I used my binoculars to view the pitcher in ball game.
  c. I noticed a shooting star crossing the sky.
- **myriad:** *If the sentence describes myriad, make big circles with both hands.. If does not, fold your arms across your stomach.*
  a. Galileo saw a multitude of stars when he used his telescope.
  b. We see one moon in our night sky.
  c. Astronomers have found an abundance of heavenly bodies in the universe.
- Have students create their own word chat with their partner/group using a word from the text. Share whole class.

Day 4
Lesson Opening

- Students will reread "Galileo" text pages 105-108 (moon/mountain section) and their Note-Taking Guide from the video.
- With a partner, identify how the two types of information compare and/or contrast.

First read of Science Text Book Unencumbered pages 310-311
Purpose: Compare information from the Science Text to Galileo's findings about the moon.
There is a copy of the text in the Student Journal to annotate. Select one of the following based on the level of your students

- Read independently
- Read with a partner
- Read with a group (based on student needs)
- Read it aloud to them

Second Read of Science Text Book pages 310-311: Close Read with Text Dependent Questions

1. Prove or disprove the following statement citing evidence from the text: " All planets have one moon." *The text says, "Different planets have different numbers and sizes of moons." It goes on to say, "Mercury and Venus do not have moons." Then it gives the number of moons for the other planets: Earth-one, Mars-two, Jupiter-at least 63, Saturn-49, Uranus-at least 27, and Neptune-13.*
2. Prove or disprove the following statement citing evidence from the text: "The size of each moon is the same." *The text says, "The sizes of the moons vary." It goes on to say that some are very small and seven are larger than Pluto.*
3. Describe how a crater is formed. *A crater is formed when objects in space collide and the impact forms a hole.*
4. Explain why the moon has more craters than Earth. *The moon has more craters than Earth because most of the objects that fall towards Earth burn up in Earth's atmosphere. Because the moon has no atmosphere, the objects that fall toward it do not burn up.*

Comparing Two Texts: Galileo pages 105-108 and Science Text pages 310-311
Ask students what type of Thinking Map we should use to compare/contrast. They may use the Thinking Maps Resource page in their Student Journal to help create the map.
Think-Pair-Share

1. How does the information from the Science text compare to Galileo's findings? *Galileo discovered that Jupiter had four moons orbiting it. The science text says that Jupiter has at least 63 moons orbiting it.*
2. Which text do you think is more valid? Why? *The science text is more valid because the information in it is more current and telescopes have improved greatly since Galileo's time.*

Video Unencumbered View of *Breathtaking New Images of the Moon* (This video is a series of images of the moon sent from a lunar orbiter. Students will only be looking at the images to see if it confirms/supports their learning.)
Purpose: Watch this video to find evidence that supports the findings of Galileo and our Science Text regarding the surface of the moon.

- Think-Pair-Share
  Give students time to think, share with a partner the supporting evidence, share with their group, then share whole class.
- Evaluate the Resource: Lead students in a discussion about importance of evaluating their resources. Have students discuss with their group the validity of the video

	resource. You would want them to come to the conclusion that this resource is good because it is information from a satellite orbiting the Moon.
Extending Understanding	**Informal Collaborative Writing Activity: Connecting to the Big Idea (Our understanding of the universe is a process.)** Think-Pair-Write-Share: This can be done with a partner or group. ● Have students think about our understanding of the universe from the time prior to Galileo's discoveries to today by reviewing their notes, sequencing map, and decidin what Thinking Map could best be used to organize their information. ● Create a Thinking Map using the various resources they have used to find their evidence. ● Write a collaborative paragraph draft that details this growth of understanding from the 1600s to today. ● Choose 2-3 paragraphs to edit under the document camera. This is a great tool for possible mini-lessons based upon student need. ● Give students time to revise and edit. ● Write a final draft on chart paper. ● Gallery Walk: Post the charts around the room. Give students Post-It Notes and have them walk around in groups. They may write a positive comment on the Post-It Note ● Optional: Students can practice keyboarding skills by typing the paragraph in a Word document. ● Optional: Groups of 4 work together to make a 5 slide PowerPoint presentation with each student being responsible for one slide with text and image. There should be a cover slide. Present to the class.

