

Geneva CUSD 304
Content-Area Curriculum Frameworks
Grades 6-12
Science

<p><i>Mission Statement</i></p>	<p><u>The Mission of Science Education Is:</u></p> <ol style="list-style-type: none"> 1) to nurture an active interest in science that continues throughout life. 2) to teach the learning skills and concepts necessary for the scientific process. 3) to develop student understanding of the interrelationships between science, society, and the environment 4) to encourage students to discover and develop their talent in science.
<p><i>Course Sequence</i> (Grades 6-12)</p>	<p>6th grade: Earth Science</p> <p>7th grade: Life Science</p> <p>8th grade: Physical Science</p> <p>9th grade: General Science Earth Science Biology Biology Honors</p> <p>10th ,11th ,12 grade: Chemistry Chemistry Honors Physics Astronomy Natural Disasters Anatomy and Physiology I and II Horticulture I and II AP Chemistry AP Biology AP Environmental Science</p>

Course Framework

Course Title Grade Level Semesters (1-2-3-4) Prerequisite	Earth Science 9 th /10 th 2 none
Course Description	This laboratory science is a study of the processes that produce changes on the surface of the earth, within the body of the earth, and in the atmosphere. These changes and their effect on humans are examined. Additionally, human influences on the environment are studied. Areas of study include the development of the earth's crust through time; the relationship between minerals and rocks; weathering and erosion of the earth's surface and the deposition of sediments; the oceans as a storehouse of riches; historical geology including fossil development, evolution, and extinction of life; elements of weather and climate that relate to micro-areas and the whole earth; interpretation of maps including geologic/topographic maps depicting landforms located within the United States; and an appreciation of our earth and its place in the cosmos.
District-approved Materials and/or Resources	Modern Earth Science Publisher: Holt Rinehart and Winston ISBN: 0-03-073543-2 Copy write: 2006

Unit Frameworks

Unit of Study: major topics	Introduction to Earth Science	<u>Resources that will support instruction</u> Textbook Worksheets Oobleck lab Measurement lab Floating & Sinking lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	<p> 11.A.4a Formulate hypotheses referencing prior research and knowledge. 11.A.4b Conduct controlled experiments or simulations to test hypotheses. 11.A.4c Collect, organize and analyze data accurately and precisely. 11.A.4d Apply statistical methods to the data to reach and support conclusions. 11.A.4e Formulate alternative hypotheses to explain unexpected results. 11.A.4f Using available technology, report, display and defend to an audience conclusions drawn from investigations. 11.A.5a Formulate hypotheses referencing prior research and knowledge. 11.A.5b Design procedures to test the selected hypotheses 11.A.5c Conduct systematic controlled experiments to test the selected hypotheses. 11.A.5d Apply statistical methods to make predictions and to test the accuracy of results. 11.A.5e Report, display and defend the results of investigations to audiences that may include professionals and technical experts. 13.A.4b Assess the validity of scientific data by analyzing the results, sample set, sample size, similar previous experimentation, possible misrepresentation of data presented and potential sources of error </p>	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	<p>I. Introduction to Earth Science (<i>Chapters 0, 1, & 2</i>)</p> <p style="padding-left: 20px;">A. Measurement (<i>Section 0</i>)</p> <ol style="list-style-type: none"> 1. Define gravity. 2. Compare, contrast, and measure length, mass, weight, volume, and density. <p style="padding-left: 20px;">B. What is Earth Science? (<i>Section 1.1</i>)</p> <ol style="list-style-type: none"> 1. Describe two cultures that contributed to modern scientific study. 2. Name the four main branches of earth science. 3. Discuss how Earth Scientists help us understand the world around us. <p style="padding-left: 20px;">C. Science as a Process (<i>Section 1.2</i>)</p> <ol style="list-style-type: none"> 1. Explain how science is different from other forms of human endeavor. 2. Identify the steps that make up scientific methods. 3. Distinguish between a hypothesis, theory, and a scientific law. 4. Analyze how scientific thought changes as new information is 	

