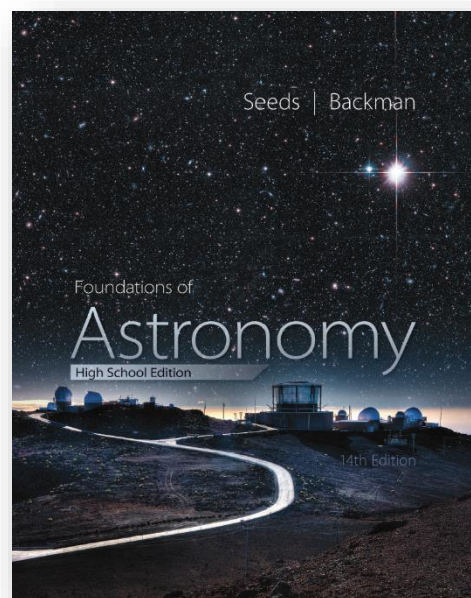




# *Foundations of Astronomy, High School Edition*

by Michael A. Seeds and Dana E. Backman, 14<sup>th</sup> Edition ©2024

## **Correlation to the TEKS for Astronomy**



**A Correlation of *Foundations of Astronomy HS* to  
the TEKS for Astronomy**

TEKS for Astronomy	<i>Fundamentals of Astronomy HS</i>
<p><b>(1) Scientific and engineering practices. The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to explain phenomena or design solutions using appropriate tools and models. The student is expected to:</b></p>	
(A) ask questions and define problems based on observations or information from text, phenomena, models, or investigations;	
(i) ask questions based on observations or information from text, phenomena, models, or investigations;	pages 7-8 (Narrative) page 10B (Instructional; Q1) page 10D (Instructional; EYK 1-2: Models and Scale - As You Read - All questions) page 45 (Narrative) pages 58-63 page 64 (Narrative; HDWK 4-1) page 141 (Instructional; Problems #2) page 236 (Instructional; Problems #1) pages 395-423 (Instructional) pages 598-599 (Narrative) pages 613-614 (Instructional)
(ii) define problems based on observations or information from text, phenomena, models, or investigations;	page 10A (Narrative) page 10B (Instructional; Q1) pages 58-63 (Narrative) page 76 (Instructional; Review Questions # 1, 12, 14) pages 79-84 (Narrative) page 598 (Narrative)
(B) apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;	
(i) apply scientific practices to plan descriptive investigations	pages 597-599 (Narrative) page 613 (Instructional; Review Questions 26-1 #1) page 613 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 2 #1-10) page 614 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 3 #1-11) page 614 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 6 #1-10)

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(ii) apply scientific practices to plan comparative investigations	pages 597-599 (Narrative) page 613 (Instructional; Review Questions 26-1 #2) page 614 (Instructional; Astronomy Projects - Comparative Investigations - Ch 7 #1-12) page 614 (Instructional; Astronomy Projects - Comparative Investigations - Ch 16 #1-12)
(iii) apply scientific practices to plan experimental investigations	page 31E (Instructional; <i>Galileo's Falling Objects</i> ) pages 597-599 (Narrative) page 613 (Instructional; Review Questions 26-1 #3) pages 614-615 (Instructional; Astronomy Projects - Experimental Investigations - Ch 6 #1-10)
(iv) apply scientific practices to conduct descriptive investigations	pages 597-599 (Narrative) page 613 (Instructional; Review Questions 26-1 #1) page 613 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 2 #1-10) page 614 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 3 #1-11) page 614 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 6 #1-10)
(v) apply scientific practices to conduct comparative investigations	pages 597-599 (Narrative) page 613 (Instructional; Review Questions 26-1 #2) page 614 (Instructional; Astronomy Projects - Comparative Investigations - Ch 7 #1-12) page 614 (Instructional; Astronomy Projects - Comparative Investigations - Ch 16 #1-12)
(vi) apply scientific practices to conduct experimental investigations	page 31E (Instructional; <i>Ch.4 Galileo's Falling Objects</i> ) pages 597-599 (Narrative) page 613 (Instructional; Review Questions 26-1 #3) pages 614-615 (Instructional; Astronomy Projects - Experimental Investigations - Ch 6 #1-10)
(vii) use engineering practices to design solutions to problems;	pages 10A-10B (Narrative) page 10B (Instructional; Q #1) page 10B (Instructional; As You Read, <i>Ch9- Create a Specta Game</i> ) page 615 (Instructional; Using Models, <i>Ch 3- Seasons on Uranus</i> )
(C) use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards;	
(i) use appropriate safety equipment during laboratory investigations as outlined in Texas Education Agency-approved safety standards;	pages 600-601 (Narrative) page 613 (Instructional; Review Questions 26-2 #1)

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	page 614 (Instructional; Astronomy Projects - Experimental Investigations - Ch 6 #4)
(ii) use appropriate safety equipment during classroom investigations as outlined in Texas Education Agency-approved safety standards;	pages 600-601 (Narrative) page 613 (Instructional; Review Questions 26-2 #1) page 614 (Instructional; Astronomy Projects - Experimental Investigations - Ch 6 #4)
(iii) use appropriate safety equipment during field investigations as outlined in Texas Education Agency-approved safety standards;	page 601 (Narrative) page 613 (Instructional; Review Questions 26-2 #2) page 614 (Instructional; Astronomy Projects - Experimental Investigations - Ch 3 #6)
(iv) use appropriate safety practices during laboratory investigations as outlined in Texas Education Agency-approved safety standards;	pages 600-601 (Narrative) page 613 (Instructional; Review Questions 26-2 #3) page 614 (Instructional; Astronomy Projects - Experimental Investigations - Ch 6 #4)
(v) use appropriate safety practices during classroom investigations as outlined in Texas Education Agency-approved safety standards;	pages 600-601 (Narrative) page 613 (Instructional; Review Questions 26-2 #3) page 614 (Instructional; Astronomy Projects - Experimental Investigations - Ch 6 #4)
(vi) use appropriate safety practices during field investigations as outlined in Texas Education Agency-approved safety standards;	page 601 (Narrative) page 613 (Instructional; Review Questions 26-2 #4) page 614 (Instructional; Astronomy Projects - Descriptive Investigations - Ch 3 #6)
(D) use appropriate tools such as gnomons; sundials; Planisphere; star charts; globe of the Earth; diffraction gratings; spectrosopes; color filters; lenses of multiple focal lengths; concave, plane, and convex mirrors; binoculars; telescopes; celestial sphere; online astronomical databases; and online access to observatories;	
(i) use appropriate tools	page 10B (Instructional; <i>As You Read - Chapter 2 &amp; Chapter 6</i> ) pages 105-116 (Narrative) pages 119-121 (Narrative) pages 602-605 (Narrative) page 613 (Instructional; Review Questions 26-3 #1-6) pages 613-614 (Instructional; Astronomy Projects - Descriptive Investigations: Ch 2 - all, Ch 3 - all, Ch 6 - all) page 614 (Instructional; Astronomy Projects: Comparative Investigations: Ch 7 - all, Ch 16 -all) pages 614-615 (Instructional; Astronomy Projects - Experimental Investigations: Ch 6 #1-10)

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(E) collect quantitative data using the International System of Units (SI) and qualitative data as evidence;	
(i) collect quantitative data using the International System of Units (SI)	page 31C (Narrative) page 31E (Instructional; <i>As You Read, Ch.2 Observing the Sky</i> ) pages 448-449 (Narrative) page 598 (Narrative) pages 606-607 (Narrative) page 614 (Instructional; <i>Remote Telescope</i> )
(ii) collect qualitative data as evidence;	page 31C (Narrative) page 31E (Instructional; <i>As You Read, Ch.12 Qualitative Sky Survey</i> ) page 194 (Narrative; HDWK 9-2) page 598 (Narrative) page 614 (Instructional; <i>Wavelength Comparisons</i> )
(F) organize quantitative and qualitative data using graphs, charts, spreadsheets, and computer software;	
(i) organize quantitative data using graphs	pages 31C-31D (Narrative) page 31E (Instructional; <i>Ch.4 Galileo's Falling Objects</i> ) page 137 (Narrative) page 318 (Narrative) page 393 (Instructional; Problem #1) page 441 (Instructional; Problem #1)
(ii) organize quantitative data using charts	pages 31C-31D (Narrative) page 586 (Narrative) page 31E (Instructional; Question #3)
(iii) organize quantitative data using spreadsheets	pages 31C-31D (Narrative) page 31E (Instructional; <i>Ch.4 Galileo's Falling Objects</i> )
(iv) organize quantitative data using computer software;	pages 31C-31D (Narrative) page 31E (Instructional; Question #4) page 115 (Narrative) page 115 (Instructional) page 150 (Narrative) page 191 (Narrative) pages 382-383
(v) organize qualitative data using graphs	pages 31C-31D (Narrative) page 31E (Instructional; Question #3)
(vi) organize qualitative data using charts	pages 31C-31D (Narrative) page 31E (Instructional; <i>Ch.12 Qualitative Sky Survey</i> ) page 31E (Instructional; Question #3)

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(vii) organize qualitative data using spreadsheets	pages 31C-31D (Narrative) page 31E (Instructional; <i>Ch. 12 Qualitative Sky Survey</i> ) page 31E (Instructional; Question #3)
(viii) organize qualitative data using computer software;	pages 31C-31D (Narrative) page 31E (Instructional; Question #4) page 599 (Narrative)
(G) develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and	page 39 (Narrative)
(i) develop models to represent phenomena, systems, processes, or solutions to engineering problems	page 10 (Instructional; Sense of Proportion #1) page 10B (Instructional; <i>Ch. 16 Using Galaxy Models</i> ) page 10C (Narrative) page 10D (Instructional; <i>Ch.2 Modeling Moon Phases</i> ) page 17 (Narrative) pages 128-130 (Narrative) pages 153-156 page 215 (Instructional; Sense of Proportion #1, 2) page 492 (Instructional; Sense of Proportion #3) page 599 (Narrative) page 615 (Instructional; <i>Using Models</i> )
(ii) use models to represent phenomena, systems, processes, or solutions to engineering problems	page 10 (Instructional; Sense of Proportion #1) page 10B (Instructional; <i>Ch. 16 Using Galaxy Models</i> ) page 10C (Narrative) page 10D (Instructional; <i>Ch.2 Modeling Moon Phases</i> ) page 17 (Narrative) page 30 (Instructional; Review Questions #13) pages 128-131 (Narrative) pages 153-156 page 215 (Instructional; Sense of Proportion #1, 2) page 599 (Narrative) page 615 (Instructional; <i>Using Models</i> )
(H) distinguish between scientific hypotheses, theories, and laws.	
(i) distinguish between scientific hypotheses, theories, and laws	page 8 (Narrative) page 69 (Narrative) page 76 (Instructional; Review Question #27)
<b>(2) Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:</b>	
(A) identify advantages and limitations of models such as their size, scale, properties, and materials;	
(i) identify advantages of models such as their size, scale, properties, and materials;	page 10 (Instructional; Sense of Proportion #1) page 10C (Narrative) page 10B (Instructional; Q#2) page 17 (Narrative)

