



SCIENCE



ACADEMIC KNOWLEDGE AND SKILLS

2009-10

K-12 SUBJECT BOOKLET

Gwinnett's curriculum for grades K-12 is called the Academic Knowledge and Skills (AKS). The AKS for each grade level spell out the essential things students are expected to know and be able to do in that grade or subject. The AKS offer a solid base on which teachers build rich learning experiences. Teachers use curriculum guides, textbooks, technology, and other materials to teach the AKS and to make sure every student is learning to his or her potential.

The Academic Knowledge and Skills (AKS) were developed by our teachers, with input from our parents and community, in response to Gwinnett County Public Schools' mission statement:

The mission of Gwinnett County Public Schools is to pursue excellence in academic knowledge, skills, and behavior for each student resulting in measured improvement against local, national, and world-class standards.

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Kindergarten Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS) (KSC_A2007-1)
- demonstrate knowledge of scientific processes and inquiry methods (GPS) (KSC_A2007-2)
- apply computation and estimation skills necessary for analyzing data and following scientific investigations (GPS) (KSC_A2007-3)
- use tools and instruments for observing, measuring, and manipulating objects in scientific activities (GPS) (KSC_A2007-4)
- use the concepts of system, model, change, and scale when exploring scientific and technological matters (GPS) (KSC_A2007-5)
- communicate scientific ideas and activities clearly (GPS) (KSC_A2007-6)

B - Earth Science

- analyze time patterns and objects (sun, moon, stars) in the day and night sky (GPS) (KSC_B2007-7)
- describe the physical attributes of rocks and soils (GPS) (KSC_B2007-8)

C - Physical Science

- describe objects in terms of their composition and physical attributes (GPS) (KSC_C2007-9)
- explore the forces that cause a change in motion (speed and direction, push and pull) (GPS) (KSC_C2007-10)
- observe and communicate the effect of gravity on objects (GPS) (KSC_C2007-11)

D - Life Science

- distinguish living things from non-living things based on physical attributes (GPS) (KSC_D2007-12)
- compare and contrast groups of organisms (GPS) (KSC_D2007-13)

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First Grade Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (1SC_A2007-1)
- demonstrate knowledge of scientific processes and inquiry methods (GPS) (1SC_A2007-2)
- apply computation and estimation skills necessary for analyzing data and following scientific investigations (GPS) (1SC_A2007-3)
- use tools and instruments for observing, measuring, and manipulating objects in scientific activities (GPS) (1SC_A2007-4)
- use the concepts of system, model, change, and scale when exploring scientific and technological matters (GPS) (1SC_A2007-5)
- communicate scientific ideas and activities clearly (GPS) (1SC_A2007-6)

B - Earth Science

- observe, measure, and analyze weather data to determine patterns in weather and climate (GPS) (1SC_B2007-7)
- observe and record changes in water as it relates to weather (GPS) (1SC_B2007-8)
- identify how natural resources and their conservation impact our daily lives and those of future generations (1SC_B2007-9)

C - Physical Science

- investigate the properties of light and sound (GPS) (1SC_C2007-10)
- demonstrate the effects of magnets on various objects and other magnets (GPS) (1SC_C2007-11)

D - Life Science

- compare and contrast the characteristics and basic needs of plants and animals (GPS) (1SC_D2007-12)

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Second Grade Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (2SC_A2007-1)
- demonstrate knowledge of scientific processes and inquiry methods (GPS) (2SC_A2007-2)
- apply computation and estimation skills necessary for analyzing data and following scientific explanations (GPS) (2SC_A2007-3)
- use tools and instruments for observing, measuring, and manipulating objects in scientific technological matters (GPS) (2SC_A2007-4)
- use the concepts of system, model, change, and scale when exploring scientific and technological matters (GPS) (2SC_A2007-5)
- communicate scientific ideas and activities clearly (GPS) (2SC_A2007-6)

B - Earth Science

- describe the universe as including the moon, sun, other stars, and planets (GPS) (2SC_B2007-7)
- investigate the position of the sun and moon to show patterns throughout the year (GPS) (2SC_B2007-8)
- observe and record changes in our surroundings and infer the causes of those changes (GPS) (2SC_B2007-9)

C - Physical Science

- investigate the properties of matter and changes that occur in objects (GPS) (2SC_C2007-10)
- identify sources of energy and how energy is used (GPS) (2SC_C2007-11)
- demonstrate changes in speed and direction using pushes and pulls (GPS) (2SC_C2007-12)

D - Life Science

- investigate the life cycles of different organisms to understand the diversity of life (GPS) (2SC_D2007-13)