	<p>collected.</p> <p>5. Explain how science affects society.</p> <p>D. Energy in the Earth System (<i>Section 2.2</i>)</p> <ol style="list-style-type: none"> 1. Compare an open system with a closed system. 2. List the characteristics of Earth's four major spheres. 3. Identify the two main sources of energy in the Earth System. 4. Identify four processes in which mater and energy cycle on Earth. <p>E. Ecology (<i>Section 2.3</i>)</p> <ol style="list-style-type: none"> 1. Define ecosystem. 2. Identify three factors that control the balance of an ecosystem. 3. Summarize how energy is transferred through an ecosystem. 4. Describe one way that ecosystems respond to environmental change. 	
<p>Assessments</p>	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>

Unit Frameworks

Unit of Study: major topics	Astronomy	<u>Resources that will support instruction</u> Textbook Worksheets Oxygen in Atmosphere lab The Universe Video
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	12.F.4a Explain theories, past and present, for changes observed in the universe. 12.F.4b Describe and compare the chemical and physical characteristics of galaxies and objects within galaxies (e.g., pulsars, nebulae, black holes, dark matter, stars). 12.F.5a Compare the processes involved in the life cycle of stars (e.g., gravitational collapse, thermonuclear fusion, nova) and evaluate the supporting evidence. 12.F.5b Describe the size and age of the universe and evaluate the supporting evidence (e.g., red-shift, Hubble’s constant).	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	II. The Earth in the Universe (<i>Chapters 2, 26, 27, and 30</i>) <ul style="list-style-type: none"> A. The Origin of the Universe (<i>Sections 26.1 and 30.4</i>) <ol style="list-style-type: none"> 1. Describe the characteristics of the universe in terms of time, distance, and organization. 2. Identify the visible and nonvisible parts of the electromagnetic spectrum. 3. Explain how Hubble’s discoveries lead to an understanding that the universe is expanding. 4. Summarize and list the evidence for the big bang theory. B. The Origin of the Solar System (<i>Section 27.1</i>) <ol style="list-style-type: none"> 1. Explain the nebular hypothesis of the origin of the solar system. 2. Describe how the planets formed. C. The Origin of the Earth (<i>Section 27.1</i>) <ol style="list-style-type: none"> 1. Describe the formation of the land, the atmosphere, and the oceans of the Earth. D. The Layers of the Earth (<i>Section 2.1</i>) <ol style="list-style-type: none"> 1. Describe the size and shape of Earth. 2. Describe the compositional and structural layers of Earth’s interior. E. The Earth in Orbit (<i>Section 26.2</i>) <ol style="list-style-type: none"> 1. Describe the two lines of evidence for Earth’s rotation. 2. Explain how the change in the apparent positions of constellations provide evidence of Earth’s rotation and revolution around the Sun. 3. Summarize how Earth’s rotation and revolution provide a basis for 	

	measuring time. 4. Explain how the tilt of Earth's axis and Earth's movement cause seasons.	
Assessments	Performance Tasks <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	Other Evidence

Unit Frameworks

Unit of Study: major topics	Plate Tectonics	<u>Resources that will support instruction</u> Textbook Worksheets Plate Tectonics Lab Virtual Plate Tectonics lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	<p>12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics).</p> <p>12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth.</p> <p>12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).</p>	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	<p>III. Plate Tectonics (<i>Chapter 10</i>)</p> <p style="padding-left: 40px;">A. Continental Drift (<i>Section 10.1</i>)</p> <ol style="list-style-type: none"> 1. Summarize Wegener’s hypothesis of continental drift. 2. Describe the process of sea-floor spreading. 3. Identify how paleomagnetism provides support for the idea of sea-floor spreading. 4. Explain how sea-floor spreading provides a mechanism for continental drift. <p style="padding-left: 40px;">B. The Theory of Plate Tectonics (<i>Section 10.2</i>)</p> <ol style="list-style-type: none"> 1) Summarize the theory of plate tectonics. 2) Compare the characteristic geologic activities that occur along the three types of plate boundaries. 3) List and describe three causes of plate movement. 	
Assessments	Performance Tasks <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	Other Evidence

