

Middle School Grade 6 Science Tutorials offer targeted instruction, practice, and review designed to help students develop scientific literacy, deepen conceptual understanding, and apply scientific practices. Students explore concepts such as Earth's weather and climate, energy transfer and conservation, and the diversity of life.

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 the Next Generation Science Standards for middle school science.

1. NATURE OF SCIENCE

• WHAT IS SCIENCE?

- **6.S.1A.1.1** generate hypotheses for scientific investigations,
- **6.S.1A.3.1** formulate scientific questions and testable hypotheses,
- **6.S.1A.4.2** support hypotheses, explanations, claims, or designs.

• TYPES OF INVESTIGATIONS

- **6.S.1A.3.3** select and use appropriate tools or instruments to collect qualitative and quantitative data, and
- **6.S.1A.1.1** generate hypotheses for scientific investigations,
- **6.S.1A.3.1** formulate scientific questions and testable hypotheses,
- **6.S.1A.4.2** support hypotheses, explanations, claims, or designs.
- **6.S.1A.1.3** extend the results of investigations or challenge claims.
- **6.S.1A.3.2** identify materials, procedures, and variables,
- **6.S.1A.4.1** reveal patterns and construct meaning or

• USING MODELS

- **6.S.1A.2.1** understand or represent phenomena, processes, and relationships,
- **6.S.1A.6.1** primary or secondary scientific evidence and models,
- **6.S.1A.6.3** predictions based on observations and measurements, or
- **6.S.1A.8.3** develop models,

2. MEASUREMENT AND DATA

• TOOLS AND MEASUREMENT

- **6.S.1A.3.3** select and use appropriate tools or instruments to collect qualitative and quantitative data, and
- **6.S.1A.5.1** use and manipulate appropriate metric units,
- **6.S.1A.5.2** collect and analyze data,
- **6.S.1A.3.4** record and represent data in an appropriate form. Use appropriate safety procedures.

- **DISPLAYING AND INTERPRETING DATA**

- **6.S.1A.2.1** understand or represent phenomena, processes, and relationships,
- **6.S.1A.3.4** record and represent data in an appropriate form. Use appropriate safety procedures.
- **6.S.1A.4.1** reveal patterns and construct meaning or
- **6.S.1A.5.2** collect and analyze data,
- **6.S.1A.5.3** express relationships between variables for models and investigations, or
- **6.S.1A.5.4** use grade-level appropriate statistics to analyze data.
- **6.S.1A.7** Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.

3. ENERGY

- **DESCRIBING ENERGY**

- **6.P.3A.1** Analyze and interpret data to describe the properties and compare sources of different forms of energy (including mechanical, electrical, chemical, radiant, and thermal).
- **6.S.1A.4.1** reveal patterns and construct meaning or
- **6.S.1A.5.2** collect and analyze data,
- **6.S.1A.5.3** express relationships between variables for models and investigations, or
- **6.S.1A.6.4** data communicated in graphs, tables, or diagrams.
- **6.S.1A.8.4** evaluate hypotheses, explanations, claims, or designs or

- **ENERGY TRANSFER AND TRANSFORMATION**

- **6.P.3A.3** Construct explanations for how energy is conserved as it is transferred and transformed in electrical circuits.
- **6.P.3A.2** Develop and use models to exemplify the conservation of energy as it is transformed from kinetic to potential (gravitational and elastic) and vice versa.
- **6.S.1A.5.2** collect and analyze data,
- **6.S.1A.5.3** express relationships between variables for models and investigations, or
- **6.S.1A.6.1** primary or secondary scientific evidence and models,
- **6.S.1A.7** Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- **6.S.1A.8.1** answer questions,
- **6.S.1A.8.2** explain or describe phenomena,

4. ENERGY, FORCE, AND WORK

- **ELECTROMAGNETIC FORCE**

- **6.P.3A.4** Develop and use models to exemplify how magnetic fields produced by electrical energy flow in a circuit is interrelated in electromagnets, generators, and simple electrical motors.

- **WORK AND SIMPLE MACHINES**

- **6.P.3B.1** Plan and conduct controlled scientific investigations to provide evidence for how the design of simple machines (including levers, pulleys, inclined planes) helps transfer mechanical energy by reducing the amount of force required to do work.
- **6.S.1B.1.1** ask questions to identify problems or needs,
- **6.P.3B.2** Design and test solutions that improve the efficiency of a machine by reducing the input energy (effort) or the amount of energy transferred to the surrounding environment as it moves an object.

5. THERMAL ENERGY AND HEAT

- **THERMAL ENERGY AND TEMPERATURE**

- **6.P.3A.1** Analyze and interpret data to describe the properties and compare sources of different forms of energy (including mechanical, electrical, chemical, radiant, and thermal).