Differentiated Instruction:	**English Learners:** Flow Map discussion frames.	**Students Who Need Additional Support:** **Flow Map discussion frames.**	**Accelerated Learners:**

Lesson Reflection

Teacher Reflection Evidenced by Student Learning/ Outcomes	

Read with a Pencil "Galileo" Text

Key Words	**Difficult Words**
Questions	**Comments or Thoughts**

Galileo's Telescope Note-Taking Guide

First Viewing: Jot down notes that explain the importance of his invention	
Second Viewing: For what purpose was the telescope first invented?	
Galileo decided to use the telescope for a different purpose. What did he learn about the moon? What did he learn about Jupiter?	
What did the Church believe about the universe in 1600? What happened when Galileo shared his ideas that were different?	
How is Galileo honored?	
"Galileo took a weapon of war and turned it into an instrument of science? What does that mean?	

"Galileo's Telescope" Video Note-Taking Guide Answer Key

First Viewing: Jot down notes that explain the importance of his invention	
Second Viewing: For what purpose was the telescope first invented? (1:55)	It was to give ships a close up view of their enemies during wartime.
Galileo decided to use the telescope for a different purpose. What did he learn about the moon? What did he learn about Jupiter? (2:30)	Galileo learned that the moon was not a smooth sphere but that it was covered with mountains. He learned that Jupiter had four large moons orbiting the planet.
What did the Church believe about the universe in 1600? What happened when Galileo shared his ideas that were different? (2:44)	The Church believed that Earth was the center of universe. Galileo spent the last years of his life in prison as a result of sharing his ideas that were different.
How is Galileo honored? (3:16)	Pope John Paul recognized his enormous contributions to science 350 years after his death. Italy's first national telescope is named after him. NASA's first space probe to study Jupiter is named after him.
"Galileo took a weapon of war and turned it into an instrument of science? What does that mean?	The telescope started as a wartime instrument used to see the enemy, and now they see into the farthest reaches of the universe.

Questions for Galileo – Text pg. 102-105

1. Describe why the "tube" was an exciting invention to Galileo.

2. What was Galileo's hypothesis, or prediction, about the two lenses?

3. "de" means "down" + "moliri" means "build or construct". If you put those together, they mean to destroy or break down. What did the author mean on page 103 when he wrote, "now he would make a tube to **demolish** the distance"?

4. Reread paragraphs 34. What evidence does the author provide that demonstrates Galileo's character?

5. What evidence proved Galileo's hypothesis?

6. How did Galileo's findings motivate him even further?

7. What about the moon puzzled Galileo?

8. What "deductions" (new ideas based on evidence), did he make about the moon? Quoting evidence from the text, why did the author describe these deductions as "bold"?

Questions for Galileo – Text pg. 106-111

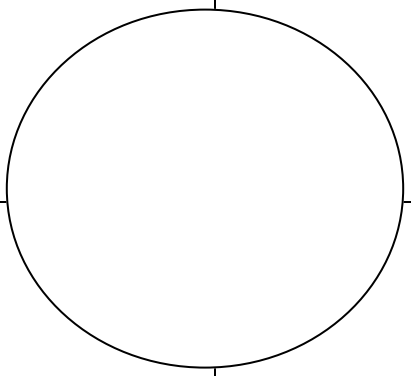
1. Through his invention of the stronger magnification of the telescope, what were Galileo's discoveries?

2. What discoveries did Galileo make about the sun, and how did they differ from the views of the time?

3. How did Galileo openly defy the Church? How was the defiance resolved?

User-friendly Definition

Characteristics of this word



Examples of this word

Non-examples of this word

Galileo Text

Thinking Map

Directions: Create a sequencing map for the events in the Galileo text.

Lesson Closure

Group Quick Write

What is the author's position on the conflict between Galileo and the Roman Catholic Church? What evidence from the text leads you to believe that? (Scaffold: Look for where the author's emotion is revealed. These could be adjectives or strong verbs).