Unit Frameworks

Unit of Study: major topics	Structural Geology	<u>Resources that will support instruction</u> Textbook Worksheet Modeling Faults lab Virtual earthquake Lab Locating and Earthquake Lab Locating Active Volcanoes Lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics). 12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth. 12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	IV. Deformation, Earthquakes, and Volcanoes (<i>Chapters 11, 12, & 13</i>) A. Deformation (<i>Chapter 11</i>) 1. How rock deforms (<i>Section 11.1</i>) a. Summarize the principle of isostasy. b. Identify the three main types of stress. c. List and compare the different types of faults and folds. 2. How mountains form (<i>Section 11.2</i>) a. Identify the types of plate collisions that form mountains. b. Identify the four types of mountains. c. Compare how folded and fault block mountains form. B. Earthquakes (<i>Chapter 12</i>) 1. How and where earthquakes happen (<i>Section 12.1</i>) a. Describe elastic rebound. b. Compare body waves and surface waves. c. Explain how the structure of Earth’s interior affects seismic waves. d. Explain why earthquakes generally occur at plate boundaries. 2. Studying Earthquakes (<i>Section 12.2</i>) a. Describe the instrument used to measure and record earthquakes. b. Summarize and apply the method scientists use to locate an epicenter.	

	<p>c. Describe the scales used to measure the magnitude and intensity of earthquakes.</p> <p>3. Earthquakes and society (<i>Section 12.3</i>)</p> <ol style="list-style-type: none"> Discuss the relationship between tsunamis and earthquakes. Describe two possible effects of a major earthquake on buildings. List three safety techniques to prevent injury caused by earthquake activity. Identify four methods scientists use to forecast earthquakes. <p>C. Volcanoes (<i>Chapter 13</i>)</p> <ol style="list-style-type: none"> Volcanoes and plate tectonics (<i>Section 13.1</i>) <ol style="list-style-type: none"> Describe the three conditions under which magma can form. Explain what volcanism is. Identify three tectonic settings where volcanoes form. Describe how magma can form plutons. Volcanic eruptions (<i>Section 13.2</i>) <ol style="list-style-type: none"> Explain how the composition of magma affects volcanic eruptions and lava flow. Describe the five major types of pyroclastic material. Identify the three main types of volcanic cones. Describe how a caldera forms. List three events that may signal a volcanic eruption. 	
<p>Assessments</p>	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>

Unit Frameworks

Unit of Study: major topics	Earth Chemistry	<u>Resources that will support instruction</u> Textbook Worksheet Powers of Ten video
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	12.C.4b Analyze and explain the atomic and nuclear structure of matter. 12.C.5a Analyze reactions (e.g., nuclear reactions, burning of fuel, decomposition of waste) in natural and man-made energy systems. 12.C.5b Analyze the properties of materials (e.g., mass, boiling point, melting point, hardness) in relation to their physical and/or chemical structures.	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	V. Earth Chemistry (<i>Chapter 4</i>) <ul style="list-style-type: none"> A. Matter (<i>Section 4.1</i>) <ol style="list-style-type: none"> 1. Compare chemical properties and physical properties. 2. Describe the basic structure of an atom. 3. Compare atomic number, mass number, and atomic mass. 4. Define Isotope. 5. Describe the arrangement of elements in the periodic table. B. Combinations of atoms (<i>Section 4.2</i>) <ol style="list-style-type: none"> 1. Define compound and molecule. 2. Interpret chemical formulas. 3. Describe two ways that electrons form chemical bonds between atoms. 4. Explain the differences between compounds and mixtures 	
Assessments	Performance Tasks <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	Other Evidence

