Science Tutorials offer targeted instruction, practice, and review designed to help students develop scientific literacy, deepen conceptual understanding, and apply scientific practices. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By continually honing their ability to apply knowledge in real-world scenarios, students build the depth of knowledge and higher-order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students as they explore the nature of science through focused content, interactive mini investigations, multi-modal representations, and personalized feedback. The Review It offers a high-impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

These Tutorials are built to state standards.

Unit 1: The Nature of Science

- **WHAT IS SCIENCE?**
- **TYPES OF INVESTIGATIONS**
- **USING MODELS**

Unit 2: Measurement and Data

- **TOOLS AND MEASUREMENT**
- **DISPLAYING AND INTERPRETING DATA**

Unit 3: Nature of Matter

- **WHAT IS MATTER?**
  - NCES.8.P.1.1: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.
  - NCES.8.P.1.2: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Explain how the physical properties of elements and their reactivity have been used to produce the current model of the Periodic Table of elements.
- **ATOMIC STRUCTURE**
  - NCES.8.P.1.2: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Explain how the physical

properties of elements and their reactivity have been used to produce the current model of the Periodic Table of elements.

- **THE PERIODIC TABLE**
  - NCES.8.P.1.2: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Explain how the physical properties of elements and their reactivity have been used to produce the current model of the Periodic Table of elements.

Unit 4: Properties and Changes in Matter

- **PROPERTIES OF MATTER**
  - NCES.8.P.1.3: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Compare physical changes such as size, shape and state to chemical changes that are the result of a chemical reaction to include changes in temperature, color, formation of a gas or precipitate.
- **PHYSICAL AND CHEMICAL CHANGES**
  - NCES.8.P.1.3: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Compare physical changes such as size, shape and state to chemical changes that are the result of a chemical reaction to include changes in temperature, color, formation of a gas or precipitate.
- **CHEMICAL EQUATIONS**
  - NCES.8.P.1.4: Matter: Properties and Change Understand the properties of matter and changes that occur when matter interacts in an open and closed container. Explain how the idea of atoms and a balanced chemical equation support the law of conservation of mass.

Unit 5: The Hydrosphere and Cryosphere

- **FRESHWATER AND ICE**
  - NCES.8.E.1.1.a: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Explain the structure of the hydrosphere including: Water distribution on earth
  - NCES.8.E.1.1.b: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Explain the structure of the hydrosphere including: Local river basins and water availability
- **OCEANS**
  - NCES.8.E.1.2.a: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Estuaries
  - NCES.8.E.1.2.b: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize

evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Marine ecosystems

- NCES.8.E.1.2.c: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Upwelling
- NCES.8.E.1.2.d: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Behavior of gases in the marine environment
- NCES.8.E.1.2.f: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Deep ocean technology and understandings gained
- NCES.8.E.1.2.e: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Value and sustainability of marine resources
- NCES.8.E.1.2.a: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Estuaries
- NCES.8.E.1.2.b: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Marine ecosystems
- NCES.8.E.1.2.c: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Summarize evidence that Earths oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: Upwelling
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Unit 6: Nature of Life, Time, and Human Impact

- **CHEMISTRY OF LIFE**
  - NCES.8.L.5.2: Molecular Biology Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms. Explain the relationship among a healthy diet, exercise, and the general health of the body (emphasis on the relationship between respiration and digestion).
- **GEOLOGIC TIME**
  - NCES.8.E.2.2: Earth History Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms. Explain the use of fossils, ice cores, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms.
  - NCES.8.E.2.1: Earth History Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms. Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and radioactive dating).
- **IMPACTS OF HUMANS**
  - NCES.8.P.2.1: Energy: Conservation and Transfer Explain the environmental implications associated with the various methods of obtaining, managing, and using energy resources. Explain the environmental consequences of the various methods of obtaining, transforming and distributing energy.
  - NCES.8.P.2.2: Energy: Conservation and Transfer Explain the environmental implications associated with the various methods of obtaining, managing, and using energy resources. Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.
  - NCES.8.E.1.3.b: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: Dissolved oxygen
  - NCES.8.E.1.3.c: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Predict the

safety and potability of water supplies in North Carolina based on physical and biological factors, including: pH