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	page 215 (Instructional; Sense of Proportion #1, 2) page 492 (Instructional; Sense of Proportion #3)
(ii) identify limitations of models such as their size, scale, properties, and materials;	page 10 (Instructional; Sense of Proportion #1) page 10B (Instructional; <i>Ch.23 Imagine Planet Nine</i> ) page 10C (Narrative) page 10D (Instructional; <i>Ch.2 Modeling Moon Phases</i> ) page 17 (Narrative) page 215 (Instructional; Sense of Proportion #1, 2) page 492 (Instructional; Sense of Proportion #4)
(B) analyze data by identifying significant statistical features, patterns, sources of error, and limitations;	page 292 (Narrative)
(i) analyze data by identifying significant statistical features	page 31C (Narrative) page 31E (Instructional; <i>Ch.9 Stellar Spectra Patterns</i> ) page 292 (Narrative) page 353 (Narrative)
(ii) analyze data by identifying patterns	page 31C (Narrative) page 31E (Instructional; EYK 2-2: Scientific Data - As you Read: Chapter 9) page 26 (Narrative) pages 288-289 (Narrative) page 51 (Instructional; Problems #18) page 574 (Instructional; Review Question #2) page 613 (Instructional; <i>Ch.2 Wandering Planets</i> ) page 614 (Instructional; <i>Ch.3 The Moon</i> )
(iii) analyze data by identifying sources of error	page 31C (Narrative) page 31E (Instructional; EYK 2-2: Scientific Data - As you Read: Chapter 9) page 58 (Narrative) page 91 (Narrative) page 329 page 393 (Instructional; Problems #10) page 598 (Narrative) page 613 (Instructional; <i>Ch.2 Wandering Planets</i> ) page 614 (Instructional; <i>Ch.3 The Moon</i> )
(iv) analyze data by identifying limitations;	page 31C (Narrative) page 31E (Instructional; EYK 2-2: Scientific Data - As you Read: Chapter 9) pages 108-109 (Narrative) page 353 (Narrative) page 598 (Narrative) page 613 (Instructional; <i>Ch.2 Wandering Planets</i> ) page 614 (Instructional; <i>Ch.3 The Moon</i> )
(C) use mathematical calculations to assess quantitative relationships in data; and	
(i) use mathematical calculations to assess quantitative relationships in data	pages 67-68 (Narrative) pages 81-89 (Narrative) page 94 (Narrative) page 103 (Narrative) pages 133-134; 342

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	page 168 (Instructional; Problems #3-16) page 197 (Instructional; Problems #3-6)
(D) evaluate experimental and engineering designs.	
(i) evaluate engineering designs.	pages 10A-10B (Narrative) page 10B (Instructional; <i>As You Read</i> - All activities) page 241 (Narrative) page 314 (Narrative; HDWK 15-1: <i>Calibration</i> )
(ii) evaluate experimental designs.	page 10B (Instructional; EYK 1-1: The Engineering Design Process - As You Read: All) page 301 (Narrative; HDWK- <i>Checks on Fraud in Science</i> ) pages 598-599 (Narrative) pages 613-614 (Instructional; <i>Descriptive Investigations</i> ) page 614 (Instructional; <i>Comparative Investigations</i> ) pages 614-615 (Instructional; <i>Experimental Investigations</i> )
<b>(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:</b>	
(A) develop explanations and propose solutions supported by data and models consistent with scientific ideas, principles, and theories;	
(i) develop explanations supported by data consistent with scientific ideas	page 30 (Instructional; Review Questions #20) pages 31C-31D (Narrative) pages 65-68 (Narrative) page 70 (Instructional; Practicing Science) page 261 (Instructional; Learning To Look #3) page 284 (Instructional; Problems #9)
(ii) develop explanations supported by data consistent with scientific principles	page 30 (Instructional; Review Questions #20) pages 31C-31D (Narrative) page 70 (Instructional; Practicing Science) page 74 (Narrative) page 261 (Instructional; Learning To Look #3) page 284 (Instructional; Problems #9)
(iii) develop explanations supported by data consistent with scientific theories;	page 30 (Instructional; Review Questions #20) pages 31C-31D (Narrative) page 31E (Instructional; EYK 2-2: Scientific Data - As you Read: Chapter 9) page 70 (Instructional; Practicing Science) pages 79-81 (Narrative) page 261 (Instructional; Learning To Look #3) page 284 (Instructional; Problems #9)
(iv) develop explanations supported by models consistent with scientific ideas	page 17 (Narrative) pages 31C-31D (Narrative) page 51 (Instructional; Learning To Look #6) page 77 (Instructional; Learning To Look #4) pages 128-130 (Narrative) page 168 (Instructional; Review Questions #18)



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	page 260 (Instructional; Review Questions #5)
(v) develop explanations supported by models consistent with scientific principles	pages 31C-31D (Narrative) page 51 (Instructional; Learning To Look #6) page 77 (Instructional; Learning To Look #4) pages 128-130 (Narrative) page 168 (Instructional; Review Questions #18) page 260 (Instructional; Review Questions #5)
(vi) develop explanations supported by models consistent with scientific theories;	pages 31C-31D (Narrative) page 51 (Instructional; Learning To Look #6) page 77 (Instructional; Learning To Look #4) pages 128-130 (Narrative) page 168 (Instructional; Review Questions #18) page 260 (Instructional; Review Questions #5)
(vii) propose solutions supported by data consistent with scientific ideas	page 10A (Narrative) pages 31C-31D (Narrative) page 30 (Instructional; Review Questions #20) page 31E (Instructional; As you Read: <i>Chapter 9-An Alien Perspective</i> ) pages 66-67 (Narrative) page 70 (Instructional; Practicing Science) page 261 (Instructional; Learning To Look #3) page 284 (Instructional; Problems #9)
(viii) propose solutions supported by data consistent with scientific principles	page 10A (Narrative) page 30 (Instructional; Review Questions #21) page 31B (Instructional; As you Read: <i>Chapter 21-Navigating on Mars</i> ) pages 31C-31D (Narrative) page 31E (Instructional; As you Read: <i>Chapter 9-An Alien Perspective</i> ) pages 66-67 (Narrative) page 70 (Instructional; Practicing Science) page 261 (Instructional; Learning To Look #3) page 284 (Instructional; Problems #9)
(ix) propose solutions supported by data consistent with scientific theories;	page 10A (Narrative) page 30 (Instructional; Review Questions #22) pages 31C-31D (Narrative) page 31E (Instructional; As you Read: <i>Chapter 9-An Alien Perspective</i> ) pages 66-67 (Narrative) page 70 (Instructional; Practicing Science) page 261 (Instructional; Learning To Look #3) page 284 (Instructional; Problems #9)
(x) propose solutions supported by models consistent with scientific ideas	page 10A (Narrative) page 10D (Instructional; As you Read: <i>Chapter 23-Pluto</i> ) pages 31C-31D (Narrative) page 51 (Instructional; Learning To Look #6) page 77 (Instructional; Learning To Look #4) page 168 (Instructional; Review Questions #18) page 260 (Instructional; Review Questions #5) page 298 (Narrative)

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	page 615 (Instructional; Using Models - <i>Ch3-Seasons on Uranus #1-6</i> )
(xi) propose solutions supported by models consistent with scientific principles	page 10A (Narrative) page 10D (Instructional; As you Read: <i>Chapter 23-Pluto</i> ) pages 31C-31D (Narrative) page 51 (Instructional; Learning To Look #6) page 77 (Instructional; Learning To Look #4) page 168 (Instructional; Review Questions #18) page 260 (Instructional; Review Questions #5) page 298 (Narrative) page 615 (Instructional; Using Models - <i>Ch3-Seasons on Uranus #1-6</i> )
(xii) propose solutions supported by models consistent with scientific theories;	page 10A (Narrative) page 10D (Instructional; As you Read: <i>Chapter 23-Pluto</i> ) pages 31C-31D (Narrative) page 51 (Instructional; Learning To Look #6) page 77 (Instructional; Learning To Look #4) page 168 (Instructional; Review Questions #18) page 260 (Instructional; Review Questions #5) page 298 (Narrative) page 615 (Instructional; Using Models - <i>Ch3-Seasons on Uranus #1-6</i> )
(B) communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and	
(i) communicate explanations individually in a variety of settings	page 51B (Instructional; EYK 3-1: Astronomy Careers - As you Read: Chapter 8) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #1)
(ii) communicate explanations individually in a variety of formats;	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #2) page 548B (Instructional; EYK 23-1: Communicating Science: <i>As you Read: Ch.4- Kepler and Newton</i> )
(iii) communicate explanations collaboratively in a variety of settings	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #1) page 548B (Instructional; <i>As You Read, Ch.6- Dark Skies</i> )
(iv) communicate explanations collaboratively in a variety of formats;	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #2)

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	page 548B (Instructional; <i>As You Read, Ch.6- Dark Skies</i> )
(v) communicate solutions individually in a variety of settings	page 31B (Instructional; <i>As You Read, Ch.21- Navigating on Mars</i> ) page 51B (Instructional; EYK 3-1: Astronomy Careers - As you Read: Chapter 8) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #1)
(vi) communicate solutions individually in a variety of formats;	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #2) page 548B (Instructional; EYK 23-1: Communicating Science: <i>As you Read: Ch.4- Kepler and Newton</i> )
(vii) communicate solutions collaboratively in a variety of settings	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #1) page 548B (Instructional; <i>As You Read, Ch.6- Dark Skies</i> )
(viii) communicate solutions collaboratively in a variety of formats;	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #2) page 548B (Instructional; <i>As You Read, Ch.6- Dark Skies</i> )
(C) engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.	
(i) engage respectfully in scientific argumentation using applied scientific explanations	page 126D (Instructional; <i>As you Read: Ch.21- Martian Machines</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #4, 5)
(ii) engage respectfully in scientific argumentation using empirical evidence.	page 126D (Instructional; <i>As you Read: Ch.21- Martian Machines</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548B (Instructional; EYK 23-1: Communicating Science Question #4, 5)
<b>(4) Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:</b>	
(A) analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;	

