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<tr>
<td>08.5.1.A1 by end of grade 8</td>
<td>Scientific Processes Habits of Mind</td>
<td>Evaluate the strengths and weaknesses of data, claims, and arguments.</td>
<td>92 study claims made by bottled water companies</td>
<td>43 study water filtration device claims</td>
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<td>08.5.1.A2 by end of grade 8</td>
<td>Scientific Processes Habits of Mind</td>
<td>Communicate experimental findings to others.</td>
<td>41 create water quality report</td>
<td>43 write paragraph to explain results</td>
<td>45 write summary of findings</td>
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<td>08.5.1.A3 by end of grade 8</td>
<td>Scientific Processes Habits of Mind</td>
<td>Recognize that the results of scientific investigations are seldom exactly the same and that replication is often necessary.</td>
<td>37 what percentage comes from this source? (problem 4)</td>
<td>13 calculating error between your barometer and a commercial barometer</td>
<td>15 importance of good record keeping in order to avoid error</td>
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<tr>
<td>08.5.1.A4 by end of grade 8</td>
<td>Scientific Processes Habits of Mind</td>
<td>Recognize that curiosity, skepticism, open-mindedness, and honesty are attributes of scientists</td>
<td>7 contributions of Joule</td>
<td>9 Joseph Black</td>
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<td>08.5.1.B1 by end of grade 8</td>
<td>Scientific Processes Inquiry and Problem Solving</td>
<td>Identify questions and make predictions that can be addressed by conducting investigations.</td>
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<td>what is temperature</td>
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<td>predicting areas with high ozone concentration based on your data</td>
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<td>asking questions pertaining to specific heat and heat flow</td>
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<td>predicting what would happen if you place your ice/water test tube into a hot cup or a cold cup</td>
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<td>estimating the number of meteor collisions on Earth during the last 3.5 billion years</td>
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### Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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<td>Scientific Processes</td>
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<td>08.5.1.B3 by end of grade 8</td>
<td>Scientific Processes</td>
<td>Inquiry and Problem Solving</td>
<td>Collect, organize, and interpret the data that results from experiments.</td>
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<td>atmospheric pressure at various altitudes graph</td>
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<td>Moh's hardness scale</td>
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<td>what evidence was used to predict the existence of the Kuiper Belt?</td>
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<td>use the data to answer the questions</td>
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<td>use the diagram to answer the questions (#2)</td>
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<td>arrange the items in the table (#3)</td>
<td>26</td>
<td>collecting qualitative data of light intensity at scale distance from the sun</td>
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<td>use the diagram to answer the questions (#4)</td>
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<td>construct a graphical model</td>
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<td>analysis with a spectrometer (#4)</td>
<td>33</td>
<td>determining relationship between temperature of the atmosphere and relative humidity</td>
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<td>33</td>
<td>collecting wet and dry bulb temperature readings</td>
<td>34</td>
<td>interpreting Doppler radar images</td>
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Correlation to New Jersey Core Curriculum Content Standards for Science

*Introduction to Earth and Space Science*

Student Text and Investigation Manual

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<p>| 43 | organize water quality data into a table |
| 44 | observing daphnia and recording movements and behavior |
| 44 | making detailed observations |
| 46 | collecting pH readings while adding carbon dioxide |
| 47 | constructing a graph of drops of acid vs pH |
| 5 | collecting time and temperature data |
| 5 | construct a temperature vs. time graph |
| 61 | finding a pattern of volcanoes on a bathymetric map |
| 67 | recording observations of crystal growing |
| 73 | using your sundial to collect accurate data |
| 75 | recording the changes in the moon over a month |
| 77 | calibrating your telescope |
| 9 | collecting and recording time and temperature data |</p>
<table>
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<tbody>
<tr>
<td>08.5.1.C1 by end of grade 8</td>
<td>Scientific Processes Safety</td>
<td>Know when and how to use appropriate safety equipment with all classroom materials.</td>
<td>4 safety caution on heating jar</td>
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</table>