Unit Frameworks

Unit of Study: major topics	Rocks & Minerals	<u>Resources that will support instruction</u> Textbook Worksheet Mineral Lab Rocks Lab Virtual Rocks and Minerals Lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	11.A.4a Formulate hypotheses referencing prior research and knowledge. 11.A.4b Conduct controlled experiments or simulations to test hypotheses. 11.A.4c Collect, organize and analyze data accurately and precisely. 11.A.4e Formulate alternative hypotheses to explain unexpected results. 12.C.4b Analyze and explain the atomic and nuclear structure of matter	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	VI. Rocks and Minerals (<i>Chapters 5 & 6</i>) <ul style="list-style-type: none"> A. Minerals (<i>Chapter 5</i>) <ol style="list-style-type: none"> 1. Define mineral. 2. Compare the two main groups of minerals. 3. Identify the six types of silicate structures and three common nonsilicate crystalline structures. 4. Describe seven physical properties that help distinguish one mineral from another. 5. List five special properties that may help identify certain minerals. B. Rocks (<i>Chapters 6</i>) <ol style="list-style-type: none"> 1. Rocks and the rock cycle (<i>Section 6.1</i>) <ol style="list-style-type: none"> a. Identify the three major types of rock, and explain how each type forms. b. Summarize the steps in the rock cycle. c. Explain Bowen’s reaction series. d. Summarize the factors that affect the stability of rocks. 2. Igneous Rock (<i>Section 6.2</i>) <ol style="list-style-type: none"> a. Summarize the three factors that affect whether rock melts. b. Describe how the cooling rate of magma and lava affects the texture of igneous rocks. c. Classify igneous rocks according to their composition and texture. d. Describe intrusive and extrusive igneous rock structures. 	

	<p>3. Sedimentary Rock (<i>Section 6.3</i>)</p> <ol style="list-style-type: none"> a. Explain the processes of compaction and cementation. b. Describe how chemical and organic sedimentary rocks form. c. Describe how clastic sedimentary rock forms. d. Identify the seven sedimentary rock features. <p>4. Metamorphic Rock (<i>Section 6.4</i>)</p> <ol style="list-style-type: none"> a. Describe the process of metamorphism. b. Explain the difference between regional and contact metamorphism. c. Distinguish between foliated and nonfoliated metamorphic rocks, and give an example of each. 	
<p>Assessments</p>	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>

Unit Frameworks

Unit of Study: major topics	Maps	<u>Resources that will support instruction</u> Textbook Worksheet Exploring Topo Maps Lab Making a Topo map Lab Room Mapping Lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	12.D.5a Analyze factors that influence the relative motion of an object (e.g., friction, wind shear, cross currents, potential differences). 12.D.5b Analyze the effects of gravitational, electromagnetic and nuclear forces on a physical system.	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	IX. Maps - Models of the Earth (<i>Chapter 3</i>) <ul style="list-style-type: none"> A. Finding Locations on Earth (<i>Section 3.1</i>) <ul style="list-style-type: none"> 1. Distinguish between latitude and longitude. 2. Explain how latitude and longitude can be used to locate places on the Earth. 3. Explain how a magnetic compass can be used to find directions on the earth. B. Mapping Earth’s Surface (<i>Section 3.2</i>) <ul style="list-style-type: none"> 1) Explain two ways scientists get data to make maps. 2) Describe the characteristics and used of three types of map projections. 3) Summarize how to use keys, legends, and scales to read maps. C. Types of Maps (<i>Section 3.3</i>) <ul style="list-style-type: none"> 1) Explain how elevation and topography can be shown on a map. 2) Interpret a topographic map. 3) Describe three types of information shown in geologic maps. 4) Identify two uses of soil maps. 	
Assessments	Performance Tasks <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	Other Evidence