Questions for Science Text pg. 311-312

1. Prove or disprove the following statement citing evidence from the text: “All planets have one moon.”

2. Prove or disprove the following statement citing evidence from the text: “The size of each moon is the same.”

3. Describe how a crater is formed.

4. Explain why the moon has more craters than Earth.

Compare and Contrast Galileo pages 105-108 and Science Text pages 310-311

1. How does the information from the Science text compare to Galileo’s findings?

2. Which text do you think is more valid? Why?

Unit: 2 **Lesson: 3**	**Grade Level/Course:** **5th**	**Duration:** One Day

Big Idea: Understanding our universe is an ongoing process.
Essential Question:

1. How do astronomers acquire information about the universe?
2. How has our understanding of the solar system changed?
3. How did different cultures relate to the universe?

Common Core and Content Standards	**RI 5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. **RI 5.2** Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. **RI 5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*. **RI 5.5** Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. **RI 5.6** Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. **RI 5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI 5.8** Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). **RI 5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. **RI 5.10** By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. **W 5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. **W 5.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sit ting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **SL 5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. **2SL 5.** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. **SL 5.4** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. **L 5.1** Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. **L 5.2** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. **L 5.3** Use knowledge of language and its conventions when writing, speaking, reading, or listening. **L 5.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases

	based on *grade 5 reading and content,* choosing flexibly from a range of strategies. **L 5.6** Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships.
Materials/ Resources/ Lesson Preparation	Video: Best of Hubble-22 Years of Incredible Images https://www.youtube.com/watch?v=z_ISPDTpJrk Student Journal: "The Making of the Hubble Telescope" text, Double Journal Entry

Objectives	**Content:** Students will watch a video, read a text, and answer text dependent questions.	**Language:** Students will discuss and summarize their understanding of the text using a Double Entry Journal.

Depth of Knowledge Level	**X Level 1: Recall** **X Level 2: Skill/Concept** **X Level 3: Strategic Thinking** **X Level 4: Extended Thinking**

College and Career Ready Skills	**X 1. Demonstrating independence** **X 2. Building strong content knowledge** **X 3. Responding to varying demands of audience, task purpose, and discipline** **▫ 4. Comprehending as well as critiquing** **X 5. Valuing evidence** **X 6. Using technology and digital media strategically and capably** **▫ 7. Coming to understand other perspectives and culture**

Common Core Instructional Shifts	**X Building knowledge through content-rich nonfiction texts**

	X Reading and writing grounded from text **X Regular practice with complex text and its academic vocabulary**

Academic Vocabulary		**KEY WORDS ESSENTIAL TO UNDERSTANDING**	**WORDS WORTH KNOWING**
	PROVIDES TEACHER SIMPLE EXPLANATION	galaxy nebulae cosmology	indispensable vastness cooperation degrade decays obstacle international chaotic propelled turbulent
	STUDENTS FIGURE OUT THE MEANING	celestial bodies	

Pre-teaching Considerations	Students should have a solid understanding of telescopes.

CCSS Foundational Standards (K-5 only)	Continue teaching the Open Court Green Section.

Lesson Delivery

Instructional Methods	**Check method(s) used in the lesson:** **x Modeling** **x Guided Practice** **x Collaboration** **x Independent Practice** **x Guided Inquiry** **x Reflection**