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Third Grade Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS, ITBS) (3SC_A2006-1)
- demonstrate knowledge of scientific processes and inquiry methods (GPS, ITBS) (3SC_A2006-2)
- apply computation and estimation skills necessary for analyzing data and following scientific explanations (GPS, ITBS) (3SC_A2006-3)
- use tools and instruments for observing, measuring, and manipulating objects in scientific activities utilizing safe laboratory procedures (GPS, ITBS) (3SC_A2006-4)
- use the concepts of system, model, change, and scale when exploring scientific and technological matters (GPS, ITBS) (3SC_A2006-5)
- communicate scientific ideas and activities clearly (GPS, ITBS) (3SC_A2006-6)
- question scientific claims and arguments effectively (GPS, ITBS) (3SC_A2006-7)

B - Earth Science

- investigate the physical attributes of rocks and soils (GPS, ITBS) (3SC_B2006-8)
- investigate fossils as evidence of organisms that lived long ago (GPS, ITBS) (3SC_B2006-9)

C - Physical Science

- explain how heat is produced and the effects of heating and cooling (GPS, ITBS) (3SC_C2006-10)
- investigate magnets and their effect on common objects and other magnets (GPS, ITBS) (3SC_C2006-11)

D - Life Science

- investigate the habitats of different organisms and the dependence of organisms on their habitat (GPS, ITBS) (3SC_D2006-12)
- explain the effects of pollution and humans on the environment (GPS, ITBS) (3SC_D2006-13)

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Fourth Grade Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS, ITBS) (4SC_A2006-1)
- demonstrate knowledge of scientific processes and inquiry methods (GPS, ITBS) (4SC_A2006-2)
- apply computation and estimation skills necessary for analyzing data and following scientific explanations (GPS, ITBS) (4SC_A2006-3)
- use tools and instruments for observing, measuring, and manipulating objects in scientific activities utilizing safe laboratory procedures (GPS, ITBS) (4SC_A2006-4)
- use the concepts of system, model, change, and scale when exploring scientific and technological matters (GPS, ITBS) (4SC_A2006-5)
- communicate scientific ideas and activities clearly (GPS, ITBS) (4SC_A2006-6)
- question scientific claims and arguments effectively (GPS, ITBS) (4SC_A2006-7)

B - Earth Science

- analyze the components of our solar system and their relationship to one another (GPS, ITBS) (4SC_B2006-8)
- analyze the role of relative position and motion in determining the sequence of the phases of the moon (GPS, ITBS) (4SC_B2006-9)
- differentiate between the states of water and how they relate to the water cycle and weather (GPS, ITBS) (4SC_B2006-10)
- analyze weather charts/maps and collect weather data to predict weather events and infer patterns and seasonal changes (GPS, ITBS) (4SC_B2006-11)

C - Physical Science

- investigate the nature of light using tools (mirrors, lenses, prisms) (GPS, ITBS) (4SC_C2006-12)
- investigate how sound is produced by vibrating objects (GPS, ITBS) (4SC_C2006-13)
- demonstrate the relationship between force and motion (GPS, ITBS) (4SC_C2006-14)

D - Life Science

- describe the roles of organisms and the flow of energy within an ecosystem (GPS, ITBS) (4SC_D2006-15)
- explain various factors (adaptation, variation, behavior, and external features) that affect the survival or extinction of organisms (GPS, ITBS) (4SC_D2006-16)

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Fifth Grade Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS, ITBS) (5SC_A2006-1)
- demonstrate knowledge of scientific processes and inquiry methods (GPS, ITBS) (5SC_A2006-2)
- apply computation and estimation skills necessary for analyzing data and following scientific explanations (GPS, ITBS) (5SC_A2006-3)
- use tools and instruments for observing, measuring, and manipulating objects in scientific activities utilizing safe laboratory procedures (GPS, ITBS) (5SC_A2006-4)
- use the concepts of system, model, change, and scale when exploring scientific and technological matters (GPS, ITBS) (5SC_A2006-5)
- communicate scientific ideas and activities clearly (GPS, ITBS) (5SC_A2006-6)
- question scientific claims and arguments effectively (GPS, ITBS) (5SC_A2006-7)

B - Earth Science

- analyze how surface features of the earth are caused by constructive and destructive processes (GPS, ITBS) (5SC_B2006-8)

C - Physical Science

- verify that an object is the sum of its parts (GPS) (5SC_C2006-9)
- distinguish between physical changes and chemical changes (GPS, ITBS) (5SC_C2006-10)
- investigate electricity and magnetism and their relationship to one another (GPS, ITBS) (5SC_C2006-11)