Unit Frameworks

Unit of Study: major topics	Weathering, Soils, Erosion	<u>Resources that will support instruction</u> Textbook Worksheets Weathering Rocks Lab Soil Lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	11.A.4a Formulate hypotheses referencing prior research and knowledge. 11.A.4b Conduct controlled experiments or simulations to test hypotheses. 11.A.4c Collect, organize and analyze data accurately and precisely. 11.A.4d Apply statistical methods to the data to reach and support conclusions. 12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics). 12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth. 12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	X. Weathering, Soils, Erosion, and Deposition (Chapters 14, 15, 17, & 18) <ul style="list-style-type: none"> A. Weathering (<i>Sections 14.1 & 14.2</i>) <ol style="list-style-type: none"> 1) Identify three agents of mechanical weathering. 2) Compare mechanical and chemical weathering processes. 3) Discuss the chemical reactions that decompose rock. 4) Explain how rock composition affects the rate of weathering. 5) Discuss how surface area affects the rate at which rock weathers. 6) Describe the effects of climate and topography on the rate of weathering. B. Soils (<i>Sections 14.3 & 14.4</i>) <ol style="list-style-type: none"> 1) Summarize how soil forms. 2) Explain how the composition of parent rock affects the soil composition. 3) Describe the characteristic layers of mature residual soils. 4) Predict the type of soil produced in various climatic environments. 5) Identify various unwise farming methods that result in accelerated soil erosion and list four methods of soil conservation that prevent this damage. C. Erosion and Deposition (<i>Sections 14.4, 15.2, 15.3, 17.2, 18.1</i>) <ol style="list-style-type: none"> 1) Define erosion and outline and compare the four agents of 	

	<p>erosion.</p> <p>2) Discuss two ways gravity contributes to erosion.</p> <p>3) Describe three major landforms shaped by weathering and erosion.</p> <p>4) Explain how deposition occurs as a result of gravity, running water, glaciers, and wind.</p>	
<p>Assessments</p>	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>

Unit Frameworks

Unit of Study: major topics	Earth's Fresh Water	<u>Resources that will support instruction</u> Textbook Worksheet Rivers Lab River Project Water & Sediment Lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics). 12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth. 12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	XI. Earth's Fresh Water (<i>Chapters 15 and 16</i>) A. The water cycle (<i>Section 15.1</i>) <ol style="list-style-type: none"> 1. Outline the stages of the water cycle. 2. Describe the factors that affect a water budget. 3. List two approaches to water conservation. B. River Systems (<i>Sections 15.2 & 15.3</i>) <ol style="list-style-type: none"> 1. Summarize how a river develops. 2. Describe the parts of a river system. 3. Explain factors that affect the evolution of a river channel. 4. Describe how erosive factors affect the evolution of a river channel. 5. Describe one advantage and one disadvantage of living on a floodplain. 6. Identify three methods of flood control. C. Groundwater (<i>Section 16.1</i>) <ol style="list-style-type: none"> 1. Identify properties of aquifers that affect the flow of groundwater. 2. Describe the water table and its relationship to the land surface. 3. Compare wells, springs, and artesian wells. 4. Describe two land features formed by hot groundwater D. Karst Topography (<i>Section 16.2</i>) <ol style="list-style-type: none"> 1. Describe how water chemically weathers rock. 	

	<p>2. Explain how caverns and sinkholes form.</p> <p>3. Identify at least two features of karst topography.</p>	
Assessments	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>

Unit Frameworks

Unit of Study: major topics	Earth History	<u>Resources that will support instruction</u> Textbook Worksheet Geologic Time Calendar Lab Life on Earth Through Time Lab Walking with Dinosaurs Video
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics). 12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth. 12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	XII. Earth History (<i>Chapters 8 & 9</i>) <ul style="list-style-type: none"> A. The Rock Record (<i>Chapter 8</i>) <ul style="list-style-type: none"> 1. Determining relative age (<i>Section 8.1</i>) <ul style="list-style-type: none"> a. State the principle of uniformitarianism. b. Explain how the law of superposition can be used to determining the relative age of rocks. c. Apply the law of crosscutting relationships to determine the relative ages of rocks. d. Compare three types of unconformities, and explain their importance for determining relative age in rocks. 2. Determining absolute age (<i>Section 8.2</i>) <ul style="list-style-type: none"> a. Summarize the limitations of using the rates of erosion and deposition to determine the absolute age of rock formations. b. Describe the formation of varves. c. Explain how the process of radioactive decay can be used to determine the absolute age of rocks. 3. The fossil record (<i>Section 8.3</i>) <ul style="list-style-type: none"> a. Describe four ways in which entire organisms can be preserved as fossils. b. List five examples of fossilized traces of organisms. c. Describe how index fossils can be used to determine the age of rocks. B. The Geologic Time Scale (<i>Chapter 9</i>) 	