- NCES.8.E.1.3.d: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: Nitrates and phosphates
- NCES.8.E.1.3.e: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: Turbidity
- NCES.8.E.1.3.f: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: Bio-indicators
- NCES.8.E.1.4.a: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Conclude that the good health of humans requires: Monitoring of the hydrosphere
- NCES.8.E.1.4.b: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Conclude that the good health of humans requires: Water quality standards
- NCES.8.E.1.4.c: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Conclude that the good health of humans requires: Methods of water treatment
- NCES.8.E.1.4.d: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Conclude that the good health of humans requires: Maintaining safe water quality
- NCES.8.E.1.4.e: Earth Systems, Structures and Processes Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. Conclude that the good health of humans requires: Stewardship

Unit 7: Genetics and the Human Body

- **BIOTECHNOLOGY**
  - NCES.8.L.2.1.a: Structures and Functions of Living Organisms Understand how biotechnology is used to affect living organisms. Summarize aspects of biotechnology including: Specific genetic information available
  - NCES.8.L.2.1.e: Structures and Functions of Living Organisms Understand how biotechnology is used to affect living organisms. Summarize aspects of biotechnology including: Implications for agriculture

- NCES.8.L.2.1.b: Structures and Functions of Living Organisms Understand how biotechnology is used to affect living organisms. Summarize aspects of biotechnology including: Careers
- NCES.8.L.2.1.c: Structures and Functions of Living Organisms Understand how biotechnology is used to affect living organisms. Summarize aspects of biotechnology including: Economic benefits to North Carolina
- NCES.8.L.2.1.d: Structures and Functions of Living Organisms Understand how biotechnology is used to affect living organisms. Summarize aspects of biotechnology including: Ethical issues

- **DISEASE AND HUMAN HEALTH**
  - NCES.8.L.1.1: Structures and Functions of Living Organisms Understand the hazards caused by agents of diseases that effect living organisms. Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.
  - NCES.8.L.1.2: Structures and Functions of Living Organisms Understand the hazards caused by agents of diseases that effect living organisms. Explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease.

Unit 8: Ecology

- **CHARACTERISTICS OF ECOSYSTEMS**
  - NCES.8.L.3.1: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Explain how factors such as food, water, shelter and space affect populations in an ecosystem.
- **INTERACTIONS IN ECOSYSTEMS**
  - NCES.8.L.3.2.a: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: Coexistence and cooperation
  - NCES.8.L.3.2.b: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: Competition (predator/prey)
  - NCES.8.L.3.2.c: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: Parasitism
  - NCES.8.L.3.2.d: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: Mutualism
  - NCES.8.L.3.1: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Explain how factors such as food, water, shelter

and space affect populations in an ecosystem.

- NCES.8.L.3.3: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Explain how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide and oxygen).
- NCES.8.L.5.1: Molecular Biology Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms. Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms (to include plants).
- NCES.8.L.5.2: Molecular Biology Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms. Explain the relationship among a healthy diet, exercise, and the general health of the body (emphasis on the relationship between respiration and digestion).

- **SUCCESSION AND ECOSYSTEM STABILITY**
  - NCES.8.L.3.1: Ecosystems Understand how organisms interact with and respond to the biotic and abiotic components of their environment. Explain how factors such as food, water, shelter and space affect populations in an ecosystem.

Unit 9: Evolution

- **THEORY OF EVOLUTION**
  - NCES.8.E.2.2: Earth History Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms. Explain the use of fossils, ice cores, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms.
  - NCES.8.L.4.1: Evolution and Genetics Understand the evolution of organisms and landforms based on evidence, theories and processes that impact the Earth over time. Summarize the use of evidence drawn from geology, fossils, and comparative anatomy to form the basis for biological classification systems and the theory of evolution.
- **NATURAL SELECTION**
  - NCES.8.L.4.2: Evolution and Genetics Understand the evolution of organisms and landforms based on evidence, theories and processes that impact the Earth over time. Explain the relationship between genetic variation and an organisms ability to adapt to its environment.