

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**
 - NCES.7.P.1.3: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Illustrate the motion of an object using a graph to show a change in position over a period of time.
 - NCES.7.P.1.4: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Interpret distance versus time graphs for constant speed and variable motion.

Unit 3: Force and Motion

- **DESCRIBING FORCES**
 - NCES.7.P.1.2: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).
- **DESCRIBING MOTION**

- NCES.7.P.1.1: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object.
- NCES.7.P.1.3: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Illustrate the motion of an object using a graph to show a change in position over a period of time.
- NCES.7.P.1.4: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Interpret distance versus time graphs for constant speed and variable motion.

- **EFFECTS OF FORCES**

- NCES.7.P.1.2: Forces and Motion Understand motion, the effects of forces on motion and the graphical representations of motion. Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).

Unit 4: Energy and Work

- **DESCRIBING ENERGY**

- NCES.7.P.2.1: Energy: Conservation and Transfer Understand forms of energy, energy transfer and transformation and conservation in mechanical systems. Explain how kinetic and potential energy contribute to the mechanical energy of an object.

- **ENERGY TRANSFER AND TRANSFORMATION**

- NCES.7.P.2.2: Energy: Conservation and Transfer Understand forms of energy, energy transfer and transformation and conservation in mechanical systems. Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).
- NCES.7.P.2.3: Energy: Conservation and Transfer Understand forms of energy, energy transfer and transformation and conservation in mechanical systems. Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.
- NCES.7.P.2.1: Energy: Conservation and Transfer Understand forms of energy, energy transfer and transformation and conservation in mechanical systems. Explain how kinetic and potential energy contribute to the mechanical energy of an object.

- **WORK AND SIMPLE MACHINES**

- NCES.7.P.2.2: Energy: Conservation and Transfer Understand forms of energy, energy transfer and transformation and conservation in mechanical systems. Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).

- NCES.7.P.2.4: Energy: Conservation and Transfer Understand forms of energy, energy transfer and transformation and conservation in mechanical systems. Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.

Unit 5: The Atmosphere, Hydrosphere, and Cryosphere

• FRESHWATER AND ICE

- NCES.7.E.1.2: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.
- NCES.7.E.1.2: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.
- NCES.7.E.1.4.c: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Predict weather conditions and patterns based on information obtained from: Cloud shapes and types and associated elevation

• THE ATMOSPHERE

- NCES.7.E.1.1: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.
- NCES.7.E.1.2: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.
- NCES.7.E.1.5: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.

Unit 6: Weather

• WEATHER

- NCES.7.E.1.3: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms

(including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.

- NCES.7.E.1.5: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.
 - NCES.7.E.1.3: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.
 - NCES.7.E.1.5: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.
 - NCES.7.E.1.4.a: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Predict weather conditions and patterns based on information obtained from: Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure)
 - NCES.7.E.1.4.b: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Predict weather conditions and patterns based on information obtained from: Weather maps, satellites and radar
- **SEVERE WEATHER**
 - NCES.7.E.1.3: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.
 - NCES.7.E.1.4.a: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Predict weather conditions and patterns based on information obtained from: Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure)

Unit 7: Climate and Human Impact

- **CLIMATE**

- NCES.7.E.1.5: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.
- NCES.7.E.1.6: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.

- **IMPACTS OF HUMANS**

- NCES.7.E.1.6: Earth Systems, Structures and Processes Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans. Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.

Unit 8: Nature of Life and Cells

- **CHARACTERISTICS OF LIFE**

- NCES.7.L.1.3: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Summarize the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms.

- **CELL STRUCTURE**

- NCES.7.L.1.2: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles).

Unit 9: Cells

- **CELL NUTRITION AND TRANSPORT**

- NCES.7.L.1.1.a: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Euglena
- NCES.7.L.1.1.b: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Amoeba
- NCES.7.L.1.1.c: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Paramecium

- **CELL GROWTH AND REPRODUCTION**

- NCES.7.L.2.1: Evolution and Genetics Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring. Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis).

Unit 10: Genetics

- **INHERITANCE**

- NCES.7.L.2.1: Evolution and Genetics Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring. Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis).
- NCES.7.L.2.2: Evolution and Genetics Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring. Infer patterns of heredity using information from Punnett squares and pedigree analysis.

- **GENES AND DNA**

- NCES.7.L.2.3: Evolution and Genetics Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring. Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival.

Unit 11: Diversity of Life and Reproduction

- **DOMAINS AND KINGDOMS OF LIFE**

- NCES.7.L.1.1.a: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Euglena
- NCES.7.L.1.1.b: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Amoeba
- NCES.7.L.1.1.c: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Paramecium
- NCES.7.L.1.1.d: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry

out the basic functions of life. Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Volvox

- **PATTERNS OF REPRODUCTION**

- NCES.7.L.2.1: Evolution and Genetics Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring. Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis).

Unit 12: The Human Body

- **HUMAN ORGAN SYSTEMS**

- NCES.7.L.1.4: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life.

- **DISEASE AND HUMAN HEALTH**

- NCES.7.L.1.4: Structures and Functions of Living Organisms Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life. Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life.