<p>| 08.5.1.C2 by end of grade 8 | Scientific Processes Safety | Understand and practice safety procedures for conducting science investigations. | 4 safety caution on heating jar | 18 safety in greenhouse gas investigation |
|                            |                      |                        |                        | 2 thermometer safety |
|                            |                      |                        |                        | 26 safety using light bulbs |
|                            |                      |                        |                        | 32 safety in swinging thermometers |
|                            |                      |                        |                        | 4 heat safety |
|                            |                      |                        |                        | 42 safety tip for water testing |
|                            |                      |                        |                        | 44 safety tips for observing Daphnia |
|                            |                      |                        |                        | 8 heat safety |
|                            |                      |                        |                        | 80 safety in lab |
|                            |                      |                        |                        | vi safety in the laboratory |</p>
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<tr>
<td>08.5.2.A1</td>
<td>Science and Society</td>
<td>Cultural Contributions</td>
<td>Recognize that scientific theories: develop over time, depend on the contributions of many people, and reflect the social and political climate of their time.</td>
<td>157</td>
<td>history of calendars</td>
<td>14</td>
<td>contributions of Schönbein</td>
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<td>counting the days in a year</td>
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<td>the history of clocks and the division of time</td>
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<td>ancient beliefs about solar eclipses</td>
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<tr>
<td>08.5.2.A2</td>
<td>Science and Society</td>
<td>Cultural Contributions</td>
<td>Know that scientists are men and women of many cultures who often work together to solve scientific and technological problems.</td>
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<td>contributions of Joule</td>
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<td>Joseph Black</td>
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<tr>
<td>08.5.2.A3</td>
<td>Science and Society</td>
<td>Cultural Contributions</td>
<td>Describe how different people in different cultures have made and continue to make contributions to science and technology.</td>
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<td>contributions of Joule</td>
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<tr>
<td>08.5.2.B1</td>
<td>by end of grade 8</td>
<td>Science and Society</td>
<td>Historical Perspectives</td>
<td>Describe the impact of major events and people in the history of science and technology, in conjunction with other world events.</td>
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<td>Describe the development and exponential growth of scientific knowledge and technological innovations.</td>
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<td>Mathematical Applications</td>
<td>Numerical Operations</td>
<td>Express quantities using appropriate number formats, such as decimals, percents and scientific notation.</td>
<td>164</td>
<td>astronomic numbers expressed in scientific notation</td>
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<td>calculating solar brightness units (SBU) from kilometers in scientific notation</td>
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<td>08.5.3.B1 by end of grade 8</td>
<td>Mathematical Applications</td>
<td>Geometry and Measurement</td>
<td>Perform mathematical computations using labeled quantities and express answers in correctly derived units.</td>
<td>166</td>
<td>calculating light year using scientific notation</td>
<td>82</td>
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<td>Mathematical Applications</td>
<td>Patterns and Algebra</td>
<td>Express physical relationships in terms of mathematical equations derived from collected data.</td>
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<td>Represent and describe mathematical relationships among variables using graphs and tables.</td>
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<td>constructing a graph of time vs. temperature</td>
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<td>organize water quality data into a table</td>
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<tr>
<td>08.5.3.D2 by end of grade 8 Mathematical Applications Data Analysis and Probability</td>
<td>Analyze experimental data sets using measures of central tendency mean, mode, and median.</td>
<td>121</td>
<td>192</td>
<td>average density (#5) average distance from the sun</td>
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<tr>
<td>08.5.3.D3 by end of grade 8 Mathematical Applications Data Analysis and Probability</td>
<td>Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables when appropriate.</td>
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<td>graphing and drawing a trend line for atmospheric pressure data</td>
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<td>draw a line of best fit through temperature data points</td>
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## Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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<td>08.5.3.D4 by end of grade 8</td>
<td>Mathematical Applications</td>
<td>Data Analysis and Probability</td>
<td>Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.</td>
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<tr>
<td>08.5.4.A1 by end of grade 8</td>
<td>Nature and Process of Technology</td>
<td>Science and Technology</td>
<td>Compare and contrast science with technology, illustrating similarities and differences between these two human endeavors.</td>
<td>104 using echo sounders to map the sea floor 171 using satellite technology 173 space shuttle</td>
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<td>08.5.4.B1</td>
<td>Nature and Process of Technology</td>
<td>Nature of technology</td>
<td>Analyze a product or system to determine the problem it was designed to solve, the design constraints, trade-offs and risks involved in using the product or system, how the product or system might fail, and how the product or system might be improved.</td>
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<td>build your own atmospheric pressure gauge</td>
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<td>design a scale model of a zoo</td>
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<p>| 08.5.4.C1  | Nature and Process of Technology | Technological Design | Recognize how feedback loops are used to control systems. | 12 | thermal equilibrium |
|            |          |                    |                                                   | 73 | the water cycle |
|            |          |                    |                                                   | 79 | pond ecosystem and water quality |
|            |          |                    |                                                   | 82 | acid rain formation system |</p>
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<tr>
<td>08.5.7.B1 by end of grade 8</td>
<td>Physics Energy Transformations</td>
<td>Recognize that the sun is a major source of the Earth's energy and that solar energy includes visible, infrared and ultraviolet radiation.</td>
<td>31</td>
<td>ultraviolet and infrared light</td>
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<td>32</td>
<td>distribution of incoming solar radiation</td>
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<td>Earth's &quot;energy budget&quot;</td>
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<td>37</td>
<td>Earth's internal energy</td>
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<tr>
<td>08.5.7.B2 by end of grade 8</td>
<td>Physics Energy Transformations</td>
<td>Describe the nature of various forms of energy, including heat, light, sound, chemical, mechanical, and electrical and trace energy transformations from one form to another.</td>
<td>197</td>
<td>energy from the sun</td>
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<td></td>
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<td>200</td>
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*Introduction to Earth and Space Science*