	<ol style="list-style-type: none"> 1. Summarize how scientists worked together to develop the geologic column. 2. List the major divisions of geologic time. 3. Summarize how evolution is related to geologic change. 4. Identify one major geologic and two major biological developments in the Precambrian, Paleozoic, Mesozoic, and Cenozoic Eras. 5. List the periods of the major eras, and list the epochs within the Cenozoic 	
<p>Assessments</p>	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>

Unit Frameworks

Unit of Study: major topics	Oceans	<u>Resources that will support instruction</u> Textbook Worksheets Ocean Mapping Lab Contour of the Ocean Floor Lab Ocean water Density Lab
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	<p>12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics).</p> <p>12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth.</p> <p>12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).</p>	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	<p>XIII. Oceans (<i>Chapters 19, 20, & 21</i>)</p> <p>A. The Ocean Floor (<i>Chapter 19</i>)</p> <ol style="list-style-type: none"> 1. Exploring the Oceans (<i>Section 19.1</i>) <ol style="list-style-type: none"> a. Name the major divisions of the global ocean. b. Describe how oceanographers study the ocean. c. Explain how sonar works. 2. The Ocean Floor (<i>Section 19.2</i>) <ol style="list-style-type: none"> a. Describe the main features of the continental margins. b. Describe the main features of the deep ocean basin. 3. Ocean Floor Sediments (<i>Section 19.3</i>) <ol style="list-style-type: none"> a. Describe the formation of ocean floor sediments. b. Explain how ocean floor sediments are classified by their physical composition. <p>B. Ocean Water, Life, and Resources (<i>Chapter 20</i>)</p> <ol style="list-style-type: none"> 1. Ocean Water (<i>Section 20.1</i>) <ol style="list-style-type: none"> a. Describe the chemical composition of ocean water. b. Describe the salinity, temperature, density, and color of ocean water. 2. Ocean Life (<i>Section 20.2</i>) <ol style="list-style-type: none"> a. Explain how marine organisms alter the chemistry of ocean water. b. Explain why plankton can be called the foundation of 	

	<p>life in the ocean.</p> <p>c. Describe the major zones of life in the ocean.</p> <p>3. Ocean Resources (<i>Section 20.3</i>)</p> <p>a. Describe three important resources of the ocean.</p> <p>b. Explain the threat water pollution poses to marine organisms.</p> <p>C. Ocean Currents, Waves, and Tides (<i>Chapter 21</i>)</p> <p>1. Ocean Currents (<i>Section 21.1</i>)</p> <p>a. Describe how wind patterns, the rotation of Earth, and continental barriers affect the surface currents in the ocean.</p> <p>b. Identify the major factor that determines the direction in which a surface current circulates.</p> <p>c. Explain how differences in the density of ocean water affect the flow of deep currents.</p> <p>2. Ocean Waves (<i>Section 21.2</i>)</p> <p>a. Describe the formation of waves and the factors that affect wave size.</p> <p>b. Explain how waves interact with the coastline.</p> <p>c. Identify the cause of destructive ocean waves.</p> <p>3. Ocean Tides (<i>Section 21.3</i>)</p> <p>a. Describe how the gravitational pull of the moon causes tides.</p> <p>b. Compare spring tides with neap tides.</p> <p>c. Describe how tidal oscillations affect tidal patterns.</p> <p>d. Explain how the coastline affects tidal currents.</p>		
<p>Assessments</p>	<table border="1"> <tr> <td data-bbox="423 1325 974 1694"> <p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams </td> <td data-bbox="974 1325 1516 1694"> <p>Other Evidence</p> </td> </tr> </table>	<p>Performance Tasks</p> <ul style="list-style-type: none"> ▪ Homework completion ▪ Design and carry out a controlled experiment ▪ Lab work and reports ▪ Quizzes ▪ Exams 	<p>Other Evidence</p>
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Unit Frameworks

