

SUGGESTED PACING

SCIENCE INQUIRY AND APPLICATION

Content Statements: During the years of grades 5-8, all students must use the following scientific processes, with appropriate laboratory safety techniques, to construct their knowledge and understanding in all science content areas:

- Identify questions that can be answered through scientific investigations
- Design and conduct a scientific investigation
- Use appropriate mathematics, tools and techniques to gather data and information
- Analyze and interpret data
- Develop descriptions, models, explanations and predictions
- Think critically and logically to connect evidence and explanations
- Recognize and analyze alternative explanations and predictions
- Communicate scientific procedures and explanations

STRAND: EARTH AND SPACE SCIENCE (ESS)**Topic: Cycles and Patterns of Earth and the Moon**

This topic focuses on Earth's hydrologic cycle, patterns that exist in atmospheric and oceanic currents, the relationship between thermal energy and the currents, and the relative position and movement of the Earth, sun and moon.

Content Statements:

- The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere and atmosphere.
- Thermal energy is transferred as water changes state throughout the cycle. The cycling of water in the atmosphere is an important part of weather patterns on Earth. The rate at which water flows through soil and rock is dependent upon the porosity and permeability of the soil or rock.

Content Statements:

- Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.
- The sun is the major source of energy for wind, air and ocean currents and the hydrologic cycle. As thermal energy transfers occur in the atmosphere and ocean, currents form. Large bodies of water can influence weather and climate. The jet stream is an example of an atmospheric current and the Gulf Stream is an example of an oceanic current.
- Ocean currents are influenced by factors other than thermal energy, such as water density, mineral content (such as salinity), ocean floor topography and Earth's rotation. All of these factors delineate global climate patterns on Earth.

Content Statements:

- The atmosphere has different properties at different elevations and contains a mixture of gases that cycle through the lithosphere, biosphere, hydrosphere and atmosphere.
- The atmosphere is held to the Earth by the force of gravity.
- There are defined layers of the atmosphere that have specific properties, such as temperature, chemical composition and physical characteristics.
- Gases in the atmosphere include nitrogen, oxygen, water vapor, carbon dioxide and other trace gases.
- Biogeochemical cycles illustrate the movement of specific elements or molecules (such as carbon or nitrogen) through the lithosphere, biosphere, hydrosphere and atmosphere.

Content Statements:

- The relative patterns of motion and positions of the Earth, moon and sun cause solar and lunar eclipses, tides and phases of the moon.
- The moon's orbit and its change of position relative to the Earth and sun result in different parts of the moon being visible from Earth (phases of the moon).
- A solar eclipse is when Earth moves into the shadow of the moon (during a new moon).
- A lunar eclipse is when the moon moves into the shadow of Earth (during a full moon).
- Gravitational force between the Earth and the moon causes daily oceanic tides.
- When the gravitational forces from the sun and moon align (at new and full moons) spring tides occur.
- When the gravitational forces of the sun and moon are perpendicular (at first and last quarter moons), neap tides occur.