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(i) analyze scientific explanations by using empirical evidence	pages 66-68 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #2) page 394B (Instructional; EYK 17-1: Analyzing Scientific Explanations - <i>As You Read Chapter 4, 15, 17</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 598 (Narrative)
(ii) analyze scientific explanations by using logical reasoning	page 28 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #4) page 394B (Instructional; EYK 17-1: Analyzing Scientific Explanations - <i>As You Read Chapter 4, 15, 17</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 598 (Narrative)
(iii) analyze scientific explanations by using experimental testing	page 38 (Narrative) page 599 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #5) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 614-615 (Instructional; <i>Astronomy Projects - Experimental Investigations: Ch 6 #1-10</i> )
(iv) analyze scientific explanations by using observational testing	pages 79-81 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #5) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 598-599 (Narrative) pages 614-615 (Instructional; <i>Astronomy Projects - Experimental Investigations: Ch 6 #1-10</i> )
(v) evaluate scientific explanations by using empirical evidence	pages 66-68 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #2) page 394B (Instructional; EYK 17-1: Analyzing Scientific Explanations - <i>As You Read Chapter 4, 15, 17</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 598 (Narrative)
(vi) evaluate scientific explanations by using logical reasoning	page 28 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #4) page 394B (Instructional; EYK 17-1: Analyzing Scientific Explanations - <i>As You Read Chapter 4, 15, 17</i> )

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	pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 598 (Narrative)
(vii) evaluate scientific explanations by using experimental testing	page 38 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #5) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 599 (Narrative) pages 614-615 (Instructional; <i>Astronomy Projects - Experimental Investigations: Ch 6 #1-10</i> )
(viii) evaluate scientific explanations by using observational testing	pages 79-81 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #5) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 598-599 (Narrative) pages 614-615 (Instructional; <i>Astronomy Projects - Experimental Investigations: Ch 6 #1-10</i> )
(ix) critique scientific explanations by using empirical evidence	pages 66-68 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #2) page 394B (Instructional; EYK 17-1: Analyzing Scientific Explanations - <i>As You Read Chapter 4, 15, 17</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 598 (Narrative)
(x) critique scientific explanations by using logical reasoning	page 28 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #4) page 394B (Instructional; EYK 17-1: Analyzing Scientific Explanations - <i>As You Read Chapter 4, 15, 17</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 598 (Narrative)
(xi) critique scientific explanations by using experimental testing	page 38 (Narrative) page 599 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #5) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 614-615 (Instructional; <i>Astronomy Projects - Experimental Investigations: Ch 6 #1-10</i> )
(xii) critique scientific explanations by using observational testing	pages 79-81 (Narrative) page 349B (Instructional; EYK 17-1: Analyzing Scientific Explanations - Question #5) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 598-599 (Narrative)

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	pages 614-615 (Instructional; <i>Astronomy Projects - Experimental Investigations: Ch 6 #1-10</i> )
(B) relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists as related to the content; and	
(i) relate the impact of current research on scientific thought, including research methodology	page 92 (Narrative; HDWK 5-2) pages 100A-100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - Question #2) page 390-391(Narrative)
(ii) relate the impact of current research on scientific thought, including cost-benefit analysis	pages 10A-10B (Narrative; EYK 1-1: The Engineering Design Process) page 10B (Instructional; EYK 1-1: The Engineering Design Process - Question #3) page 10B (Instructional; EYK 1-1: The Engineering Design Process - <i>As You Read - Ch.16- Merging Galaxy Models</i> ) page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #6) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 548A-548B (Instructional; EYK 23-1: Communicating Science - Question #3)
(iii) relate the impact of current research on scientific thought, including contributions of diverse scientists as related to the content	pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) pages 100A-100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - Question #4) page 100C (Instructional; EYK 5-1: Scientific Research - <i>As You Read, Ch 17- Evolving Universe</i> )
(iv) relate the impact of past research on scientific thought, including research methodology	pages 77A-77B (Narrative) page 76 (Instructional; Review Questions #6) pages 100A-100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - Question #1)
(v) relate the impact of past research on scientific thought, including cost-benefit analysis	pages 10A-10B (Narrative; EYK 1-1: The Engineering Design Process) page 10B (Instructional; EYK 1-1: The Engineering Design Process - Question #3) page 10B (Instructional; EYK 1-1: The Engineering Design Process - <i>As You Read - Ch.16- Merging Galaxy Models</i> ) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) page 548A-548B (Instructional; EYK 23-1: Communicating Science - Question #3)

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<p>(vi) relate the impact of past research on scientific thought, including contributions of diverse scientists as related to the content</p>	<p>pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) pages 100A-100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - <i>As You Read, Ch 17- Evolving Universe</i>)</p>
<p>(vii) relate the impact of current research on society, including research methodology</p>	<p>pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #4)</p>
<p>(viii) relate the impact of current research on society including cost-benefit analysis</p>	<p>pages 10A-10B (Narrative; EYK 1-1: The Engineering Design Process) page 10B (Instructional; EYK 1-1: The Engineering Design Process - Question #3) page 10B (Instructional; EYK 1-1: The Engineering Design Process - <i>As You Read - Ch.16- Merging Galaxy Models</i>) pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #6) pages 548A-548B (Narrative; EYK 23-1: Communicating Science) pages 548A-548B (Instructional; EYK 23-1: Communicating Science - Question #3)</p>
<p>(ix) relate the impact of current research on society including contributions of diverse scientists as related to the content</p>	<p>pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #8) pages 100A-100C (Narrative; EYK 5-1: Scientific Research)</p>
<p>(x) relate the impact of past research on society, including research methodology</p>	<p>pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #4)</p>
<p>(xi) relate the impact of past research on society, including cost-benefit analysis</p>	<p>pages 10A-10B (Narrative; EYK 1-1: The Engineering Design Process) page 10B (Instructional; EYK 1-1: The Engineering Design Process - Question #3) page 10B (Instructional; EYK 1-1: The Engineering Design Process - <i>As You Read - Ch.16- Merging Galaxy Models</i>) pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society) page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #6) pages 548A-548B (Instructional; EYK 23-1: Communicating Science - Question #3)</p>
<p>(xii) relate the impact of past research on society, including contributions of diverse scientists as related to the content</p>	<p>pages 77A-77B (Narrative; EYK 4-1: Astronomy and Society)</p>

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	page 77B (Instructional; EYK 4-1: Astronomy and Society - Question #7) pages 100A-100C (Narrative; EYK 5-1: Scientific Research)
(C) research and explore resources such as museums, planetariums, observatories, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers.	
(i) research resources in order to investigate STEM careers.	pages 51A-51B (Narrative; EYK 3-1: Astronomy Careers) page 51B (Instructional; EYK 3-1: Astronomy Careers - Questions #1)
(ii) explore resources in order to investigate STEM careers.	pages 51A-51B (Narrative; EYK 3-1: Astronomy Careers) page 51B (Instructional; EYK 3-1: Astronomy Careers - Questions #1)
<b>(5) Science concepts. The student understands how astronomy influenced and advanced civilizations. The student is expected to:</b>	
(A) evaluate and communicate how ancient civilizations developed models of the universe using astronomical structures, instruments, and tools such as the astrolabe, gnomons, and charts and how those models influenced society, time keeping, and navigation;	
(i) evaluate how ancient civilizations developed models of the universe using astronomical structures	page 20 (Instructional; Review Question #13) page 31B (Instructional; EYK 2-1: Timekeeping and Navigation - <i>As You Read, Ch.4- Early Astronomical Structures</i> ) pages 53-55 (Narrative) page 76 (Instructional; Review Questions #1,2,8) page 77A (Narrative)
(ii) evaluate how ancient civilizations developed models of the universe using astronomical instruments	pages 70-71 (Narrative) page 76 (Instructional; Review Question #24) page 77B (Narrative)
(iii) evaluate how ancient civilizations developed models of the universe using astronomical tools such as the astrolabe, gnomons, and charts	pages 31A-31B (Narrative) page 31B (Instructional; Question #5) page 31B (Instructional; Question #3) page 55 (Narrative) page 77B (Narrative) page 77B (Instructional; EYK 4-1: Astronomy and Society)
(iv) communicate how ancient civilizations developed models of the universe using astronomical structures	page 20 (Instructional; Review Question #13) page 31B (Instructional; EYK 2-1: Timekeeping and Navigation - <i>As You Read, Ch.4- Early Astronomical Structures</i> ) pages 53-55 (Narrative) page 77A (Narrative)



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	page 76 (Instructional; Review Questions #1,2,8)
(v) communicate how ancient civilizations developed models of the universe using astronomical instruments	pages 70-71 (Narrative) page 76 (Instructional; Review Question #24) page 77B (Narrative)
(vi) communicate how ancient civilizations developed models of the universe using astronomical tools such as the astrolabe, gnomons, and charts	pages 31A-31B (Narrative) page 31B (Instructional; Question #5) page 31B (Instructional; Question #3) page 55 (Narrative) page 77B (Narrative)
(vii) evaluate how those models influenced society	pages 53-74 (Narrative) page 76 (Instructional; Active Inquiry Questions #1,2) page 77A (Narrative) page 77B (Instructional; Question #1)
(viii) evaluate how those models influenced time keeping	page 31A (Narrative) page 31B (Instructional; Question #4)
(ix) evaluate how those models influenced navigation;	pages 31A-31B (Narrative) page 31B (Instructional; Question #4) page 77B (Narrative)
(x) communicate how those models influenced society	pages 53-74 (Narrative) page 76 (Instructional; Active Inquiry Questions #1,2) page 77A (Narrative) page 77B (Instructional; Question #1)
(xi) communicate how those models influenced time keeping	page 31A (Narrative) page 31B (Instructional; Question #4)
(xii) communicate how those models influenced navigation;	pages 31A-31B (Narrative) page 31B (Instructional; Question #4) page 77B (Narrative)
(B) research and evaluate the contributions of scientists, including Ptolemy, Copernicus, Tycho Brahe, Kepler, Galileo, and Newton, as astronomy progressed from a geocentric model to a heliocentric model; and	
(i) research the contributions of scientists, including Ptolemy, as astronomy progressed from a geocentric model to a heliocentric model	page 58 (Narrative) page 61 (Narrative) page 76 (Instructional; Review Question #9, 10, 11)
(ii) research the contributions of scientists, including Copernicus, as astronomy progressed from a geocentric model to a heliocentric model	pages 58-63 (Narrative) page 76 (Instructional; Review Question #12) page 76 (Instructional; <i>Active Inquiry</i> Question #1) page 394B (Instructional; <i>As You Read, Ch.4-The Heliocentric Model</i> )
(iii) research the contributions of scientists, including Tycho Brahe, as astronomy progressed from a geocentric model to a heliocentric model	pages 64-66 (Narrative) page 76 (Instructional; Review Questions #14, 16)
(iv) research the contributions of scientists, including Kepler, as astronomy progressed from a geocentric model to a heliocentric model	pages 66-69 (Narrative) page 76 (Instructional; Review Question #18)