Lesson Continuum

Preparing the Learner	**Day 1** **Unencumbered First View: Best of Hubble-22 Years of Incredible Images** **https://www.youtube.com/watch?v=z_ISPDTpJrk** Think-Pair-Share: ● Have students identify the source of the images. *NASA and the EESA* ● Do you think this is a reliable source? Why?
Interacting with the Text/Concept	**The Making of the Hubble Telescope Text** **Purpose:** Students may annotate this text found in the Student Journal during the first read, looking for key words, difficult words, questions and comments they might have as they read. Select one of the following based on the level of your students ● Read independently ● Read with a partner ● Read with a group (based on student needs) ● Read it aloud to them **Second Read: Close Read with Text Dependent Questions: Think-Pair-Share** **First page** 1. What were two of the first contributions to be made by the telescope? Support your answer with a quote from the text. *Astronomers were able to see farther into the universe and it allowed astronomers "like Copernicus, Galileo, and Kepler to disprove the centuries' old belief that Earth was the center of our universe".* **Teacher Note: This would be a good time for a mini-lesson on using quotation marks.** 2. From the 16th century to the beginning of the 20th century, how did the accepted beliefs change? *In the 16th century, the centuries' old belief was that Earth was the center of the universe. By the turn of the 20th century, most astronomers believed that the universe that could be observed consisted of one galaxy, our Milky Way Galaxy and many stars, dust, and gas.* 3. Describe the important discovery that was made in 1924. Include details from the text. *Edwin Hubble, using 60 inch and 100 inch reflector telescopes, observed billions of other galaxies which were all moving away from each other. This suggested that the universe was expanding.* 4. Describe the greatest obstacle to a clear view of the universe. *Earth's atmosphere which is a fluid, chaotic soup of gas and dust.* **Page 2** 5. How did Lyman Spitzer propose to overcome this? *He wanted to use a rocket to send a telescope into Earth's orbit above the atmosphere.* 6. The text says, "The invention of a space telescope became his life mission". What do you think the author meant by "life mission"? *A life mission would be something that was very important to you and you would be willing to work all your life toward achieving it.* 7. How does the author use evidence to support that the space telescope truly was his life mission? Support your answer with a quote from the text. *"Even as Spitzer turned 80, he continued to analyze the images sent from the Hubble. After a full day of working at his life's work, on March 31, 1997, Spitzer collapsed at home and passed*

	away." 8. NASA approved the plans for the space telescope in 1968, but it didn't launch until April 25, 1990. Identify some of the problems they encountered along the way. *They had problems with both the space shuttle and the observatory. They had technical problems, money problems, and things took longer than they thought they should. Just when they got the observatory completed, the Space Shuttle Challenger exploded after liftoff. The problem with the space shuttles needed to be fixed.* 9. The text reads, "Then NASA discovered a final obstacle. The pictures being sent from the Hubble were blurry. The telescopes mirrors had been ground incorrectly." Based upon your understanding of telescopes from previous lessons, what type of telescope is this? Support your answer with evidence from previously read texts. (OCR "Telescopes", Telescopes Video , and Telescopes PowerPoint) *It is a reflector telescope because it uses mirrors.* **Page 3** 10. Knowing that the Hubble Space Telescope was a very expensive project that spanned 22 years, do you believe that its contributions have made it worth the effort? Support your opinion with evidence from the text. **Page 4** 11. Are there any clues around the word "degrade" that can help you to determine the meaning? *It says that the telescope will stop working so I think that degrade means that the parts will worsen or become destroyed.* 12. Decay has the same prefix as degrade. Read around the word decay to determine its meaning. What clues helped you to understand it? *An orbit remains steady around something, so if the orbit decays and Hubble spirals toward Earth that means that its orbit will become worse or deteriorate.* 13. Describe what will happen to the Hubble in the future. Cite evidence from the text. *Its time will end. The parts will stop working and it will start to fall out of its orbit around Earth. Then a robotic mission will have to guide its remains back through Earth's orbit and into the ocean.* **Add any new information to the Process Grid under the heading Space Telescopes**
Extending Understanding	**Double Entry Journal** ● Students will reread the text and make a double entry journal charting the main points and the supporting evidence. ● Explain to students that they will be using this scaffold to help them summarize the text and organize notes as they read. ● This may be done collaboratively or individually. ● It may also be done for homework. ● The Double Journal Entry is a good way to hold them accountable for their reading. **Extended Anticipatory Guide** Have students go back to the Extended Anticipatory Guide from Day 1 and fill out the last column. They should discuss any changes they made and why with their partner/group. **Reflection (in the Student Journal): Based on your new understandings, what Essential Questions can be answered? How does this relate to the Big Idea?** **Big Idea:** Understanding our universe is an ongoing process.