PRINT RESOURCES		DIGITAL RESOURCES	
<p><i>ScienceFusion</i></p> <ul style="list-style-type: none"> Unit 1, TE pages 1-94 Unit 2, TE pages 95-188 Unit 2, Lab Manual pages 98-170 Unit 2, Assessment Guide pages 34-66 Unit 3, TE pages 189-264 Unit 3, Lab Manual pages 171-235 Unit 3, Assessment Guide pages 67-97 Unit 4, TE pages 265-342 Unit 4, Lab Manual pages 236-314 Unit 4, Assessment Guide pages 98-128 Unit 5, TE pages 343-404 Unit 5, Lab Manual pages 315-357 Unit 5, Assessment Guide pages 129-157 		<p><i>ScienceFusion</i></p> <ul style="list-style-type: none"> Unit 1, Digital Lessons Unit 2, Lesson 1 Digital Lesson Unit 2, Lesson 2 Digital Lesson & Virtual Lab Unit 2, Lesson 3 Digital Lesson Unit 2, Lesson 4 Digital Lesson & Virtual Lab Unit 2, Lesson 5 Digital Lesson Unit 3, Lesson 1 Digital Lesson & Virtual Lab Unit 3, Lesson 2 Digital Lesson Unit 3, Lesson 3 Digital Lesson Unit 3, Lesson 4 Digital Lesson & Virtual Lab Unit 4, Lesson 1 Digital Lesson Unit 4, Lesson 2 Digital Lesson & Virtual Lab Unit 4, Lesson 3 Digital Lesson Unit 4, Lesson 4 Digital Lesson Unit 5, Lesson 1 Digital Lesson & Virtual Lab Unit 5, Lesson 2 Digital Lesson & Virtual Lab Unit 5, Lesson 3 Digital Lesson 	
SCIENCE AND ACADEMIC VOCABULARY			
<p>Unit 1: Accuracy, Constant, Data, Dependent Variable, Empirical Evidence, Engineering, Experiment, Hypothesis, Independent Variable, Mean, Measurement, Model, Observation, Precision, Prototype, Scientific Notation, Simulation, Technology</p> <p>Units 2-5: Acid Precipitation, Adhesion, Air Mass, Air Pollution, Air Pressure, Air Quality, Aquifer, Atmosphere, Channel, Climate, Cohesion, Condensation, Conduction, Convection, Coriolis Effect, Day, Deep Current, Dew Point, Divide, Eclipse, Elevation, Equinox, Eutrophication, Evaporation, Front, Global Warming, Global Wind, Gravity, Greenhouse Effect, Groundwater, Heat, Humidity, Ice Age, Jet Stream, Latitude, Local Wind, Lunar Phases, Mesosphere, Neap Tide, Non-Point-Source Pollution, Ocean Current, Ozone Layer, Particulate, Penumbra, Point-Source Pollution, Polarity, Potable, Precipitation, Radiation Relative Humidity, Reservoir, Revolution, Rotation, Satellite, Season, Smog, Solstice, Solvent, Specific Heat, Spring Tide, Stratosphere, Sublimation, Surface Current, Surface Water, Temperature, Thermal Energy, Thermal Expansion, Thermal Pollution, Thermosphere, Tidal Range, Tide, Topography, Transpiration, Tributary, Troposphere, Umbra, Upwelling, Visibility, Water Cycle, Water Pollution, Water Table, Watershed, Weather, Wind, Year</p>			
DIFFERENTIATION		FIELD EXPERIENCE CONNECTIONS	
<p>Leveled Inquiry</p> <ul style="list-style-type: none"> Unit 2 TE pages 98, 110, 124, 138, 152, 172 Unit 3 TE pages 192, 202, 216, 232, 250 Unit 4 TE pages 268, 278, 292, 310, 326 Unit 5 TE pages 346, 356, 372, 390 <p>Response to Intervention</p> <ul style="list-style-type: none"> Unit 2 TE page 99 Unit 3 TE page 193 Unit 4 TE page 269 Unit 5 TE page 347 <p>Differentiated Instruction (Basic, ELL, and Advanced)</p> <ul style="list-style-type: none"> Unit 2 TE pages 113, 127, 141, 155, 169, 175 Unit 3 TE pages 205, 219, 235, 247, 253 Unit 4 TE pages 281, 295, 306, 313, 329 Unit 5 TE pages 359, 368, 375, 387, 393 		<p>Great Lakes Science Center's Cleveland Creates! Program.</p> <p>Program Details: A standards-based program that uses the Engineering and Design Process. Students learn about energy transformation and electricity through an electrifying demonstration and a hands-on workshop. To prepare in advance, plan to attend the professional development session.</p> <p>For more information contact: Karyn Saunders 216-696-2760 or email saundersk@glsc.org</p>	
INQUIRY SKILLS			
<ul style="list-style-type: none"> Applying Concepts Classifying Data Collecting Data Collecting Samples Communicating Results Comparing Data Conducting Research Creating Models Creating Sketches Creating/Constructing Graphs Developing Hypotheses Developing Procedures Drawing Conclusions Evaluating Models Evaluating Procedures / Methods Explaining Observations Explaining Results Identifying Patterns Making Inferences Making Observations Making Predictions Performing Calculations Practicing Lab Techniques Recording Observations Revising Hypotheses Testing Hypotheses 			