- **HEAT AND THERMAL ENERGY**

- **6.S.1A.2.1** understand or represent phenomena, processes, and relationships,
- **6.S.1A.2.3** communicate ideas to others.
- **6.S.1A.6.1** primary or secondary scientific evidence and models,
- **6.S.1A.6.3** predictions based on observations and measurements, or
- **6.P.3A.5** Develop and use models to describe and compare the directional transfer of heat through convection, radiation, and conduction.

- **ENERGY TRANSFER AND TECHNOLOGY**

- **6.S.1B.1.1** ask questions to identify problems or needs,
- **6.S.1B.1.3** generate and communicate ideas for possible devices or solutions,
- **6.S.1A.2.3** communicate ideas to others.
- **6.S.1A.6.1** primary or secondary scientific evidence and models,
- **6.P.3A.3** Construct explanations for how energy is conserved as it is transferred and transformed in electrical circuits.
- **6.S.1A.2.1** understand or represent phenomena, processes, and relationships,
- **6.P.3A.6** Design and test devices that minimize or maximize heat transfer by conduction, convection, or radiation.

6. THERMAL ENERGY AND EARTH SYSTEMS

- **FRESHWATER AND ICE**

- **6.E.2A.3** Construct explanations of the processes involved in the cycling of water through Earth's systems (including transpiration, evaporation, condensation and crystallization, precipitation, and downhill flow of water on land).
- **6.E.2B.1** Analyze and interpret data from weather conditions (including wind speed and direction, air temperature, humidity, cloud types, and air pressure), weather maps, satellites, and radar to predict local weather patterns and conditions.

- **OCEANS**

- **6.E.2B.3** Develop and use models to represent how solar energy and convection impact Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).
- **6.E.2B.4** Construct explanations for how climate is determined in an area (including latitude, elevation, shape of the land, distance from water, global winds, and ocean currents).

- **THE ATMOSPHERE**

- **6.E.2A.1** Develop and use models to exemplify the properties of the atmosphere (including the gases, temperature and pressure differences, and altitude changes) and the relative scale in relation to the size of Earth.
- **6.S.1A.7** Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- **6.S.1A.8.4** evaluate hypotheses, explanations, claims, or designs or
- **6.E.2B.3** Develop and use models to represent how solar energy and convection impact Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).
- **6.P.3A.5** Develop and use models to describe and compare the directional transfer of heat through convection, radiation, and conduction.

7. WEATHER AND CLIMATE

- **WEATHER**

- **6.E.2B.1** Analyze and interpret data from weather conditions (including wind speed and direction, air temperature, humidity, cloud types, and air pressure), weather maps, satellites, and radar to predict local weather patterns and conditions.
- **6.E.2B.3** Develop and use models to represent how solar energy and convection impact Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).
- **6.E.2B.2** Develop and use models to explain how relationships between the movement and interactions of air masses, high and low pressure systems, and frontal boundaries result in weather conditions and storms (including thunderstorms, hurricanes and tornadoes).
- **6.S.1A.8.2** explain or describe phenomena,

- **SEVERE WEATHER**

- **6.E.2B.2** *Develop and use models to explain how relationships between the movement and interactions of air masses, high and low pressure systems, and frontal boundaries result in weather conditions and storms (including thunderstorms, hurricanes and tornadoes).*
- **6.S.1B.1.2** *ask questions about the criteria and constraints of the device or solutions,*
- **6.E.2B.1** *Analyze and interpret data from weather conditions (including wind speed and direction, air temperature, humidity, cloud types, and air pressure), weather maps, satellites, and radar to predict local weather patterns and conditions.*

- **CLIMATE**

- **6.S.1A.8.4** *evaluate hypotheses, explanations, claims, or designs or*
- **6.E.2B.4** *Construct explanations for how climate is determined in an area (including latitude, elevation, shape of the land, distance from water, global winds, and ocean currents).*
- **6.E.2B.3** *Develop and use models to represent how solar energy and convection impact Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).*
- **6.S.1A.7** *Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.*
- **6.S.1A.8.2** *explain or describe phenomena,*
- **6.E.2A.2** *Critically analyze scientific arguments based on evidence for and against how different phenomena (natural and human induced) may contribute to the composition of Earth's atmosphere.*

8. LIFE ON EARTH

- **CHARACTERISTICS OF LIFE**

- **6.L.4A.1.1** *obtain and use resources for energy,*
- **6.L.4B.3** *Construct explanations of how animal responses (including hibernation, migration, grouping, and courtship) to environmental stimuli allow them to survive and reproduce.*
- **6.L.4A.1.3** *reproduce, and*
- **6.L.4A.1.4** *grow and develop.*
- **6.L.4A.1.2** *respond to stimuli,*