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<td>08.5.7.B3 by end of grade 8</td>
<td>Physics</td>
<td>Energy Transformations</td>
<td>Describe how heat can be conducted through materials or transferred across space by radiation and know that if the material is a fluid, convection currents may aid the transfer of heat.</td>
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<td>densely packed solids are good conductors of heat</td>
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<td>heat transfer through air</td>
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<td>convection currents in water</td>
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<td>transfer of heat by radiation</td>
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<td>solid road surface emits radiation</td>
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<td>45</td>
<td>apply knowledge of heat transfer to different situations</td>
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<td>investigate convection in liquids</td>
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<tr>
<td>08.5.8.A1</td>
<td>Earth Science</td>
<td>Earth's Properties and Materials</td>
<td>Observe that most rocks and soils are made of several substances or minerals.</td>
<td>107 activity of Earth’s crust at plate boundaries</td>
<td>61 examining the magma chemistry of volcanoes and how it relates to a volcano's location</td>
<td>66 understanding how igneous rocks are formed and growing crystals to investigate their formation</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>108 balance of creating and consuming Earth’s crust</td>
<td>128 properties of volcanically formed rock</td>
<td>68 understanding how sedimentary rocks are formed and creating sedimentary deposits to investigate them</td>
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<td>133 types of volcanic rock</td>
<td>135 describing volcanic rock</td>
<td>70 understanding and investigating how metamorphic rocks are formed</td>
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<td>136 constructive and destructive processes</td>
<td>136 constructive and destructive processes</td>
<td>71 interpreting how different rock formations were formed</td>
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<td>139 formation of soil</td>
<td>144 properties of minerals</td>
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<td>145 common minerals</td>
<td>146 Mohs hardness scale</td>
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<td>147 formation of igneous and sedimentary and metamorphic rocks</td>
<td>149 identifying igneous and sedimentary and metamorphic rocks</td>
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<td>150 the rock cycle</td>
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<tr>
<td>08.5.8.A2 by end of grade 8</td>
<td>Earth Science</td>
<td>Earth's Properties and Materials</td>
<td>Observe that the properties of soil vary from place to place and will affect the soil's ability to support life.</td>
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<td>activity of Earth’s crust at plate boundaries</td>
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<td>estimating the effects of meteor impacts on Earth</td>
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<td>identifying which geologic features on Earth were caused by meteors</td>
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<td>08.5.8.A3 by end of grade 8</td>
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<td>Earth's Properties and Materials</td>
<td>Recognize that fossils provide evidence about the plants and animals that lived long ago and nature of the environment at the time.</td>
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<td>studying moon rocks on Earth</td>
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*Introduction to Earth and Space Science*