	Essential Question: 4. How do astronomers acquire information about the universe? 5. How has our understanding of the solar system changed? 6. How did different cultures relate to the universe?

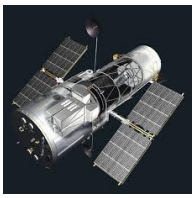
Differentiated Instruction:	**English Learners:**	**Students Who Need Additional Support: Access differentiation folder on GOORU for additional scaffolds and activities**	**Accelerated Learners: Access differentiation folder on GOORU for additional activities**

Lesson Continuum

Lesson Reflection

Teacher Reflection Evidenced by Student Learning/ Outcomes	

Lesson Continuum



The Making of the Hubble Telescope

Double Entry Journal

Main Points from the Text	Supporting Evidence

Reflection

Based upon our reading, what Essential Questions could be answered? How does our learning connect to the Big Idea?

Big Idea: Understanding our universe is an ongoing process.
Essential Question:

1. How do astronomers acquire information about the universe?
2. How has our understanding of the solar system changed?
3. How did different cultures relate to the universe?

Unit: 2 **Lesson 4** Assessment	**Grade Level/Course:**	**Duration:** Two Days

Big Idea: Understanding our universe is an ongoing process.
Essential Questions:

1. How do astronomers acquire information about the universe?
2. How has our understanding of the solar system changed?
3. How did different cultures relate to the universe?

Common Core and Content Standards	**W 5.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., *in contrast, especially*). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented. **W 5.4** Produce clear and coherent writing (including multiple-paragraph texts) in which the development and organization are appropriate to task, purpose, and audience. **W 5.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. **W 5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic **W 5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. **W 5.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sit ting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **L 5.1** Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. **L 5.2** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. **L 5.3** Use knowledge of language and its conventions when writing, speaking, reading, or listening. **L 5.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 5 reading and content,* choosing flexibly from a range of strategies. **L 5.6** Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships.

Materials/ Resources/ Lesson Preparation	Examples of brochures or https://www.google.com/search?q=brochure+examples+for+students&tbm=isch&tbo=u&source=univ&sa=X&ei=HJ_FU8OzK-XgiwLA6YGoCw&ved=0CBwQsAQ&biw=1240&bih=646 Various art supplies-colored pencils, markers, crayons, construction paper Student Journal

Objectives	**Content:** Students will use their understanding of the four types of telescopes to create an informational brochure.	**Language:** Students will use domain specific language from various resources in order to demonstrate their understanding through speaking and writing.

Depth of Knowledge Level	**X Level 1: Recall** **X Level 2: Skill/Concept** **X Level 3: Strategic Thinking** **X Level 4: Extended Thinking**

College and Career Ready Skills	**X 1. Demonstrating independence** **X 2. Building strong content knowledge** **X 3. Responding to varying demands of audience, task purpose, and discipline** **X 4. Comprehending as well as critiquing** **X 5. Valuing evidence** **X 6. Using technology and digital media strategically and capably** **▫ 7. Coming to understand other perspectives and culture**

Common Core Instructional Shifts	**▫ Building knowledge through content-rich nonfiction texts** **X Reading and writing grounded from text** **X Regular practice with complex text and its academic vocabulary**

Academic Vocabulary		**KEY WORDS ESSENTIAL TO UNDERSTANDING**	**WORDS WORTH KNOWING**

(Tier II)	**PROVIDES TEACHER SIMPLE EXPLANATION**	NA	NA
(Tier III)	**STUDENTS FIGURE OUT THE MEANING**	NA	NA

Pre-teaching Considerations	Collaborative Academic Conversation Norms

CCSS Foundational Standards (K-5 only)	Continue with the Green section of Open Court

Lesson Delivery

Instructional Methods	**Check method(s) used in the lesson:** **▫ Modeling ▫ Guided Practice ▫ Collaboration** **X Independent Practice ▫ Guided Inquiry X Reflection**