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(v) research the contributions of scientists, including Galileo, as astronomy progressed from a geocentric model to a heliocentric model	pages 70-73 (Narrative) page 76 (Instructional; Review Questions #24, 25) page 76 (Instructional; <i>Active Inquiry</i> Question #2) page 77 (Instructional; Problem #9) page 79-81 (Narrative)
(vi) research the contributions of scientists, including Newton, as astronomy progressed from a geocentric model to a heliocentric model	pages 81-84 (Narrative) page 91 (Narrative) page 99 (Instructional; Review Questions # 17,18)
(vii) evaluate the contributions of scientists, including Ptolemy, as astronomy progressed from a geocentric model to a heliocentric model	page 58 (Narrative) page 61 (Narrative) page 76 (Instructional; Review Question #9, 10, 11)
(viii) evaluate the contributions of scientists, including Copernicus, as astronomy progressed from a geocentric model to a heliocentric model	pages 58-63 (Narrative) page 76 (Instructional; Review Question #12) page 76 (Instructional; <i>Active Inquiry</i> Question #1) page 394B (Instructional; <i>As You Read, Ch.4-The Heliocentric Model</i> )
(ix) evaluate the contributions of scientists, including Tycho Brahe, as astronomy progressed from a geocentric model to a heliocentric model	pages 64-66 (Narrative) page 76 (Instructional; Review Questions #14, 16)
(x) evaluate the contributions of scientists, including Kepler, as astronomy progressed from a geocentric model to a heliocentric model	pages 66-69 (Narrative) page 76 (Instructional; Review Question #18)
(xi) evaluate the contributions of scientists, including Galileo, as astronomy progressed from a geocentric model to a heliocentric model	pages 70-73 (Narrative) page 76 (Instructional; Review Questions #24, 25) page 76 (Instructional; <i>Active Inquiry</i> Question #2) page 77 (Instructional; Problem #9) pages 79-81 (Narrative)
(xii) evaluate the contributions of scientists, including Newton, as astronomy progressed from a geocentric model to a heliocentric model	pages 81-84 (Narrative) page 91 (Narrative) page 99 (Instructional; Review Questions # 17,18)
(C) describe and explain the historical origins of the perceived patterns of constellations and the role of constellations in ancient and modern navigation.	
(i) describe the historical origins of the perceived patterns of constellations	pages 12-13 (Narrative) page 30 (Instructional; Review Question #1)
(ii) describe the role of constellations in ancient navigation.	pages 31A-31B (Narrative; EYK 2-1: Timekeeping and Navigation) page 31B (Instructional; EYK 2-1: Timekeeping and Navigation Question #2)
(iii) describe the role of constellations in modern navigation.	pages 31A-31B (Narrative; EYK 2-1: Timekeeping and Navigation) page 31B (Instructional; EYK 2-1: Timekeeping and Navigation Question #2)
(iv) explain the historical origins of the perceived patterns of constellations	pages 12-13 (Narrative) page 30 (Instructional; Review Question #1)

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(v) explain the role of constellations in ancient navigation.	pages 31A-31B (Narrative; EYK 2-1: Timekeeping and Navigation) page 31B (Instructional; EYK 2-1: Timekeeping and Navigation Question #2)
(vi) explain the role of constellations in modern navigation.	pages 31A-31B (Narrative; EYK 2-1: Timekeeping and Navigation) page 31B (Instructional; EYK 2-1: Timekeeping and Navigation Question #2)
<b>(6) Science concepts. The student conducts and explains astronomical observations made from the point of reference of Earth. The student is expected to:</b>	
(A) observe, record, and analyze the apparent movement of the Sun, Moon, and stars and predict sunrise and sunset;	
(i) observe the apparent movement of the Sun	pages 17-21 (Narrative) pages 21-24 (Narrative) page 30 (Narrative; this is a chapter summary) page 31 (Instructional; Learning To Look #3, 4) page 31E (Instructional; As You Read, Ch.2- Observing the Sky)
(ii) observe the apparent movement of the Moon	page 31E (Instructional; As You Read, Ch.2- Observing the Sky) pages 33-36 (Narrative) page 49 (Narrative; this is a chapter summary) page 51 (Instructional; LearningToLook #5)
(iii) observe the apparent movement of the stars	pages 17-21 (Narrative) page 30 (Narrative; this is a chapter summary) page 31 (Instructional; LearningToLook #3, 4) page 31E (Instructional; As You Read, Ch.2- Observing the Sky)
(vi) record the apparent movement of the Sun	pages 17-21 (Narrative) page 21-24 (Narrative) page 30 (Instructional; Review Question #15, 23) page 31E (Instructional; As You Read, Ch.2- Observing the Sky)
(v) record the apparent movement of the Moon	page 31E (Instructional; As You Read, Ch.2- Observing the Sky) pages 33-36 (Narrative) page 50 (Instructional; Review Questions #11) page 50 (Instructional; Problems # 7, 12)
(vi) record the apparent movement of the stars	pages 17-21 (Narrative) page 30 (Instructional; Review Questions #19) page 31 (Instructional; LearningToLook #1, 4) page 31E (Instructional; As You Read, Ch.2- Observing the Sky)
(vii) analyze the apparent movement of the Sun	pages 17-21 (Narrative) pages 21-24 (Narrative) page 30 (Instructional; Review Question #15, 23) page 31E (Instructional; As You Read, Ch.2- Observing the Sky)

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(viii) analyze the apparent movement of the Moon	page 31E (Instructional; As You Read, Ch.2- Observing the Sky) pages 33-36 (Narrative) page 50 (Instructional; Review Questions #11) page 50 (Instructional; Problems # 7, 12)
(ix) analyze the apparent movement of the stars	pages 17-21 (Narrative) page 30 (Instructional; Review Questions #19) page 31 (Instructional; LearningToLook #1, 4) page 31E (Instructional; As You Read, Ch.2- Observing the Sky)
(x) predict sunrise	page 30 (Instructional; Review Question #23) page 31D (Narrative; EYK 2-2: Scientific Data) page 31E (Instructional; EYK 2-2: Scientific Data, Question #5)
(xi) predict sunset	page 31D (Narrative; EYK 2-2: Scientific Data) page 31E (Instructional; EYK 2-2: Scientific Data, Question #5)
(B) observe the movement of planets throughout the year and measure how their positions change relative to the constellations;	
(i) observe the movement of planets throughout the year	pages 24-25 (Narrative) page 60 (Narrative) page 62 (Narrative) pages 64-70 (Narrative) page 76 (Instructional; Problems # 2,3) page 613 (Instructional; Astronomy Projects: <i>Descriptive Investigations: Ch 2 -Wandering Planets</i> )
(ii) measure how their [planets] positions change relative to the constellations	pages 24-25 (Narrative) page 60 (Narrative) page 62 (Narrative) pages 64-70 (Narrative) page 76 (Instructional; Problems # 2,3) page 613 (Instructional; Astronomy Projects: <i>Descriptive Investigations: Ch 2 -Wandering Planets</i> )
(C) identify constellations such as Ursa Major, Ursa Minor, Orion, Cassiopeia, and constellations along the ecliptic and describe their importance; and	
(i) identify constellations along the ecliptic	pages 12-15 (Narrative) pages 18-19 (Narrative) page 24 page 30 (Instructional; Review Questions #3, 4) page 31 (Instructional; <i>Learning To Look</i> #1,2,3,4) pages 602-605 (Narrative)
(ii) describe the importance [of the constellations along the ecliptic]	pages 12-15 (Narrative) page 24 (Narrative) pages 30-31 (Instructional; Review Questions #4) pages 30-31 (Instructional; LearningToLook #1,2,3,4) pages 31A-31B (Narrative)

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	page 31B (Instructional; EYK 2-1: Timekeeping and Navigation - Question #1, 2)
(D) understand the difference between astronomy and astrology, the reasons for their historical conflation, and their eventual separation.	
(i) understand the difference between astronomy and astrology	page 26 (Narrative; HDWK 2-2 Pseudoscience) page 30 (Instructional; Review Question #27) pages 77A-77B (Narrative; EYK 4-1: <i>Astronomy and Society</i> ) page 77B (Instructional; EYK 4-1: <i>Astronomy and Society</i> Question #2)
(ii) understand the reasons for their historical conflation	page 26 (Narrative; HDWK 2-2 Pseudoscience) pages 77A-77B (Narrative; EYK 4-1: <i>Astronomy and Society</i> ) page 30 (Instructional; Review Question #27) page 55 page 75 (Narrative; What Are We? - Thinkers) page 77B (Instructional; EYK 4-1: <i>Astronomy and Society</i> Question #2)
(iii) understand [the] eventual separation [of astronomy and astrology]	page 26 (Narrative; HDWK 2-2 Pseudoscience) page 30 (Instructional; Review Question #27) page 55 page 75 (Narrative; What Are We? - Thinkers) pages 77A-77B (Narrative; EYK 4-1: <i>Astronomy and Society</i> ) page 77B (Instructional; EYK 4-1: <i>Astronomy and Society</i> Question #2)
<b>(7) Science concepts. The student knows our relative place in the solar system. The student is expected to:</b>	
(A) demonstrate the use of units of measurement in astronomy, including astronomical units and light years, minutes, and seconds;	
(i) demonstrate the use of units of measurement in astronomy, including astronomical units	page 3 (Narrative) page 9 (Instructional; Problems #3, 6) page 67 (Narrative) pages 607-608 (Narrative)
(ii) demonstrate the use of units of measurement in astronomy, including light years	page 4 (Narrative) page 9 (Instructional; Problems #9, 10, 11, 12) pages 607-608 (Narrative)
(iii) demonstrate the use of units of measurement in astronomy, including light minutes	page 9 (Instructional; Problems #7) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: <i>Models and Scale</i> - Question # 1)
(iv) demonstrate the use of units of measurement in astronomy, including light seconds;	pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: <i>Models and Scale</i> - Question # 1)