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<td>08.5.8.B1 by end of grade 8</td>
<td>Earth Science</td>
<td>Atmosphere and Water</td>
<td>Describe conditions in the atmosphere that lead to weather systems and how these systems are represented on weather maps.</td>
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<tr>
<td>08.5.8.C1 by end of grade 8</td>
<td>Earth Science</td>
<td>Processes that Shape the Earth</td>
<td>Explain how Earth's landforms and materials are created through constructive and destructive processes.</td>
<td>102 predicting what Earth might look like in 50 million years</td>
<td>102 definition of plate tectonics</td>
<td>52 listing which kind of plate boundary is associated with each geologic feature</td>
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- 121: predict separation of North America and Europe in 75 million years
- 122: predict effects of divergent plate boundaries on Great Rift Valley
- 126: formation of magma in Earth's mantle
- 126: geologic basis for volcanic eruptions
- 127: where volcanic activity occurs
- 128: properties of volcanically formed rock
- 128: types and shapes of volcanoes
- 129: formation of Hawaiian Islands due to volcanic activity
- 129: geologic basis for shield volcanoes
- 129: formation of shield volcanoes due to hot spots
- 129: shield volcanoes
- 130: stratovolcanoes
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## Correlation to New Jersey Core Curriculum Content Standards for Science

### Introduction to Earth and Space Science

**Student Text and Investigation Manual**

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<td>Processes that Shape the Earth</td>
<td>Show how successive layers of sedimentary rock and the fossils contained in them can be used to confirm the age, history, changing life forms, and geology of Earth.</td>
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<td>Utilize data gathered from emerging technologies (i.e. geographic information systems (GIS) and global positioning systems (GPS) to create representations and describe processes of change on the Earth's surface.</td>
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<td>3 construct a graphical model</td>
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<td>61 plot locations of volcanoes using latitude and longitude</td>
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#### Student Text and Investigation Manual

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<td>Explain how technology designed to investigate features of the Earth's surface impacts how scientists study the Earth.</td>
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### Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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<td>Investigate the Earth, moon, and sun as a system and explain how the motion of these bodies results in the phases of the moon and eclipses.</td>
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## Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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**Correlation to New Jersey Core Curriculum Content Standards for Science**

*Introduction to Earth and Space Science*

**Student Text and Investigation Manual**

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<td>Know that the universe consists of many billions of galaxies, each including billions of stars.</td>
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### Correlation to New Jersey Core Curriculum Content Standards for Science

#### Introduction to Earth and Space Science

**Student Text and Investigation Manual**

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<td>When making decisions, evaluate conclusions, weigh evidence, and recognize that arguments may not have equal merit.</td>
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<td>Explore cases that demonstrate the interdisciplinary nature of the scientific enterprise.</td>
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<td>describe the work of a geologist and paleontologist and seismologist</td>
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### Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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<td>Recognize the role of the scientific community in responding to changing social and political conditions and how scientific and technological achievement affect historical events.</td>
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<td>Science and Society</td>
<td>Historical Perspectives</td>
<td>Examine the lives and contributions of important scientists who effected major breakthroughs in our understanding of the natural and designed world.</td>
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<td>the history of clocks and the division of time</td>
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<td>Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed directly to the advancement of scientific knowledge.</td>
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### Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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### Correlation to New Jersey Core Curriculum Content Standards for Science

#### Introduction to Earth and Space Science

#### Student Text and Investigation Manual

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*Introduction to Earth and Space Science*