HANDS-ON INQUIRY AND APPLICATION

- Unit 2, Lesson 1 Quick Lab 1: Reaching the Dew Point: LM pages 98-100
- Unit 2, Lesson 1 Quick Lab 2: Compare Densities: LM pages 101-104
- Unit 2, Lesson 2 Quick Lab 1: Modeling the Water Cycle: LM pages 105-107
- Unit 2, Lesson 2 Quick Lab 2: Can You Make It Rain in a Jar?: LM pages 108-111
- Unit 2, Lesson 2 Exploration Lab 1: Changes in Water: LM pages 112-123
- Unit 2, Lesson 3 Quick Lab 1: Modeling Groundwater: LM pages 124-125
- Unit 2, Lesson 3 Quick Lab 2: Model a Stream: LM pages 126-129
- Unit 2, Lesson 3 STEM Lab 1: Aquifers and Development: LM pages 130-141
- Unit 2, Lesson 4 Quick Lab 1: Modeling the Coriolis Effect: LM pages 142-145
- Unit 2, Lesson 4 Quick Lab 2: The Formation of Deep Currents: LM pages 146-149
- Unit 2, Lesson 4 Quick Lab 3: Can Messages Travel on Ocean Water?: LM pages 150-153
- Unit 2, Lesson 5 Quick Lab 1: Ocean Pollution From Land: LM pages 154-156
- Unit 2, Lesson 5 Quick Lab 2: Turbidity and Water Temperature: LM pages 157-160
- Unit 2, Lesson 5 Field Lab 1: Investigating Water Quality: LM pages 161-170

- Unit 3, Lesson 1 Quick Lab 1: Modeling Air Pressure: LM pages 171-172
- Unit 3, Lesson 1 Quick Lab 2: Modeling Air Pressure Changes with Altitude: LM pages 173-176
- Unit 3, Lesson 1 Field Lab 1: Measuring Oxygen in the Air: LM pages 177-193
- Unit 3, Lesson 2 Quick Lab 1: The Sun's Angle and Temperature: LM pages 194-197
- Unit 3, Lesson 2 Quick Lab 2: How Does Color Affect Temperature?: LM pages 198-201
- Unit 3, Lesson 2 Quick Lab 3: Modeling Convection: LM pages 202-205
- Unit 3, Lesson 2 STEM Lab 1: Heat from the Sun: LM pages 206-216
- Unit 3, Lesson 3 Quick Lab 1: Flying with the Jet Stream: LM pages 217-219
- Unit 3, Lesson 3 Quick Lab 2: Rising Heat: LM pages 220-222
- Unit 3, Lesson 3 Quick Lab 3: Modeling Air Movement by Convection: LM pages 223-227
- Unit 3, Lesson 4 Quick Lab 1: Collecting Air-Pollution Particles: LM pages 228-231
- Unit 3, Lesson 4 Quick Lab 2: Identifying Sources of Indoor Air Pollution: LM pages 232-235

- Unit 4, Lesson 1 Quick Lab 1: Classifying Features of Different Types of Clouds: LM pages 236-239
- Unit 4, Lesson 1 Quick Lab 2: Investigate the Measurement of Rainfall: LM pages 240-243
- Unit 4, Lesson 1 Field Lab 1: Exploring Landforms: LM pages 244-262
- Unit 4, Lesson 2 Quick Lab 1: Analyze Weather Patterns: LM pages 263-265
- Unit 4, Lesson 2 Quick Lab 2: Coastal Climate Model: LM pages 266-269
- Unit 4, Lesson 2 Exploration Lab 1: Modeling El Niño: LM pages 270-280
- Unit 4, Lesson 3 Quick Lab 1: Determining Climate: LM pages 281-284
- Unit 4, Lesson 3 Quick Lab 2: Factors that Affect Climate: LM pages 285-288
- Unit 4, Lesson 3 Quick Lab 3: The Angles of the Sun's Rays: LM pages 289-293
- Unit 4, Lesson 3 Field Lab 1: How Land Features Affect Climate: LM pages 294-305
- Unit 4, Lesson 4 Quick Lab 1: Greenhouse Effect: LM pages 306-309
- Unit 4, Lesson 4 Quick Lab 2: Graphing Sunspots: LM pages 310-314