Preparing the Learner	**Collaborative Conversation** Lead students in a discussion about brochures. Use this website for numerous student-friendly examples: https://www.google.com/search?q=brochure+examples+for+students&tbm=isch&tbo=u&source=univ&sa=X&ei=HJ_FU8OzK-XgiwLA6YGoCw&ved=0CBwQsAQ&biw=1240&bih=646 Ask students where they might have seen brochures. For example, historical places,

Lesson Continuum

	resorts and hotels, theme parks, cars, etc. Point out that although there are brochures for many different places, the purpose of the writing remains the same-to inform the reader.
Interacting with the Text/Concept	**Introduce the Task** Students will be creating an informational brochure using texts, videos, PowerPoint information and their process grid. **Purpose of the Task** Students will demonstrate their understanding of telescopes, language conventions, and academic language as they organize and concisely write informational text. Point out to students the importance of organizing their writing because they are limited by the amount of space on a brochure. **Create a tri-fold brochure** Show students how to make the brochure. Make one from copy paper. This will be used for planning their brochure. Make another one from construction paper for their final copy. **Review the Rubric (following the lesson plan and in the Student Journal)** It is important for students to understand the expectation of their final product before they begin the brochure. Please note, that in order for them to get a 4 in the Content Accuracy section, they will need to bring in extra information beyond what was covered in the lessons. ● Attractiveness and Organization ● Content Accuracy ● Writing-Mechanics ● Graphics/Pictures ● Citing Sources **Make a Draft of the Six Panels** ● Front Panel: This should have the title, name of the student, and basic information about the topic. A picture, clip art, or small piece of artwork about the topic should be included. ● Four Panels: There will be one panel for each telescope. Include a piece of artwork for each panel. ● Back Panel of Brochure: This panel should cite the resources used. **Constructing the Brochure** ● Once the planning is done, students may begin working on the final project. ● This will take two days.
Extending Understanding	**Presenting Brochures:** ● Students may present their brochures to their group or to a partner. ● Students may place their brochure on their desks and do a gallery walk, having students move from group to group. Give students Post-It Notes to make comments on the brochures. ● Students may share their brochure with their group. Using the rubric, students could vote on the one that they feel would have the highest score. That student could present theirs to the whole group using the document camera.

Differentiated Instruction:	**English Learners:**	**Students Who Need Additional Support:**	**Accelerated Learners:** Students could be required to find a specific number of additional resources.

Lesson Continuum

Lesson Continuum

Lesson Reflection	
Teacher Reflection Evidenced by Student Learning/ Outcomes	

Brochure Rubric

Category	4 Excellent	3 Good	2 Almost	1 Not yet
Attractiveness & Organization	**The brochure has exceptionally attractive formatting and well-organized information.**	**The brochure has attractive formatting and well-organized information.**	**The brochure has well-organized information.**	**The brochure's format and organization of material are confusing to the reader.**
Content Accuracy	**The brochure has all of the required information and some additional information.**	**The brochure has all of the required information.**	**The brochure has most of the required information.**	**The brochure has little of the required information.**
Writing Mechanics	**All of the writing is done in complete sentences. Capitalization and punctuation are correct throughout the brochure.**	**Most of the writing is done in complete sentences. Most of the capitalization and punctuation are correct throughout the brochure.**	**Some of the writing is done in complete sentences. Some of the capitalization and punctuation are correct throughout the brochure.**	**Most of the writing is not done in complete sentences. Most of the capitalization and punctuation are not correct throughout the brochure.**
Graphics/Pictures	**The graphics go well with the text and there is a good mix of text and graphics.**	**The graphics go well with the text, but there are so many that they distract from the text.**	**The graphics go well with the text, but there are too few.**	**The graphics do not go with the accompanying text or appear to be randomly chosen.**
Sources	**Many citations from a variety of sources are accurately listed on the brochure.**	**Some citations from a variety of sources are accurately listed on the brochure.**	**A few citations are accurately listed on the brochure.**	**Incomplete or inaccurate citations are listed on the brochure.**