D - Life Science

- classify organisms to simplify the study of living things (GPS, ITBS) (5SC_D2006-12)
- identify the cell as the building block of living organisms (GPS, ITBS) (5SC_D2006-13)
- compare and contrast the characteristics of learned behaviors and inherited traits (GPS, ITBS) (5SC_D2006-14)
- analyze how microorganisms benefit or harm other organisms (GPS) (5SC_D2007-1)

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Sixth Grade Science

A - Characteristics of Science

- identify questions and problems that can be answered and solved through scientific inquiry (GPS, ITBS, ACT) (6SC_A2005-1)
- design and conduct investigations using scientific method (GPS, ITBS, ACT) (6SC_A2005-2)
- apply standard safety practices for all classroom laboratory and field investigations (GPS) (6SC_A2005-3)
- use appropriate scientific tools, techniques, and technologies to gather, analyze, and interpret data (GPS, ITBS, ACT) (6SC_A2005-4)
- apply computation and estimation skills necessary for analyzing data and developing conclusions (GPS) (6SC_A2005-5)
- think critically and logically about relationships between evidence and explanations (GPS, ITBS, ACT) (6SC_A2005-6)
- communicate scientific ideas clearly (GPS) (ITBS, ACT) (6SC_A2005-7)
- read scientific materials to establish context for subject matter, to develop vocabulary, and to be aware of current research (GPS) (6SC_A2005-8)
- analyze the importance of understanding systems, models, and scales when exploring scientific and technological matters (GPS) (6SC_A2005-9)
- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS) (6SC_A2006-1)

B - Astronomy

- explain the effects of the relative position of the sun, Earth, and moon (GPS, ITBS) (6SC_B2005-10)
- analyze the composition of our solar system (GPS, ITBS) (6SC_B2005-11)
- analyze current scientific views about the formation of the universe and how those views evolved (GPS, ITBS) (6SC_B2005-12)

C - Hydrology

- analyze the significant role of water in earth processes (GPS, ITBS, CE) (6SC_C2005-14)

D - Meteorology

- explain how the distribution of land and oceans affects climate and weather (GPS, ITBS) (6SC_D2005-15)

E - Geology

- investigate the composition and formation of Earth's surface (GPS, ITBS) (6SC_E2005-16)
- describe processes that cause gradual changes in Earth's surface (GPS, ITBS) (6SC_E2005-17)

F - Paleontology

- describe Earth's geologic history (6SC_F2005-18)

G - Ecology

- compare various sources of energy and describe their uses and methods of conservation (GPS) (6SC_G2005-19)

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Seventh Grade Science

A - Characteristics of Science

- identify questions and problems that can be answered and solved through scientific inquiry (GPS, ITBS, ACT) (7SC_A2005-1)
- design and conduct investigations using scientific method (GPS, ITBS, ACT) (7SC_A2005-2)
- apply standard safety practices for all classroom laboratory and field investigations (GPS) (7SC_A2005-3)
- use appropriate scientific tools, techniques, and technologies to gather, analyze, and interpret data (GPS, ITBS, ACT) (7SC_A2005-4)
- apply computation and estimation skills necessary for analyzing data and developing conclusions (GPS, ACT) (7SC_A2005-5)
- think critically and logically about relationships between evidence and explanations (GPS, ITBS, ACT) (7SC_A2005-6)
- communicate scientific ideas clearly (GPS, ACT) (7SC_A2005-7)
- read scientific materials to establish context for subject matter, develop vocabulary, and to be aware of current research (GPS) (7SC_A2005-8)
- analyze the importance of understanding systems, models, and scales when exploring scientific and technological matters (GPS) (7SC_A2005-9)
- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (7SC_A2006-1)

B - Ecology

- compare and contrast food/energy requirements of different organisms (7SC_B2005-10)
- examine the dependence of all organisms on one another and their environments (GPS) (7SC_B2005-11)
- describe the characteristics of Earth's major terrestrial biomes (tropical rain forest, savannah, temperate, desert, taiga, tundra, and mountain) and aquatic communities (freshwater, estuaries, and marine) (GPS, ITBS) (7SC_B2005-12)
- assess how changes in environmental conditions can affect the survival of both individuals and entire species and cause them to become endangered or extinct (GPS, ITBS, CE) (7SC_B2005-13)

C - Evolution

- examine the evolution of living organisms through inherited characteristics that promote survival of organisms and the survival of successive generations of their offspring (GPS) (7SC_C2005-14)

D - Cells and Systems

- identify the cell as a basic unit and structure of all organisms (GPS, ITBS) (7SC_D2005-15)
- explain how the human body is composed of organ systems functioning together (GPS, ITBS) (7SC_D2005-16)