- Unit 5, Lesson 1 Quick Lab 1: Earth's Rotation and Revolution: LM pages 315-318
- Unit 5, Lesson 1 Quick Lab 2: Seasons Model: LM pages 319-321
- Unit 5, Lesson 1 Field Lab 1: Sunlight and Temperature: LM pages 322-331
- Unit 5, Lesson 2 Quick Lab 1: Moon Phases: LM pages 332-334
- Unit 5, Lesson 2 Quick Lab 2: Lunar Eclipse: LM pages 335-337
- Unit 5, Lesson 2 STEM Lab 1: What the Moon Orbits: LM pages 338-350
- Unit 5, Lesson 3 Quick Lab 1: Tides and Beaches: LM pages 351-353
- Unit 5, Lesson 3 Quick Lab 2: Tidal Math: LM pages 354-357

- STEM Unit 2: TE pages 166-169
- STEM Unit 3: TE pages 244-247
- STEM Unit 5: TE pages 384-387

ASSESSMENTS/PROGRESS MONITORING

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| <ul style="list-style-type: none"> • Formative and Summative Assessment <ul style="list-style-type: none"> ○ Unit 2, Lesson 1 - TE page 115 ○ Unit 2, Lesson 2 - TE page 129 ○ Unit 2, Lesson 3 - TE page 143 ○ Unit 2, Lesson 4 - TE page 157 ○ Unit 2, Lesson 5 - TE page 177 ○ Unit 3, Lesson 1 - TE page 207 ○ Unit 3, Lesson 2 - TE page 221 ○ Unit 3, Lesson 3 - TE page 237 ○ Unit 3, Lesson 4 - TE page 255 ○ Unit 4, Lesson 1 - TE page 283 ○ Unit 4, Lesson 2 - TE page 297 ○ Unit 4, Lesson 3 - TE page 315 ○ Unit 4, Lesson 4 - TE page 331 ○ Unit 5, Lesson 1 - TE page 361 ○ Unit 5, Lesson 2 - TE page 377 ○ Unit 5, Lesson 3 - TE page 395 | <ul style="list-style-type: none"> • Visual Summary and Lesson Review <ul style="list-style-type: none"> ○ Unit 2, Lesson 1 - TE page 120 ○ Unit 2, Lesson 2 - TE page 135 ○ Unit 2, Lesson 3 - TE page 149 ○ Unit 2, Lesson 4 - TE page 164 ○ Unit 2, Lesson 5 - TE page 184 ○ Unit 3, Lesson 1 - TE page 213 ○ Unit 3, Lesson 2 - TE page 228 ○ Unit 3, Lesson 3 - TE page 243 ○ Unit 3, Lesson 4 - TE page 261 ○ Unit 4, Lesson 1 - TE page 288 ○ Unit 4, Lesson 2 - TE page 304 ○ Unit 4, Lesson 3 - TE page 322 ○ Unit 4, Lesson 4 - TE page 339 ○ Unit 5, Lesson 1 - TE page 366 ○ Unit 5, Lesson 2 - TE page 382 ○ Unit 5, Lesson 3 - TE page 400 | <ul style="list-style-type: none"> • Unit 2 Review - TE pages 186-188 • Unit 3 Review - TE pages 262-264 • Unit 4 Review - TE pages 340-342 • Unit 5 Review - TE pages 402-404 |
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ASSESSMENT GUIDE

Unit 2

- Pretest: AG pages 34-35
- Lesson 1 Quiz: Water and Its Properties: AG page 36
- Lesson 1 Alt. Assessment: Water and Its Properties: A G page 37
- Lesson 2 Quiz: The Water Cycle: AG page 38
- Lesson 2 Alt. Assessment: The Water Cycle: AG page 39
- Lesson 3 Quiz: Surface Water and Groundwater: AG page 40
- Lesson 3 Alt. Assessment: Surface Water & Groundwater: AG page 41
- Lesson 4 Quiz: Ocean Currents: AG page 42
- Lesson 4 Alt. Assessment: Ocean Currents: AG page 43
- Lesson 5 Quiz: Human Impact on Water: AG page 44
- Lesson 5 Alt. Assessment: Human Impact on Water: AG page 45
- Performance-Based Assessment: TE: AG page 46
- Performance-Based Assessment: SE: AG pages 47-48
- Unit Review: AG pages 49-52
- Unit Test A: AG pages 53-59
- Unit Test B: AG pages 60-66