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(B) model the scale, size, and distances of the Sun, Earth, and Moon system and identify the limitations of physical models; and	
(i) model the scale of the Sun, Earth, and Moon system	pages 3-4 (Narrative) page 10 (Instructional; <i>Sense Of Proportion #1, 4</i> ) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: Models and Scale - Question # 3)
(ii) model the size of the Sun, Earth, and Moon system	pages 3-4 (Narrative) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10 (Instructional; <i>Sense Of Proportion #1, 4</i> ) page 10D (Instructional; EYK 1-2: Models and Scale - Question # 3)
(iii) model the distances of the Sun, Earth, and Moon system	pages 3-4 (Narrative) page 10 (Instructional; <i>Sense Of Proportion #2</i> ) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) pages 10C-10D (Instructional; EYK 1-2: Models and Scale - As You Read - Chp 2) page 10D (Instructional; EYK 1-2: Models and Scale - Question # 2)
(iv) identify the limitations of physical models [of the Sun, Earth, Moon system]	pages 3-4 (Narrative) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: Models and Scale - Question # 3) page 10D (Instructional; EYK 1-2: Models and Scale - As You Read - Ch.2- Modeling Moon Phases)
(C) model the scale, sizes, and distances of the Sun and the planets in our solar system and identify the limitations of physical models.	
(i) model the scale the Sun and the planets in our solar system	pages 3-4 (Narrative) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: Models and Scale - As You Read, Chp 18- Solar System Model) page 396 (Narrative) pages 398-399 (Narrative) page 492 (Instructional; <i>Sense Of Proportion #2</i> )
(ii) model the sizes of the Sun and the planets in our solar system	pages 3-4 (Narrative) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: Models and Scale - As You Read, Chp 18- Solar System Model) page 396 (Narrative) pages 398-399 (Narrative)

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(iii) model the distances of the Sun and the planets in our solar system	pages 3-4 (Narrative) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: Models and Scale - <i>As You Read, Chp 18- Solar System Model</i> ) page 396 (Narrative) pages 456-462 (Narrative) page 492 (Instructional; <i>Sense Of Proportion #2</i> )
(iv) identify the limitations of physical models [of the Sun and the planets]	page 4 (Narrative) pages 10C-10D (Narrative; EYK 1-2: Models and Scale) page 10D (Instructional; EYK 1-2: Models and Scale - <i>As You Read, Chp 18- Solar System Model</i> ) page 10D (Instructional; EYK 1-2: Models and Scale - Question # 3) page 17 (Narrative; HDWK 2-1) page 396 (Narrative)
<b>(8) Science concepts. The student observes and models the interactions within the Sun, Earth, and Moon system. The student is expected to:</b>	
(A) model how the orbit and relative position of the Moon cause lunar phases and predict the timing of moonrise and moonset during each phase;	
(i) model how the orbit of the Moon cause lunar phases	pages 33-36 (Narrative) page 10D (Instructional; EYK 1-2: Models and Scale, <i>As You Read, Chp 2- Modeling Moon Phases</i> ) page 51 (Instructional; Learning To Look #1, 3, 4)
(ii) model how the relative position of the Moon cause[s] lunar phases	pages 33-36 (Narrative) page 10D (Instructional; EYK 1-2: Models and Scale, <i>As You Read, Chp 2- Modeling Moon Phases</i> ) page 51 (Instructional; Learning To Look #1, 3, 4)
(iii) predict the timing of moonrise during each phase;	page 34 (Narrative) page 50 (Instructional; Review Questions #4,6) page 51 (Instructional; Learning To Look #4)
(iv) predict the timing of moonset during each phase;	page 34 (Narrative) page 50 (Instructional; Review Question #4) page 51 (Instructional; Learning To Look #4)
(B) model how the orbit and relative position of the Moon cause lunar and solar eclipses; and	
(i) model how the relative position of the Moon causes lunar eclipses;	pages 36-38 (Narrative) page 50 (Instructional; Review Question #11, 13) page 50 (Instructional; Active Inquiry Questions #1) page 51 (Instructional; Learning To Look #6)
(ii) model how the relative position of the Moon causes solar eclipses;	pages 38-47 (Narrative) page 50 (Instructional; Review Questions #13) page 50 (Instructional; Active Inquiry Question #1, 2) page 51 (Instructional; Learning To Look #6)
(iii) model how the orbit of the Moon causes lunar eclipses;	pages 36-38 (Narrative) page 50 (Instructional; Review Question #11, 13)

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	page 50 (Instructional; Active Inquiry Questions #1) page 51 (Instructional; Learning To Look #6)
(iv) model how the orbit of the Moon causes solar eclipses;	pages 38-47 (Narrative) page 50 (Instructional; Review Questions #13) page 50 (Instructional; Active Inquiry Question #1, 2) page 51 (Instructional; Learning To Look #6)
(C) examine and investigate the dynamics of tides using the Sun, Earth, and Moon model.	
(i) examine the dynamics of tides using the Sun, Earth, and Moon model.	page 84 (Narrative) pages 89-91 (Narrative) page 99 (Instructional; Review Question #33)
(ii) investigate the dynamics of tides using the Sun, Earth, and Moon model.	page 85 (Narrative) pages 89-91 (Narrative) page 99 (Instructional; Review Question #33)
<b>(9) Science concepts. The student models the cause of planetary seasons. The student is expected to:</b>	
(A) examine the relationship of a planet's axial tilt to its potential seasons;	
(i) examine the relationship of a planet's axial tilt to its potential seasons;	pages 21-29 (Narrative) page 30 (Instructional; Review Question #24) page 31 (Instructional; Active Inquiry Question #3) page 526 (Narrative) page 547 (Instructional; Review Questions #2, 3)
(B) predict how changing latitudinal position affects the length of day and night throughout a planet's orbital year;	
(i) predict how changing latitudinal position affects the length of day and night throughout a planet's orbital year;	pages 22-23 (Narrative) pages 31C-31E (Narrative; EYK 2-2: Scientific Data) page 31E (Instructional; EYK 2-2: Scientific Data - Question #5)
(C) investigate the relationship between a planet's axial tilt, angle of incidence of sunlight, and concentration of solar energy; and	
(i) investigate the relationship between a planet's axial tilt, angle of incidence of sunlight, and concentration of solar energy;	pages 21-24 (Narrative) page 30 (Instructional; Review Questions #20-25) page 31 (Instructional; Active Inquiry Question #3) page 476 (Narrative) pages 526-527 (Narrative) page 547 (Instructional; Review Questions #2, 3)
(D) explain the significance of Earth's solstices and equinoxes.	
(i) explain the significance of Earth's solstices	pages 21-24 (Narrative) page 31B (Instructional; <i>As You Read Ch.4 - Early Astronomical Structures</i> ) page 76 (Instructional; Problem #1) pages 77A-77B (Narrative)



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	page 77B (Instructional; EYK 4-1: Astronomy and Society Question #1)
(ii) explain the significance of Earth's equinoxes.	pages 21-24 (Narrative) page 31B (Instructional; <i>As You Read Ch.4 - Early Astronomical Structures</i> ) page 76 (Instructional; Problem #1) pages 77A-77B (Narrative) page 77B (Instructional; EYK 4-1: Astronomy and Society Question #1)
<b>(10) Science concepts. The student knows how astronomical tools collect and record information about celestial objects. The student is expected to:</b>	
(A) investigate the use of black body radiation curves and emission, absorption, and continuous spectra in the identification and classification of celestial objects;	
(i) investigate the use of black body radiation curves in the identification of celestial objects	pages 132-134 (Narrative) page 141 (Instructional; Review Questions #12, 16) page 141 (Instructional; Problems #2,3,4) pages 175-179 (Narrative) page 197 (Instructional; Problem # 8)
(ii) investigate the use of black body radiation curves in the classification of celestial objects	pages 132-134 (Narrative) page 141 (Instructional; Review Questions #12, 16) page 141 (Instructional; Problems #2,3,4) pages 175-179 (Narrative) page 197 (Instructional; Problem # 8)
(iii) investigate the use of emission spectra in the identification of celestial objects	pages 135-138 (Narrative) pages 175-179 (Narrative) page 196 (Instructional; Review Questions #8-10) page 197 (Instructional; Problems #7,8)
(iv) investigate the use of absorption spectra in the identification of celestial objects	pages 135-138 (Narrative) pages 175-179 (Narrative) page 214 (Instructional; Review Questions #2, 10-12)
(v) investigate the use of continuous spectra in the identification of celestial objects	pages 135-138 (Narrative) pages 175-179 (Narrative) page 141 (Instructional; Review Questions #14)
(vi) investigate the use of emission spectra in the classification of celestial objects	pages 135-138 (Narrative) pages 175-179 (Narrative) page 196 (Instructional; Review Questions #8-10) page 197 (Instructional; Problems #7,8)
(vii) investigate the use of absorption spectra in the classification of celestial objects	pages 135-138 (Narrative) pages 175-179 (Narrative) page 214 (Instructional; Review Questions #2, 10-12)
(viii) investigate the use of continuous spectra in the classification of celestial objects	pages 135-138 (Narrative) page 141 (Instructional; Review Questions #14) pages 175-179 (Narrative)
(B) calculate the relative light-gathering power of different-sized telescopes to compare telescopes for different applications;	