- **CHEMISTRY OF LIFE**

- **6.L.4A.1.1** *obtain and use resources for energy,*

9. DIVERSITY OF LIFE

- **DOMAINS AND KINGDOMS OF LIFE**

- **6.L.4A.2** *Develop and use models to classify organisms based on the current hierarchical taxonomic structure (including the kingdoms of protists, plants, fungi, and animals).*
- **6.L.4B.1** *Analyze and interpret data related to the diversity of animals to support claims that all animals (vertebrates and invertebrates) share common characteristics.*
- **6.L.5A.1** *Analyze and interpret data from observations to compare how the structures of protists (including euglena, paramecium, and amoeba) and fungi allow them to obtain energy and explore their environment.*
- **6.L.5A.2** *Analyze and interpret data to describe how fungi respond to external stimuli (including temperature, light, touch, water, and gravity).*
- **6.L.5B.1** *Construct explanations of how the internal structures of vascular and nonvascular plants transport food and water.*

- **CLASSIFICATION OF LIVING THINGS**

- **6.L.4A.2** *Develop and use models to classify organisms based on the current hierarchical taxonomic structure (including the kingdoms of protists, plants, fungi, and animals).*
- **6.L.4B.1** *Analyze and interpret data related to the diversity of animals to support claims that all animals (vertebrates and invertebrates) share common characteristics.*
- **6.S.1A.8.3** *develop models,*

10. CELLS

● CELL NUTRITION AND TRANSPORT

- **6.L.4A.1.1** obtain and use resources for energy,
- **6.S.1A.8.2** explain or describe phenomena,
- **6.L.5A.1** Analyze and interpret data from observations to compare how the structures of protists (including euglena, paramecium, and amoeba) and fungi allow them to obtain energy and explore their environment.

● CELL GROWTH AND REPRODUCTION

- **6.L.4A.1.3** reproduce, and
- **6.L.4A.1.4** grow and develop.

11. REPRODUCTION AND DEVELOPMENT

● PATTERNS OF REPRODUCTION

- **6.L.4A.1.3** reproduce, and
- **6.L.4A.1.4** grow and develop.
- **6.L.5B.3** Develop and use models to compare structural adaptations and processes that flowering plants use for defense, survival and reproduction.

● LIFE CYCLES

- **6.L.4A.1.3** reproduce, and
- **6.L.4A.1.4** grow and develop.

12. ADAPTATIONS

● ORGANS AND ORGAN SYSTEMS

- **6.L.4A.1.1** obtain and use resources for energy,
- **6.L.4B.2** Obtain and communicate information to explain how the structural adaptations and processes of animals allow for defense, movement, or resource obtainment.
- **6.L.5B.1** Construct explanations of how the internal structures of vascular and nonvascular plants transport food and water.
- **6.L.5B.2** Analyze and interpret data to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.
- **6.L.5B.3** Develop and use models to compare structural adaptations and processes that flowering plants use for defense, survival and reproduction.

● SPECIALIZED CELLS AND TISSUES

- **6.L.5B.1** Construct explanations of how the internal structures of vascular and nonvascular plants transport food and water.
- **6.L.5B.2** Analyze and interpret data to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.
- **6.L.5B.3** Develop and use models to compare structural adaptations and processes that flowering plants use for defense, survival and reproduction.

● NATURAL SELECTION

- **6.L.4B.2** Obtain and communicate information to explain how the structural adaptations and processes of animals allow for defense, movement, or resource obtainment.
- **6.L.4B.3** Construct explanations of how animal responses (including hibernation, migration, grouping, and courtship) to environmental stimuli allow them to survive and reproduce.
- **6.S.1A.6.1** primary or secondary scientific evidence and models,
- **6.S.1A.6.4** data communicated in graphs, tables, or diagrams.
- **6.S.1A.8.2** explain or describe phenomena,

13. RESPONSE TO STIMULI

• ANIMAL BEHAVIOR

- **6.L.4A.1.2** *respond to stimuli,*
- **6.L.4B.2** *Obtain and communicate information to explain how the structural adaptations and processes of animals allow for defense, movement, or resource obtainment.*
- **6.L.4B.3** *Construct explanations of how animal responses (including hibernation, migration, grouping, and courtship) to environmental stimuli allow them to survive and reproduce.*
- **6.L.4B.4** *Obtain and communicate information to compare and classify innate and learned behaviors in animals.*
- **6.L.4B.5** *Analyze and interpret data to compare how endothermic and ectothermic animals respond to changes in environmental temperature.*

• PLANT RESPONSES

- **6.L.4A.1.2** *respond to stimuli,*
- **6.L.5B.2** *Analyze and interpret data to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.*
- **6.L.5B.4** *Plan and conduct controlled scientific investigations to determine how changes in environmental factors (such as air, water, light, minerals, or space) affect the growth and development of a flowering plant.*
- **6.L.5B.5** *Analyze and interpret data to describe how plants respond to external stimuli (including temperature, light, touch, water, and gravity).*
- **6.L.5B.3** *Develop and use models to compare structural adaptations and processes that flowering plants use for defense, survival and reproduction.*