E - Genetics

- explain how biological traits are passed to successive generations (GPS) (7SC_E2005-17)

F - Classification

- use external and internal features to classify and compare organisms (simple to complex) (ITBS) (7SC_F2005-18)
- investigate the diversity of living organisms and how they can be compared scientifically (GPS) (7SC_F2005-19)
- compare and contrast mechanisms by which organisms reproduce (7SC_F2005-20)

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Eighth Grade Science

A - Characteristics of Science

- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS) (8SC_A2007-1)
- identify questions and problems that can be answered and solved through scientific inquiry (GPS) (8SC_A2007-2)
- design and conduct investigations using the scientific method (GPS) (8SC_A2007-3)
- apply standard safety practices for all classroom laboratory and field investigations (GPS) (8SC_A2007-4)
- use appropriate scientific tools, techniques, and technologies to gather, analyze, and interpret data (GPS) (8SC_A2007-5)
- apply computation and estimation skills necessary for analyzing data and developing conclusions (GPS) (8SC_A2007-6)
- think critically and logically about relationships between evidence and explanations (GPS) (8SC_A2007-7)
- communicate scientific ideas clearly (GPS) (8SC_A2007-8)
- read scientific materials to establish context for subject matter, develop vocabulary, and to be aware of current research (GPS) (8SC_A2007-9)
- analyze the importance of understanding systems, models, and scales when exploring scientific and technological matters (GPS) (8SC_A2007-10)

B - Matter

- examine the scientific view of the nature of matter (GPS) (8SC_B2007-11)
- investigate the arrangement of the Periodic Table (GPS) (8SC_B2007-12)

C - Energy

- examine various forms and transformations of energy (GPS) (8SC_C2007-13)

D - Force and Motion

- investigate the relationship between force, mass, and the motion of objects (GPS) (8SC_D2007-14)
- examine the mechanisms of simple machines and the effect they have on work (GPS) (8SC_D2007-15)

E - Gravity

- examine the factors that determine gravity and the effects that gravity has on all matter in the universe (GPS) (8SC_E2007-16)

F - Waves

- investigate the properties of waves (GPS) (8SC_F2007-17)
- examine and explain how the behavior of light waves is manipulated causing reflection, refraction, diffraction, and absorption (GPS) (8SC_F2007-18)
- explore the wave nature of sound (GPS) (8SC_F2007-19)

G - Electricity and Magnetism

- investigate the characteristics and interactions of electricity and magnetism that classify them as major forces acting in nature (GPS) (8SC_G2007-20)
- analyze the properties of magnets and magnetic fields (GPS) (8SC_G2007-21)

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Biology

A - Characteristics of Science

- design and conduct scientific investigations (GPS, HSGT, ACT) (SCBI_A2005-1)
- apply standard safety practices for all classroom laboratory and field investigations (GPS, HSGT) (SCBI_A2005-2)
- use technology to collect, observe, measure, and manipulate data and findings (GPS, HSGT, ACT) (SCBI_A2005-3)
- use valid critical assumptions to draw conclusions (GPS, HSGT, ACT) (SCBI_A2005-4)
- apply computation and skills necessary for analyzing data and developing conclusions (GPS, HSGT) (SCBI_A2005-5)
- communicate scientific investigations clearly (GPS, HSGT) (SCBI_A2005-6)
- read scientific materials to establish context for subject matter, develop vocabulary, and to be aware of current research (GPS, HSGT) (SCBI_A2005-7)
- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS) (SCBI_A2006-1)

B - Academic Knowledge

- analyze the relationship between structures and functions in living cells (GPS, HSGT) (SCBI_B2005-8)
- analyze how biological traits are passed on to successive generations (GPS, HSGT) (SCBI_B2005-9)
- examine the relationship between unicellular and multicellular organisms and the increasing complexity of systems (GPS, HSGT) (SCBI_B2005-10)
- evaluate the dependence of all organisms on one another and the flow of energy and matter within their ecosystems (GPS, HSGT, CE) (SCBI_B2005-11)
- evaluate the role of natural selection in the development of the theory of evolution (GPS, HSGT) (SCBI_B2005-12)

