

Disney Youth Education Series

Everyday Chemistry

National Standards

Science

Understands atmospheric processes and the water cycle

Grades 3-5

- Knows that the Sun provides the light and heat necessary to maintain the temperature of the earth

Grades 6-8

- Knows that the Sun is the principle energy source for phenomena on the Earth's surface
- Knows the properties that make water an essential component of the Earth system

Grades 9-12

- Knows the major external and internal sources of energy on Earth

Understands relationships among organisms and their physical environment

Grades 3-5

- Knows that the transfer of energy is essential to all living organisms

Grades 6-8

- Knows that as matter and energy flow through different levels of organization in living systems and between living systems and the physical environment, chemical elements are recombined in different ways
- Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials

Understands the structure and properties of matter

Grades 3-5

- Knows that substances can be classified by their physical and chemical properties
- Knows that materials may be composed to parts that are too small to be seen without magnification

Grades 6-8

- Knows that matter is made up of tiny particles called atoms, and different arrangements of atoms into groups compose all substances
- Knows that atoms often combine to form a molecule, the smallest particle of a substance that retains its properties
- Knows that states of matter depend on molecular arrangement and motion
- Knows that substances containing only one kind of atom are elements and do not break down by normal laboratory reactions
- Knows that many elements can be grouped according to similar properties
- Knows that substances react chemically in characteristic ways with other substances to form new substances with different characteristic properties
- Knows factors that influence reaction rates

Grades 9-12

- Knows the structure of an atom
- Understands how elements are arranged in the periodic table, and how this arrangement shows repeating patterns among elements with similar properties
- Knows that atoms may be bonded together into molecules or crystalline solids, and compounds are formed from chemical bonds between two or more different kinds of atoms
- Understands that chemical reactions either release or consume energy
- Knows the variety of structures that may be formed from the bonding of carbon atoms and their roles in various chemical reactions, including those required for life processes
- Understands radical reactions and their role in natural and human processes

Understands the sources and properties of energy

Grades 3-5

- Knows that heat is often produced as a byproduct when one form of energy is converted to another form

Grades 6-8

- Knows that energy is a property of many substances
- Knows how the Sun acts as a major source of energy for changes on the Earth's surface

Understands the nature of scientific knowledge

Grades 3-5

- Knows that scientists make the results of their investigations public; they describe the investigations in ways that enable others to repeat the investigations
- Knows that scientists review and ask questions about the results of other scientists' work

Grades 6-8

- Knows that an experiment must be repeated many times and yield consistent results before the results are accepted as correct

Understands the nature of scientific inquiry

Grades 3-5

- Uses appropriate tools and simple equipment to gather scientific data and extend the senses

Grades 6-8

- Uses appropriate tools and techniques to gather, analyze, and interpret scientific data
- Knows possible outcomes of scientific investigations

Grades 9-12

- Uses technology and mathematics to perform accurate scientific investigations and communications
- Knows that scientists conduct experiments for a variety of reasons
- Knows that investigations and public communication among scientists must meet certain criteria in order to result in new knowledge and methods

Understands the scientific enterprise

Grades 3-5

- Knows that people of all ages, backgrounds, and groups have made contributions to science and technology throughout history
- Knows that although people using scientific inquiry have learned much about the objects, events, and phenomena in nature, science is an ongoing process and will never be finished

Grades 6-8

- Knows that the work of science requires a variety of human abilities, qualities, and habits of mind

Grades 9-12

- Understands that individuals and teams contribute to science and engineering at different levels of complexity
- Knows that science and technology are essential social enterprises, but alone they can only indicate what can happen, not what should happen
- Understands that science involves different types of work in many different disciplines
- Knows that creativity, imagination, and a good knowledge base are all required in the work of science and engineering

Technology

Understands the nature of technological design

Grades 6-8

- Designs a solution or product, taking into account needs and constraints
- Implements a proposed design
- Understands that nonphysical objects and physical objects are both subject to the design process
- Evaluates the ability of a technological design to meet criteria established in the original purpose
- Knows that invention is the process of creating a new system or object out of an idea while innovation is the process of modifying an existing system or object to improve

Grades 9-12

- Proposes designs and uses models, simulations, and other tests to choose an optimal solution
- Knows that a design involves different design factors and design principles

Understands the nature and operation of systems

Grades 3-5

- Knows that when things are made up of many parts, the parts usually affect one another
- Understands the relationships between elements in systems

Grades 6-8

- Knows that a system can include processes as well as components
- Identifies the elements, structure, sequence, operation, and control of systems

Grades 9-12

- Knows that understanding how things work and designing solutions to problems of almost any kind can be facilitated by systems thinking, which employs mathematical modeling and simulation

Understands the nature and uses of different forms of technology

Grades 3-5

- Knows that different types of energy have different advantages and disadvantages, and that regardless of the source of energy, the technological design should attempt to maximize the use of it

- Knows that the manufacturing processes include the designing the product, gathering natural and/or synthetic resources, and final production

Grades 6-8

- Knows that most technological systems require and input of energy, which is an important consideration both in designing an object or a system and in conserving energy

Grades 9-12

- Knows that biotechnology is used in a variety of areas and requires specific knowledge about the natural system being modified