Unit of Study: major topics	Meteorology	<u>Resources that will support instruction</u> Textbook Worksheets The Atmosphere Lab Weather Project
Illinois Learning Standards, Benchmarks, National Standards Assessment Frameworks, or other standards that will be taught in this unit	<p>11.A.4f Using available technology, report, display and defend to an audience conclusions drawn from investigations.</p> <p>11.A.5e Report, display and defend the results of investigations to audiences that may include professionals and technical experts.</p> <p>12.E.4a Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics).</p> <p>12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).</p>	
Objectives <ul style="list-style-type: none"> ○ Conceptual ○ Factual ○ Procedural 	<p>XIV. Meteorology (<i>Chapters 22, 23, & 24</i>)</p> <p>A. The Atmosphere (<i>Section 22.1</i>)</p> <ol style="list-style-type: none"> 1. Describe the composition of Earth’s atmosphere. 2. Explain how two types of barometers work. 3. Identify the layers of the atmosphere. 4. Identify two effects of air pollution. <p>B. Energy Transfer in the Atmosphere (<i>Section 22.2</i>)</p> <ol style="list-style-type: none"> 1. Explain how radiant energy reaches Earth. 2. Describe how visible light and infrared energy warm Earth. 3. Summarize the processes of radiation, conduction, and convection. <p>C. Atmospheric Circulation (<i>Section 22.3</i>)</p> <ol style="list-style-type: none"> 1. Explain the Coriolis Effect. 2. Describe the global patterns of air circulation, and name three global wind patterns. 3. Identify two factors that form local wind patterns. <p>D. Atmospheric Moisture (<i>Section 23.1</i>)</p> <ol style="list-style-type: none"> 1. Explain how heat energy affects the changing phases of water. 2. Explain what absolute humidity and relative humidity are, and describe how they are measured. 3. Describe what happens when the temperature of air decrease to the dew point or below the dew point. 	

E. Clouds and Fog (*Section 23.2*)

1. Describe the conditions that are necessary for clouds to form.
2. Explain the four processes of cooling that can lead to the formation of clouds.
3. Identify the three types of clouds.
4. Describe four ways in which fog can form.

F. Precipitation (*Section 23.3*)

1. Identify the four forms of precipitation.
2. Compare the two processes that cause precipitation.
3. Describe two ways that precipitation is measured.
4. Explain how rain can be produced artificially.

G. Air Masses and Fronts (*Sections 24.1 & 24.2*)

1. Explain how an air mass forms and list the four types of air masses.
2. Describe how air masses affect the weather of North America.
3. Compare the characteristic weather patterns of cold fronts with those of warm fronts.
4. Describe how a midlatitude cyclone forms.
5. Describe the development of hurricanes, thunderstorms, and tornadoes.

H. Weather Forecasting (*Sections 23.3 & 23.4*)

1. Identify the various weather instruments that measure lower- and upper-atmospheric weather conditions and describe how they are used.
2. Explain how computers help scientists understand weather.
3. Explain how weather stations communicate weather data.
4. Explain how a weather map is created.
5. Explain how computer models help meteorologists forecast weather.
6. List three types of weather that meteorologists have attempted to control.

I. Climatology (*Chapter 25*)

1. Discuss the factors that affect climate. (*Section 25.1*)
2. Outline the major climate zones and explain why city climates may differ from rural climates. (*Section 25.2*)
3. Discuss the methods of study, factors of cause, possible impacts, and ways to minimize climate change. (*Section 25.3*)

Assessments	Performance Tasks <ul style="list-style-type: none">▪ Homework completion▪ Design and carry out a controlled experiment▪ Projects▪ Lab work and reports▪ Quizzes▪ Exams	Other Evidence
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