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Chemistry

A - Characteristics of Science

- design and conduct scientific investigations (GPS, HSGT, ACT) (SCCH_A2005-1)
- apply standard safety practices for all classroom laboratory and field investigations (GPS, HSGT) (SCCH_A2005-2)
- use technology to collect, observe, measure, and manipulate data and findings (GPS, HSGT, ACT) (SCCH_A2005-3)
- use valid critical assumptions to draw conclusions (GPS, ACT) (SCCH_A2005-4)
- apply computation and estimation skills necessary for analyzing data and developing conclusions (GPS, HSGT, ACT) (SCCH_A2005-5)
- communicate scientific investigations clearly (GPS, HSGT, ACT) (SCCH_A2005-6)
- read scientific materials to establish context for subject matter, develop vocabulary, and to be aware of current research (GPS, HSGT) (SCCH_A2005-7)
- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS) (SCCH_A2006-1)

B - Academic Knowledge

- analyze the nature of matter and its classifications (GPS, HSGT) (SCCH_B2005-8)
- evaluate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions (GPS, HSGT) (SCCH_B2005-9)
- use the modern atomic theory to explain the characteristics of atoms (GPS, HSGT) (SCCH_B2005-10)
- use the organization of the periodic table of elements to predict the properties of elements (GPS, HSGT) (SCCH_B2005-11)
- predict how various factors affect the rate of a chemical reaction (GPS, HSGT) (SCCH_B2005-12)
- evaluate the motion and behavior of atoms and molecules in chemical and physical processes (GPS, HSGT) (SCCH_B2005-13)
- analyze properties that describe solutions and the behavior of acids and bases (GPS, HSGT) (SCCH_B2005-14)

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Physics

A - Characteristics of Science

- design and conduct scientific investigations (GPS, HSGT, ACT) (SCPH_A2005-1)
- apply standard safety practices for all classroom laboratory and field investigations (GPS, HSGT) (SCPH_A2005-2)
- use technology to collect, observe, measure, and manipulate data and findings (GPS, HSGT) (SCPH_A2005-3)
- use valid critical assumptions to draw conclusions (GPS, HSGT, ACT) (SCPH_A2005-4)
- apply computation and estimation skills necessary for analyzing data and developing conclusions (GPS, HSGT, ACT) (SCPH_A2005-5)
- communicate scientific investigations clearly (GPS, HSGT) (SCPH_A2005-6)
- read scientific materials to establish context for subject matter, develop vocabulary, and to be aware of current research (GPS, HSGT) (SCPH_A2005-7)
- discuss the importance of curiosity, honesty, openness, and skepticism in science and exhibit these traits in efforts to understand how the world works (GPS) (SCPH_A2006-1)

B - Mathematical Skills

- apply mathematical skills and processes to analyze and solve scientific problems (GPS, HSGT) (SCPH_B2005-8)

C - Mechanics

- analyze straight-line motion both vertically and horizontally (GPS, HSGT) (SCPH_C2005-9)
- analyze the motion of an object moving in two dimensions (GPS, HSGT) (SCPH_C2005-10)
- explain and apply Newton's Three Laws of Motion (GPS, HSGT) (SCPH_C2005-11)
- analyze forces in static and dynamic situations (GPS, HSGT) (SCPH_C2005-12)
- explain Newton's Law of Universal Gravitation (GPS, HSGT) (SCPH_C2005-13)
- explain the relationship between work and power (using narrative and mathematical descriptions) and apply to realistic situations (GPS, HSGT) (SCPH_C2005-14)
- apply the Law of Conservation of Energy to describe conceptually and solve mathematically the conversions between potential and kinetic energy (GPS, HSGT) (SCPH_C2005-15)
- explain the relationship between momentum and impulse (using narrative and mathematical descriptions) and apply to realistic situations (GPS, HSGT) (SCPH_C2005-16)
- relate the effects of thermal energy to kinetic molecular theory (GPS, HSGT) (SCPH_C2005-17)
- identify and describe a system of torque-producing forces acting in equilibrium (GPS, HSGT) (SCPH_C2005-18)
- describe the corrections of Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large (GPS) (SCPH_C2008-1)

D - Electricity and Magnetism

- analyze and describe electrostatics (GPS, HSGT) (SCPH_D2005-19)
- explain the concept of electric potential (SCPH_D2005-20)
- calculate the values of current, voltage, resistance, and power in various circuits using Ohm's Law (GPS, HSGT) (SCPH_D2005-21)
- analyze (via laboratory analysis) the properties of magnetic fields and their relationship to electric fields (GPS, HSGT) (SCPH_D2005-22)

E - Waves

- analyze the properties of waves (GPS, HSGT) (SCPH_E2005-23)
- analyze the properties of sound (GPS, HSGT) (SCPH_E2005-24)
- analyze the properties of light and optics (GPS, HSGT) (SCPH_E2005-25)

F - Nuclear Physics

- analyze nuclear decay and energy production by means of fission and fusion (GPS, HSGT) (SCPH_F2005-26)

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