Student Text and Investigation Manual

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- 13 graphing and drawing a trend line for atmospheric pressure data
- 13 constructing a graph from atmospheric pressure data
- 19 graphing water and ice temperature readings
- 22 constructing a graph of time vs. temperature
- 3 find slope of a trend line
- 3 draw a line of best fit through temperature data points
- 3 construct a graphical model
- 47 constructing a graph of drops of acid vs pH
- 5 calculate slope of a graph
- 5 construct a temperature vs. time graph
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<td>Know that scientific inquiry is driven by the desire to understand the natural world and seeks to answer questions that may or may not directly influence humans, while technology is driven by the need to meet human needs and solve human problems.</td>
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## Correlation to New Jersey Core Curriculum Content Standards for Science

### Introduction to Earth and Space Science

**Student Text and Investigation Manual**

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<td>Assess the impacts of introducing a new technology in terms of alternative solutions, costs, tradeoffs, risks, benefits and environmental impact.</td>
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<td>research economic impact of producing gases that cause acid rain</td>
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## Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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<td>Plan, develop, and implement a proposal to solve an authentic technological problem.</td>
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| 12.5.8.A1 by end of grade 12 | Earth Science Earth's Properties and Materials | Explain the interrelationship of the geosphere, hydrosphere, and the atmosphere. | 23 | description of Earth's atmosphere |
| | | | 24 | effect of life on Earth's atmosphere |
| | | | 29 | layers of the atmosphere |
| | | | 30 | layers of the atmosphere |
| | | | 84 | oceans as part of the hydrosphere |
### Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

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<td>Atmosphere and Water</td>
<td>Describe how weather (in the short term) and climate (in the long term) involve the transfer of energy in and out of the atmosphere.</td>
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<td>Processes that Shape the Earth</td>
<td>Use the theory of plate tectonics to explain the relationship among earthquakes, volcanoes, mid-ocean ridges, and deep-sea trenches.</td>
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<td>definition of plate tectonics</td>
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## Correlation to New Jersey Core Curriculum Content Standards for Science

*Introduction to Earth and Space Science*

*Student Text and Investigation Manual*

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Correlation to New Jersey Core Curriculum Content Standards for Science

*Introduction to Earth and Space Science*

Student Text and Investigation Manual

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## Correlation to New Jersey Core Curriculum Content Standards for Science

### Introduction to Earth and Space Science

#### Student Text and Investigation Manual

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### Correlation to New Jersey Core Curriculum Content Standards for Science

**Introduction to Earth and Space Science**

**Student Text and Investigation Manual**

<table>
<thead>
<tr>
<th>Standard #: Grade level</th>
<th>Standard</th>
<th>Strand</th>
<th>Cumulative Progress</th>
<th>student text pg</th>
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<tr>
<td>12.5.9.A2 by end of grade 12</td>
<td>Astronomy and Space Science</td>
<td>Earth, Moon, Sun System</td>
<td>Recognize that changes in the Earth's position relative to the sun produces differing amounts of daylight seasonally.</td>
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<td>the effects of Earth’s rotation on daytime heating and nighttime cooling</td>
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<td>Explain that our solar system coalesced from a nebular cloud of gas and dust left from exploding stars.</td>
<td>215</td>
<td>how the solar system was formed</td>
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</table>

- Correlation to New Jersey Core Curriculum Content Standards for Science
- **Introduction to Earth and Space Science**
- Student Text and Investigation Manual
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<td>Astronomy and Space Science</td>
<td>Stars</td>
<td>Describe the physical characteristics, stages of development, and the apparent motions of stars.</td>
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<td>the life cycle of stars</td>
<td>79</td>
<td>observe and describe the appearance of the moon and Jupiter and its moons</td>
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<td>using spectroscopy to analyze the light emitted by stars and identify most common elements</td>
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<td>Galaxies and Universe</td>
<td>Describe data gathering and observation technologies and explain how they are used to explore the solar system and beyond.</td>
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<td>history of the telescope</td>
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<td>measuring apparent brightness to calculate the distance to stars and galaxies</td>
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