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(i) calculate the relative light-gathering power of different-sized telescopes to compare telescopes for different applications;	pages 107-111 (Narrative) page 125 (Instructional; Problems #5, 7) page 126 (Instructional; Learning To Look #4)
(C) analyze the importance and limitations of optical, infrared, and radio telescopes, gravitational wave detectors, and other ground-based technology;	
(i) analyze the importance of optical telescopes	pages 105-111 (Narrative) page 125 (Instructional; Review Q #6) page 125 (Instructional; Problems #8, 11) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> )
(ii) analyze the importance of infrared telescopes	pages 116-117 (Narrative) page 126 (Instructional; Learning To Look #2) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> )
(iii) analyze the importance of radio telescopes	page 115 (Narrative) page 125 (Instructional; Review Q #9, 10, 22) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> )
(iv) analyze the importance of gravitational wave detectors	page 123 (Narrative) pages 126A-126B (Narrative; EYK 6-1: <i>Gravitational Wave Detectors</i> ) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> ) page 126B (Instructional; EYK 6-1: <i>Gravitational Wave Detectors</i> - Question #1)
(v) analyze the importance of other ground-based technology;	pages 118-123 (Narrative) page 125 (Instructional; Review Q #21) page 126 (Instructional; Learning To Look #6)
(vi) analyze the limitations of optical telescopes	pages 107-110 (Narrative) page 125 (Instructional; Review Q #6, 9, 11) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> )
(vii) analyze the limitations of infrared telescopes	pages 116-117 (Narrative) page 125 (Instructional; Review Q #15, 17) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> )
(viii) analyze the limitations of radio telescopes	page 115 (Narrative) page 125 (Instructional; Review Q #9, 10, 13, 22) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> )
(ix) analyze the limitations of gravitational wave detectors	page 123 (Narrative) pages 126A-126B (Narrative; EYK 6-1: <i>Gravitational Wave Detectors</i> ) page 126B (Instructional; As you Read <i>Ch 6-Comparing Ways of Getting Astronomical Data</i> ) page 126B (Instructional; EYK 6-1: <i>Gravitational Wave Detectors</i> - Question #2)
(x) analyze the limitations of other ground-based technology;	pages 118-123 (Narrative) page 125 (Instructional; Review Q #19)

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(D) analyze the importance and limitations of space telescopes in the collection of astronomical data across the electromagnetic spectrum.	
(i) analyze the importance of space telescopes in the collection of astronomical data across the electromagnetic spectrum.	pages 116-117 (Narrative) page 126 (Instructional; Problem #12) page 126 (Instructional; Sense Of Proportion #2) page 126A-126B (Instructional; EYK 6-1: Gravitational Wave Detectors - As you Read Chapter 6)
(ii) analyze limitations of space telescopes in the collection of astronomical data across the electromagnetic spectrum.	pages 116-117 (Narrative) page 126 (Instructional; Learning To Look #8)
<b>(11) Science concepts. The student uses models to explain the formation, development, organization, and significance of solar system bodies. The student is expected to:</b>	
(A) relate Newton's law of universal gravitation and Kepler's laws of planetary motion to the formation and motion of the planets and their satellites;	
(i) relate Newton's law of universal gravitation to the formation of the planets	page 100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - As You Read <i>Chp 18- Planetary Formation</i> ) pages 403-410 (Narrative)
(ii) relate Newton's law of universal gravitation to the formation of [the planets'] satellites;	page 100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - As You Read <i>Chp 18- Planetary Formation</i> ) pages 403-410 (Narrative)
(iii) relate Newton's law of universal gravitation to the motion of the planets	pages 83-89 (Narrative) page 99 (Instructional; Review Q #29, 31) page 100 (Instructional; Problem #9) page 100C (Narrative; EYK 5-1: Scientific Research)
(iv) relate Newton's law of universal gravitation to the motion of [the planets'] satellites;	page 89 (Narrative) page 99 (Instructional; Review Q #17) page 100 (Instructional; Problem #15) page 100C (Narrative; EYK 5-1: Scientific Research)
(v) relate Kepler's laws of planetary motion to the formation the planets	page 100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - As You Read <i>Chp 18- Planetary Formation</i> ) pages 403-410 (Narrative)
(vi) relate Kepler's laws of planetary motion to the formation of [the planets'] satellites;	page 100C (Narrative; EYK 5-1: Scientific Research) page 100C (Instructional; EYK 5-1: Scientific Research - As You Read <i>Chp 18- Planetary Formation</i> ) pages 403-410 (Narrative)
(vii) relate Kepler's laws of planetary motion to the motion of the planets	pages 67-68 (Narrative) page 76 (Instructional; Review Q #18, 20, 22) page 77 (Instructional; Problems #4, 6-8) pages 85-89 (Narrative) page 99 (Instructional; Review Q #29,31)
(viii) relate Kepler's laws of planetary motion to the motion of [the planets'] satellites;	page 10B (Instructional; EYK 1-1: The Engineering Design Process - As You Read <i>Ch.23- Imagine Planet Nine</i> ) page 89 (Narrative) page 100C (Narrative; EYK 5-1: Scientific Research)

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	page 548B (Instructional; EYK 23-1: Communicating Science - As You Read <i>Ch 4- Kepler and Newton</i> )
(B) explore and communicate the origins and significance of planets, planetary rings, satellites, asteroids, comets, Oort cloud, and Kuiper belt objects;	
(i) explore the origins of planets	pages 406-412 (Narrative) page 421 (Instructional; RQs #1,6,7,8,9)
(ii) explore the origins of planetary rings	pages 508-509 (Narrative) pages 516-520 (Narrative) page 522 (Instructional; RQ #20,23) page 547 (Instructional; RQ#11,13)
(iii) explore the origins of satellites	pages 453-454 (Narrative) page 462 (Instructional; RQ #15) page 491 (Instructional; RQ#24) pages 507-508 (Narrative) page 522 (Instructional; RQ #30)
(iv) explore the origins of asteroids	page 411 (Narrative) pages 560-562 (Narrative) page 575 (Instructional; RQs #11, 12,16, 18, 30)
(v) explore the origins of comets	pages 567-568 (Narrative) page 575 (Instructional; RQ #24, 26, 30)
(vi) explore the origins of [the] Oort cloud	page 568 (Narrative) page 575 (Instructional; RQ #30)
(vii) explore the origins of Kuiper belt objects;	page 569 (Narrative) page 575 (Instructional; RQ #30)
(viii) explore the significance of planets	pages 424-439 (Narrative) page 428 (Instructional; PS) pages 456-536 (Narrative) page 474 (Instructional; PS) page 492 (Instructional; AIQ#3)
(ix) explore the significance of planetary rings	pages 508-509 (Narrative) pages 516-520 (Narrative) pages 522-523 (Instructional; RQ #23, 33-35) page 547 (Instructional; RQ #11, 13, 14) page 547 (Instructional; AIQ# 1)
(x) explore the significance of satellites	pages 443-455 (Narrative) pages 486-490(Narrative) pages 499-509 (Narrative) page 509 (Instructional; PS) page 520 (Instructional; PS) page 522 (Instructional; RQ 12, 13,14 ,23) page 547 (Instructional; RQ #13, 14, 20)
(xi) explore the significance of asteroids	pages 556-563 (Narrative) pages 569-573 (Narrative) page 575 (Instructional; RQ #22, 31) page 575 (Instructional; ALQ #1) page 576 (Instructional; P #16)
(xii) explore the significance of comets	pages 563-573 (Narrative) page 575 (Instructional; RQ# 26-29)

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	page 575 (Instructional; ALQ #2)
(xiii) explore the significance of [the] Oort cloud	page 568 (Narrative) page 576 (Instructional; P #14,15) page 576 (Instructional; SOP #2)
(xiv) explore the significance of Kuiper belt objects;	page 10D (Instructional; EYK 1-2: Models and Scale - As You Read - <i>Chp 23-Pluto</i> ) pages 568-569 (Narrative)
(xv) communicate the origins of planets	pages 406-412 (Narrative) page 421 (Instructional; RQs #1,6,7,8,9)
(xvi) communicate the origins of planetary rings	pages 508-509 (Narrative) pages 516-520 (Narrative) page 522 (Instructional; RQ #20,23) page 547 (Instructional; RQ#11,13)
(xvii) communicate the origins of satellites	pages 453-454 (Narrative) page 462 (Instructional; RQ #15) page 491 (Instructional; RQ#24) pages 507-508 (Narrative) page 522 (Instructional; RQ #30)
(xviii) communicate the origins of asteroids	page 411 (Narrative) pages 560-562 (Narrative) page 575 (Instructional; RQs #11, 12,16, 18, 30)
(xix) communicate the origins of comets	pages 567-568 (Narrative) page 575 (Instructional; RQ #24, 26, 30)
(xx) communicate the origins of [the] Oort cloud	page 568 (Narrative) page 575 (Instructional; RQ #30)
(xxi) communicate the origins of Kuiper belt objects;	page 569 (Narrative) page 575 (Instructional; RQ #30)
(xxii) communicate the significance of planets	pages 424-439 (Narrative) page 428 (Instructional; PS) pages 456-536 (Narrative) page 474 (Instructional; PS) page 492 (Instructional; AIQ#3)
(xxiii) communicate the significance of planetary rings	pages 508-509 (Narrative) pages 516-520 (Narrative) pages 522-523 (Instructional; RQ #23, 33-35) page 547 (Instructional; RQ #11, 13, 14) page 547 (Instructional; AIQ# 1)
(xxiv) communicate the significance of satellites	pages 443-455(Narrative) pages 486-490 (Narrative) pages 499-509 (Narrative) page 509 (Instructional; PS) page 520 (Instructional; PS) page 522 (Instructional; RQ 12, 13,14 ,23) page 547 (Instructional; RQ #13, 14, 20)
(xxv) communicate the significance of asteroids	pages 556-563 (Narrative) pages 569-573 (Narrative) page 575 (Instructional; RQ #22, 31) page 575 (Instructional; ALQ #1) page 576 (Instructional; P #16)

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(xxvi) communicate the significance of comets	pages 563-573 (Narrative) page 575 (Instructional; RQ# 26-29) page 575 (Instructional; ALQ #2)
(xxvii) communicate the significance of Oort cloud	page 568 (Narrative) page 576 (Instructional; P #14,15) page 576 (Instructional; SOP #2)
(xxviii) communicate the significance of Kuiper belt objects;	page 10D (Instructional; EYK 1-2: Models and Scale - As You Read - <i>Ch 23-Pluto</i> ) pages 568-569 (Narrative)
(C) compare the planets in terms of orbit, size, composition, rotation, atmosphere, natural satellites, magnetic fields, and geological activity; and	
(i) compare the planets in terms of orbit	page 428 (Narrative; Earth) page 455 (Mercury) page 475 (Narrative; Mars and Venus) page 492 (Instructional; Sense of Proportion #2) page 510 (Narrative; Jupiter and Saturn) page 537 (Narrative; Uranus and Neptune)
(ii) compare the planets in terms of size	page 10D (Narrative) page 422 (Instructional; Problem #4) page 425 (Narrative) page 441 (Instructional; Problem #1) page 441 (Instructional; SOP#2) page 494 (Narrative)
(iii) compare the planets in terms of composition	pages 425-426 (Narrative; Terrestrial planets) page 462 (Instructional; RQ#18) page 495 (Narrative; Jovian planets) page 542 (Instructional; RQ#22) page 547 (Instructional; RQ#7) page 547 (Instructional; RQ#15)
(iv) compare the planets in terms of rotation	page 421 (Instructional; RQ #8) page 428 (Narrative; Earth) page 455 (Mercury) page 475 (Narrative; Mars and Venus) page 510 (Narrative; Jupiter and Saturn) page 537 (Narrative; Uranus and Neptune) page 547 (Instructional; RQ#4) page 547 (Instructional; AIQ#2)
(v) compare the planets in terms of atmosphere	page 425 (Narrative) page 433 (Narrative; Earth) page 440 (Instructional; RQ #2,5) pages 465-466 (Narrative; Venus) pages 477-479 (Narrative; Mars) page 491 (Instructional; RQ #12,18) page 492 (Instructional; LTL #1,3) page 495 (Narrative; Jovian planets) page 522 (Instructional; RQ#3) page 547 (Instructional; RQ #15)
(vi) compare the planets in terms of natural satellites	page 486 (Narrative; Mars) page 495 (Narrative; Jovian planets)