Unit 3

- Pretest: AG pages 67-68
- Lesson 1 Quiz: The Atmosphere: AG page 69
- Lesson 1 Alt. Assessment: The Atmosphere: AG page 70
- Lesson 2 Quiz: Energy Transfer: AG page 71
- Lesson 2 Alt. Assessment: Energy Transfer: AG page 72
- Lesson 3 Quiz: Wind in the Atmosphere: AG page 73
- Lesson 3 Alt. Assessment: Wind in the Atmosphere: AG page 74
- Lesson 4 Quiz: Human Impact on the Atmosphere: AG page 75
- Lesson 4 Alt. Assessment: Human Impact on the Atmosphere: AG page 76
- Performance-Based Assessment: TE: AG page 77
- Performance-Based Assessment: SE: AG pages 78-79
- Unit Review: AG pages 80-83
- Unit Test A: AG pages 84-90
- Unit Test B: AG pages 91-97

Unit 4

- Pretest: AG pages 98-99
- Lesson 1 Quiz: Elements of Weather: AG page 100
- Lesson 1 Alt. Assessment: Elements of Weather: AG page 101
- Lesson 2 Quiz: What Influences Weather?: AG page 102
- Lesson 2 Alt. Assessment: What Influences Weather?: AG page 103
- Lesson 3 Quiz: Climate: AG page 104
- Lesson 3 Alt. Assessment: Climate: AG page 105
- Lesson 4 Quiz: Climate Change: AG page 106
- Lesson 4 Alt. Assessment: Climate Change: AG page 107
- Performance-Based Assessment: TE: AG page 108
- Performance-Based Assessment: SE: AG pages 109-110
- Unit Review: AG pages 111-114
- Unit Test A: AG pages 115-121
- Unit Test B: AG pages 122-128

Unit 5

- Pretest: AG pages 129-130
- Lesson 1 Quiz: Earth's Days, Years, & Seasons: AG page 131
- Lesson 1 Alt. Assessment: Earth's Days, Years, and Seasons: AG page 132
- Lesson 2 Quiz: Moon Phases and Eclipses: AG page 133
- Lesson 2 Alt. Assessment: Moon Phases & Eclipses: AG page 134
- Lesson 3 Quiz: Earth's Tides: AG page 135
- Lesson 3 Alt. Assessment: Earth's Tides: AG page 136
- Performance-Based Assessment: TE: AG page 137
- Performance-Based Assessment: SE: AG pages 138-139
- Unit Review: AG pages 140-143
- Unit Test A: AG pages 144-150
- Unit Test B: AG pages 151-157

ACADEMIC CONNECTIONS TO OTHER DISCIPLINES:

- Astronomy Connection - TE page 236
- Botany Connection - TE page 128
- Do the Math - TE page 117
- Do the Math - TE page 132
- Do the Math - TE page 337
- Earth Science Connection - TE page 330
- Ecology Connection - TE page 156
- Engineering Connection - TE page 220
- Engineering Connection - TE page 282
- Engineering Connection - TE page 394
- Environmental Science Connection - TE page 236
- Health Connection - TE page 156
- Health Connection - TE page 176
- Language Art Connection - TE page 114
- Language Arts Connection - TE page 128
- Language Arts Connection - TE page 206
- Language Arts Connection - TE page 296
- Language Arts Connection - TE page 330
- Life Science Connection - TE page 314
- Math Connection - TE page 142
- Physical Science Connection - TE page 114
- Physiology Connection - TE page 376
- Real World Connection - TE page 142
- Real World Connection - TE page 176
- Real World Connection - TE page 206
- Real World Connection - TE page 220
- Real World Connection - TE page 254
- Real World Connection - TE page 254
- Real World Connection - TE page 394
- Social Studies Connection - TE page 296
- Social Studies Connection - TE page 314
- Social Studies Connection - TE page 360
- Technology Connection - TE page 282
- Technology Connection - TE page 360