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	pages 499-508 (Narrative; Jupiter) pages 512-515 (Narrative; Saturn) page 522 (Instructional; RQ# 12-15, 29-31)
(vii) compare the planets in terms of magnetic fields	page 431(Narrative; Earth) page 440 (Instructional; RQ #16) page 457 (Instructional; #12) page 465 (Narrative; Venus) page 477 (Narrative; Mars) page 497 (Narrative; Jupiter) page 522 (Instructional; RQ #10)
(viii) compare the planets in terms of geological activity	pages 434-435 (Narrative; Earth) pages 470-473 (Narrative; Venus, Earth) pages 480-481 (Narrative; Mars) page 491 (Instructional; RQ #7,8 14) page 492 (Instructional; LTL #4)
(D) compare the factors essential to life on Earth such as temperature, water, gases, and gravitational and magnetic fields to conditions on other planets and their satellites.	
(i) compare the factors essential to life on Earth to conditions on other planets	pages 578-589 (Narrative) page 593 (Narrative; HDWK 25-2) page 595 (Instructional; RQ #3,21)
(ii) compare the factors essential to life on Earth to conditions on [other planet's] satellites	pages 578-589 (Narrative) page 593 (Narrative; HDWK 25-2) page 595 (Instructional; RQ #3,21)
<b>(12) Science concepts. The student knows that our Sun serves as a model for stellar activity. The student is expected to:</b>	
(A) identify the approximate mass, size, motion, temperature, structure, and composition of the Sun;	
(i) identify the approximate mass of the Sun	page 144 (Narrative) page 237 (Instructional; P #4) page 237 (Instructional; SOP #1)
(ii) identify the approximate size of the Sun	pages 144-147 (Narrative) page 168 (Instructional; Problems #1,2, 4) page 169 (Instructional; SOP #1)
(iii) identify the approximate motion of the Sun	page 144 (Narrative) page 153 (Narrative) page 168 (Instructional; Problem #10) page 318 (Narrative)
(iv) identify the approximate temperature of the Sun	pages 31C-31E (Instructional; EKY 2-2: Scientific Data- As you Read - Chapter 9) page 144 (Narrative) pages 146-149 (Narrative) page 167 (Instructional; RQ #4, 10)
(v) identify the approximate structure of the Sun	pages 144-149 (Narrative) pages 167-168 (Instructional; RQ #4, 6, 11, 13, 14) page 168 (Instructional; LTL #1, 2)
(vi) identify the approximate composition of the Sun	page 144 (Narrative) pages 149-150 (Narrative)

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	page 168 (Instructional; RQ #29) page 168 (Instructional; AIQ #1)
(B) distinguish between nuclear fusion and nuclear fission and identify the source of energy within the Sun as nuclear fusion of hydrogen to helium;	
(i) distinguish between nuclear fusion and nuclear fission	page 51B (Instructional; As you Read: <i>Chapter 8- Explaining Fusion and Fission</i> ) page 162 (Narrative)
(ii) identify the source of energy within the Sun as nuclear fusion of hydrogen to helium	pages 162-164 (Narrative) page 168 (Instructional; RQ #25-27)
(C) describe the eleven-year solar cycle and the significance of sunspots; and	
(i) describe the eleven-year solar cycle of sunspots;	pages 152-156 (Narrative) page 169 (Instructional; RQ #17-19)
(ii) describe the significance of sunspots;	pages 152-156 (Narrative) page 169 (Instructional; RQ #17-19)
(D) analyze the origins and effects of space weather, including the solar wind, coronal mass ejections, prominences, flares, and sunspots.	
(i) analyze the origins of space weather, including the solar wind	page 149 (Narrative) pages 157-159 (Narrative) page 168 (Instructional; Problem #9) page 492B (Instructional; As You Read, <i>Ch 21- Space Weather</i> )
(ii) analyze the origins of space weather, including coronal mass ejections	page 157 (Narrative) page 159 (Narrative) page 169 (Instructional; LTL #5,6)
(iii) analyze the origins of space weather, including prominences	page 43 (Narrative) pages 156-158 (Narrative) page 169 (Instructional; LTL #5,6)
(iv) analyze the origins of space weather, including flares	page 157 (Narrative) page 159 (Narrative) page 169 (Instructional; LTL #5,6)
(v) analyze the origins of space weather, including sunspots	pages 152-156 (Narrative) page 168 (Instructional; RQ #18,19)
(vi) analyze the effects of space weather, including the solar wind	pages 157-160 (Narrative) page 168 (Instructional; Problem #9)
(vii) analyze the effects of space weather, including coronal mass ejections	page 77B (Instructional; As You Read- <i>Ch 8- The Impact of Solar Weather on Society</i> ) pages 157-160 (Narrative) page 492B (Instructional; As You Read, <i>Ch 21- Space Weather</i> )
(viii) analyze the effects of space weather, including prominences	pages 157-160 (Narrative) page 168 (Instructional; RQ #22)
(ix) analyze the effects of space weather, including flares	pages 157-160 (Narrative) page 168 (Instructional; RQ #23) page 168 (Instructional; P #14) page 168 (Instructional; AIQ #4)



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(x) analyze the effects of space weather, including sunspots	pages 152-156 (Narrative) page 168 (Instructional; Problem #7)
<b>(13) Science concepts. The student understands the characteristics and life cycle of stars. The student is expected to:</b>	
(A) identify the characteristics of main sequence stars, including surface temperature, age, relative size, and composition;	
(i) identify the characteristics of main sequence stars, including surface temperature	pages 177-179 (Narrative) page 196 (Instructional; RQ #8, 9) page 197 (Instructional; RQ #14,15)
(ii) identify the characteristics of main sequence stars, including age	page 197 (Instructional; RQ #20) pages 244-245 (Narrative) page 261 (Instructional; P#6,7)
(iii) identify the characteristics of main sequence stars, including relative size	pages 179-180 (Narrative) page 183 (Narrative) page 197 (Instructional; RQ #14) page 197 (Instructional; Problem #13)
(iv) identify the characteristics of main sequence stars, including composition;	pages 177-179 (Narrative) page 197 (Instructional; Problem #7)
(B) describe and communicate star formation from nebulae to protostars to the development of main sequence stars;	
(i) describe star formation from nebulae to protostars to the development of main sequence stars;	pages 217-234 (Narrative) page 236 (Instructional; RQ #1-7,10,21) pages 243-244 (Narrative)
(ii) communicate star formation from nebulae to protostars to the development of main sequence stars;	pages 217-234 (Narrative) page 236 (Instructional; RQ #1-7,10,21) pages 243-244 (Narrative)
(C) evaluate the relationship between mass and fusion on stellar evolution;	
(i) evaluate the relationship between mass and fusion on stellar evolution;	pages 248-252 (Narrative) page 284 (Instructional; RQ #25) page 285 (Instructional; LTL#1)
(D) compare how the mass of a main sequence star will determine its end state as a white dwarf, neutron star, or black hole;	
(i) compare how the mass of a main sequence star will determine its end state as a white dwarf, neutron star, or black hole	pages 264-269 (Narrative) page 284 (Instructional; RQ# 22,23) pages 287-288 (Narrative) pages 297-298 (Narrative) page 307 (Instructional; RQ #3-5)
(E) describe the use of spectroscopy in obtaining physical data on celestial objects such as temperature, chemical composition, and relative motion;	
(i) describe the use of spectroscopy in obtaining physical data on celestial objects such as temperature, chemical composition, and relative motion	pages 135-139 (Narrative) page 142 (Instructional; Problems #10,11,12) pages 175-179 (Narrative) pages 184-197 (Narrative) page 196 (Instructional; RQ #8,9,10)

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	page 197 (Instructional; Problem #7) page 397 (Narrative)
(F) use the Hertzsprung-Russell diagram to classify stars and plot and examine the life cycle of stars from birth to death;	
(i) use the Hertzsprung-Russell diagram to classify stars	pages 180-182 (Narrative) page 197 (Instructional; RQ #17) page 260 (Instructional; RQ #1,10); page 261 (Instructional; LTL #3,5)
(ii) use the Hertzsprung-Russell diagram to plot the life cycle of stars from birth to death;	pages 220; 226 (Narrative) pages 244; 246-250 (Narrative) page 260 (Instructional; RQ #13, 14, 15) page 260 (Instructional; AIQ #3) page 261 (Instructional; LTL #5)
(iii) use the Hertzsprung-Russell diagram to examine the life cycle of stars from birth to death;	pages 220; 226 (Narrative) pages 244; 246-250 (Narrative) page 260 (Instructional; RQ #13, 14, 15) page 260 (Instructional; AIQ #3) page 261 (Instructional; LTL #5)
(G) illustrate how astronomers use geometric parallax to determine stellar distances and intrinsic luminosities; and	
(i) illustrate how astronomers use geometric parallax to determine stellar distances	pages 172-173 (Narrative) page 196 (Instructional; RQ #1,2,3) page 197 (Instructional; Problem #1)
(ii) illustrate how astronomers use geometric parallax to determine intrinsic luminosities;	pages 174-175 (Narrative) page 197 (Instructional; Problem #6,10,11,12)
(H) describe how stellar distances are determined by comparing apparent brightness and intrinsic luminosity when using spectroscopic parallax and the Leavitt relation for variable stars.	
(i) describe how stellar distances are determined by comparing apparent brightness and intrinsic luminosity when using spectroscopic parallax	page 184 (Narrative) page 196 (Instructional; RQ #5) page 197 (Instructional; Problem #5)
(ii) describe how stellar distances are determined by the Leavitt relation for variable stars.	pages 313-315 (Narrative) page 334 (Instructional; Problem #5)
<b>(14) Science concepts. The student knows the structure of the universe and our relative place in it. The student is expected to:</b>	
(A) illustrate the structure and components of our Milky Way galaxy and model the size, location, and movement of our solar system within it;	
(i) illustrate the structure of our Milky Way galaxy	pages 315-317 (Narrative) page 334 (Instructional; Problem #1)
(ii) illustrate the components of our Milky Way galaxy	pages 315-317 (Narrative) page 334 (Instructional; Problem #1)
(iii.a) model the size of our solar system within [our Milky Way Galaxy]	page 6 (Narrative) page 334 (Instructional; SOP #1) pages 342-343 (Narrative)

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(iv.a) model the location of our solar system within [our Milky Way Galaxy]	page 5 (Narrative) pages 317-318 (Narrative) page 334 (Instructional; Problem #1)
(iii.b) model the size [of our Milky Way galaxy];	page 5 (Narrative) page 316 (Narrative) page 334 (Instructional; Problem #1)
(iv.b) model the location [our Milky Way galaxy];	page 6 (Narrative) page 334 (Instructional; Problem #1) pages 346-347 (Narrative)
(v) model the movement of our solar system within [our Milky Way Galaxy]	pages 317-318 (Narrative) page 334 (Instructional; Problem #1)
(B) compare spiral, elliptical, irregular, dwarf, and active galaxies;	
(i) compare spiral, elliptical, irregular, dwarf, and active galaxies;	pages 336-361 (Narrative) page 362 (Instructional; RQ #1,2,9,10,11)
(C) develop and use models to explain how galactic evolution occurs through mergers and collisions;	
(i) develop models to explain how galactic evolution occurs through mergers	pages 346-351 (Narrative) page 362 (Instructional; RQ #5,6,7) page 363 (Instructional; LTL #2)
(ii) develop models to explain how galactic evolution occurs through collisions;	pages 346-351 (Narrative) page 362 (Instructional; RQ #5,6,8) page 363 (Instructional; LTL #2)
(iii) use models to explain how galactic evolution occurs through mergers	pages 346-351 (Narrative) page 362 (Instructional; RQ #5,6,9) page 363 (Instructional; LTL #2)
(iv) use models to explain how galactic evolution occurs through collisions;	pages 346-347 (Narrative) page 362 (Instructional; RQ #5,6,10) page 363 (Instructional; LTL #2)
(D) describe the Local Group and its relation to larger-scale structures in the universe; and	
(i) describe the Local Group	page 10C (Narrative) pages 346-351 (Narrative) page 363 (Instructional; SOP #1,2)
(ii) describe the Local Group's relation to larger-scale structures in the universe	page 10D (Instructional; <i>As You Read - Chp17- The Local Supercluster</i> ) pages 381-383 (Narrative)
(E) evaluate the indirect evidence for the existence of dark matter.	
(i) evaluate the indirect evidence for the existence of dark matter.	pages 318-319 (Narrative) pages 343-345 (Narrative) pages 380-383 (Narrative) page 393 (Instructional; RQ #28) page 394B (Instructional; <i>As You Read Ch 15- The Evidence for Dark Matter</i> )
<b>(15) Science concepts. The student knows the scientific theories of cosmology. The student is expected to:</b>	

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(A) describe and evaluate the historical development of evidence supporting the Big Bang Theory;	
(i) describe the historical development of evidence supporting the Big Bang Theory	pages 366-371 (Narrative) page 393 (Instructional; RQ #19) page 394B (Instructional; As You Read <i>Ch 17- Big Bang Timeline</i> )
(ii) evaluate the historical development of evidence supporting the Big Bang Theory	pages 366-371 (Narrative) page 393 (Instructional; RQ #19) page 394B (Instructional; As You Read <i>Ch 17- Big Bang Timeline</i> )
(B) evaluate the limits of observational astronomy methods used to formulate the distance ladder;	
(i) evaluate the limits of observational astronomy methods used to formulate the distance ladder	pages 340-342 (Narrative) page 346 (Instructional; <i>Practicing Science</i> )
(C) evaluate the indirect evidence for the existence of dark energy;	
(i) evaluate the indirect evidence for the existence of dark energy	pages 384-386 (Narrative) pages 389-390 (Narrative) page 391 (Instructional; <i>Practicing Science</i> ) page 394B (Instructional; As You Read, <i>Ch. 17- Dark Energy</i> )
(D) describe the current scientific understanding of the evolution of the universe, including estimates for the age of the universe; and	
(i) describe the current scientific understanding of the evolution of the universe, including estimates for the age of the universe	pages 368-369 (Narrative) pages 386-387 (Narrative) page 393 (Instructional; Problems 10-11)
(E) describe current scientific hypotheses about the fate of the universe, including open and closed universes.	
(i) describe current scientific hypotheses about the fate of the universe, including open universes	pages 376-380 (Narrative) pages 386-387 (Narrative) page 393 (Instructional; Q #27 ,30)
(ii) describe current scientific hypotheses about the fate of the universe, including closed universes	pages 376-380 (Narrative) pages 386-387 (Narrative) page 393 (Instructional; Q #16)
<b>(16) Science concepts. The student understands the benefits and challenges of expanding our knowledge of the universe. The student is expected to:</b>	
(A) describe and communicate the historical development of human space flight and its challenges;	
(i) describe the historical development of human space flight	pages 445-449 (Narrative) pages 463A-463B (Narrative) page 463B (Instructional; As You Read <i>Ch. 20- Human Space Flight Timeline</i> )
(ii) describe the [challenges] of human space flight	pages 445-449 (Narrative) pages 463A-463B (Narrative)

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	page 463B (Instructional; Q #1)
(iii) communicate the historical development of human space flight	pages 445-449 (Narrative) pages 463A-463B (Narrative) page 463B (Instructional; <i>As You Read Ch. 20- Human Space Flight Timeline</i> )
(iv) communicate the [challenges] of human space flight	pages 445-449 (Narrative) pages 463A-463B (Narrative) page 463B (Instructional; Q #1)
(B) describe and communicate the uses and challenges of robotic space flight;	
(i) describe the uses of robotic space flight;	page 466 (Narrative) pages 468-469 (Narrative) pages 479-482 (Narrative) pages 492A-492B (Narrative) page 492B (Instructional; Q #1)
(ii) describe the challenges of robotic space flight;	page 466 (Narrative) pages 468-469 (Narrative) pages 479-482 (Narrative) pages 492A-492B (Narrative) page 492B (Instructional; Q #4)
(iii) communicate the uses of robotic space flight;	page 466 (Narrative) pages 468-469 (Narrative) pages 479-482 (Narrative) pages 492A-492B (Narrative) page 492B (Instructional; Q #1, 4)
(iv) communicate the challenges of robotic space flight;	page 466 (Narrative) pages 468-469 (Narrative) pages 479-482 (Narrative) pages 492A-492B (Narrative) page 492B (Instructional; Q #4)
(C) evaluate the evidence of the existence of habitable zones and potentially habitable planetary bodies in extrasolar planetary systems;	
(i) evaluate the evidence of the existence of habitable zones in extrasolar planetary systems;	pages 589-594 (Narrative) page 596 (Instructional; LTL #2,3)
(ii) evaluate the evidence of the existence of potentially habitable planetary bodies in extrasolar planetary systems;	pages 589-594 (Narrative) page 596 (Instructional; ALQ #1,2)
(D) evaluate the impact on astronomy from light pollution, radio interference, and space debris;	
(i) evaluate the impact on astronomy from light pollution	page 110 (Narrative) page 126C (Narrative) page 126D (Instructional; <i>As You Read, Ch.6- Man-Made Interference</i> )
(ii) evaluate the impact on astronomy from radio interference	page 110 (Narrative) page 126C (Narrative) page 126D (Instructional; <i>As You Read, Ch.6- Man-Made Interference</i> )

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(iii) evaluate the impact on astronomy from space debris;	pages 126C-126D (Narrative) page 126D (Instructional; Q #3,4) page 126D (Instructional; <i>As You Read, Ch.6- Man-Made Interference</i> ) page 397 (Narrative)
(E) examine and describe current developments and discoveries in astronomy; and	
(i) examine current developments in astronomy;	pages 96-97 (Narrative) page 100C (Instructional; Q #4) pages 121-123 (Narrative) page 363 (Instructional; Q #1) pages 384-391 (Narrative) pages 418-419 (Narrative) page 421 (Instructional; Q #1,7)
(ii) examine current discoveries in astronomy;	pages 96-97 (Narrative) page 100C (Instructional; Q #4) pages 121-123 (Narrative) page 363 (Instructional; Q #6) pages 384-391 (Narrative) pages 418-419 (Narrative) page 421 (Instructional; Q #10)
(iii) describe current developments in astronomy;	pages 96-97 (Narrative) pages 121-123 (Narrative) page 272 (Instructional; <i>Practicing Science</i> ) page 361 (Instructional; <i>Practicing Science</i> ) page 383 (Instructional; <i>Practicing Science</i> ) pages 384-391 (Narrative) pages 418-419 (Narrative)
(iv) describe current discoveries in astronomy;	pages 96-97 (Narrative) pages 121-123 (Narrative) page 325 (Instructional; <i>Practicing Science</i> ) pages 384-391 (Narrative) page 391 (Instructional; <i>Practicing Science</i> ) pages 418-419 (Narrative)
(F) explore and explain careers that involve astronomy, space exploration, and the technologies developed through them.	
(i) explore careers that involve astronomy	pages 51A-51B (Narrative) page 51B (Instructional; Q #1-2) pages 149-150 (Narrative)
(ii) explore careers that involve space exploration	pages 51A-51B (Narrative) page 51B (Instructional; Q #1-2) pages 447-449 (Narrative)
(iii) explore careers that involve the technologies developed through them.	pages 51A-51B (Narrative) page 51B (Instructional; Q #3) pages 110-115 (Narrative)
(iv) explain careers that involve astronomy	pages 51A-51B (Narrative) page 51B (Instructional; Q #1-2) pages 149-150 (Narrative)
(v) explain careers that involve space exploration	pages 51A-51B (Narrative)

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	page 51B (Instructional; Q #1-2) pages 447-449 (Narrative)
(vi) explain careers that involve the technologies developed through them.	pages 51A-51B (Narrative) page 51B (Instructional; Q #3) pages 110-115 (Narrative)