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ABSTRACT

As part of the school reform legislation of 1985, the Illinois State Board of Education established State Goals for Learning in six fundamental learning areas: language arts, mathematics, science, social science, fine arts, and physical development and health. The next step is to develop standards that will more clearly define the knowledge and skills that students should have as a result of their education. The Illinois Academic Standards Project was launched to update the State Goals for Learning and clarify the knowledge and skills necessary to meet each goal. This volume, the second in a series of four, presents the discussion drafts that are a product of work by 200 Illinois teachers, administrators, parents, higher education faculty, and business representatives. The volume proposes guidelines for science and social science, and the benchmarks to measure progress toward each state goal for these areas; and contains the summary charts for each of the six fundamental learning areas: English language arts, mathematics, science, social science, fine arts, physical development and health, and foreign languages. Appendices contain a chart that compares 1985 State Goals for Learning with the 1996 draft goals, a list of participants, and two feedback instruments. (Contains 93 references.) (LMI)

VOLUME TWO
STATE GOALS 11-18

1996

PRELIMINARY DRAFT:
ILLINOIS ACADEMIC STANDARDS

FOR PUBLIC REVIEW AND COMMENT

JUNE

SCIENCE

SOCIAL SCIENCE

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VOLUME TWO
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JUNE 1996

Please duplicate as needed.

June, 1996

A Message to Illinois Citizens:

Improving the quality of public education must be a shared priority. Ensuring that our children acquire the knowledge and skills they will need to be successful in their education, career and community life requires a joint effort of educators and school board members, as well as business, community and civic representatives. In order for such cooperation to take place, the intended results of schooling must be defined and communicated in ways that all participants can understand and use.

This discussion document represents a year of work on the part of over 200 educators and citizens. The document proposes the essential academic knowledge and skills all students should learn as a result of their public education. Once finalized, the document will serve as a guide to help our children acquire this essential learning. It will also serve as a basis for communicating the expected results of Illinois schooling to our residents and the rest of the nation.

Please make time to review this work in progress. Your contribution is crucial to the success of this effort. Become an active participant in the ongoing process of developing a set of academic standards that will focus the work of schools as they prepare our children for the future. We urge you to review this document and to submit one or both of the feedback instruments/comment forms in Appendices D and E to the Illinois State Board of Education.

Questions concerning this draft may be directed to your Regional Office of Education or to the Illinois State Board of Education at 1-800-387-1470 or (rschaljo@spr6.isbe.state.il.us).

We look forward to your comments.

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INTRODUCTION

As part of the school reform legislation of 1985, the State Board of Education established State Goals for Learning in six fundamental learning areas: language arts, mathematics, science, social science, fine arts, and physical development and health. While these broad statements of goals and objectives have been helpful to schools over the past 10 years, the next step is to develop standards that will more clearly define the knowledge and skills that students should have as a result of their education.

The Illinois Academic Standards Project was launched to update the State Goals for Learning and clarify the knowledge and skills necessary to meet each goal. The discussion drafts presented here are the result of more than a year of work by 200 Illinois teachers, administrators, parents, higher education faculty and business representatives. Of the four volumes in the series, three cover the six fundamental learning areas: **Volume One** - English Language Arts (reading and writing) and Mathematics, **Volume Two** - Science and Social Science, and **Volume Three** - Fine Arts and Physical Development and Health. **Volume Four** addresses Foreign Languages, which is not one of the fundamental learning areas identified in the School Code, but is included as a resource for foreign language programs.

The standards are being released as a discussion draft for review by all Illinois citizens. Through November 1996, individuals and groups will have opportunities to comment on the standards and make suggestions. The purpose of seeking public comment is to come to agreement upon a set of rigorous academic standards for Illinois students.

Once the standards are complete, state assessments will be improved to more accurately measure student achievement at designated grade levels. In addition, the academic standards are expected to

- clarify the intended results of schooling for all audiences including parents, students and the community;
- provide high academic standards and expectations for student learning across the state;
- ensure continuity for students who move from one district to another; and
- create a clear set of expectations for student performance that can be assessed at both state and local levels, as well as provide for individual student progress reporting.

The goals, academic standards and learning benchmarks may be adapted and modified to meet individual student needs and learning styles to maximize the number of students meeting and exceeding the learning expectations these standards represent.

These documents are works in progress that are meant to provide the basis for public discussion about Illinois education and our expectations for student achievement. We encourage your suggestions and ideas for improvement.

Academic standards such as these describe what children should learn, not how they should be taught. Matters such as instructional techniques and materials are left for local communities and schools to determine.

The draft Illinois goals, academic standards and learning benchmarks are a work in progress. This discussion draft has been distributed widely throughout the state for review by all who are interested. Your comments and discussion are welcomed and encouraged. With your help, we can improve our schools, and the quality of education our children receive, helping them to meet the challenges ahead.

CRITERIA FOR STANDARDS

To assure clarity and effectiveness, the teams drafting the goals and academic standards addressed the following criteria:

- The standards must be clear and meaningful to students, parents, educators, business representatives and the community at large.
- The standards should include an appropriate combination of knowledge and skills, not just facts alone or skills alone.
- The standards should build upon and go beyond the basics within each of the academic disciplines.
- The standards should be specific enough to convey what students should learn, but broad enough to allow for a variety of approaches to teaching, curriculum, course design and assessment.
- The standards should be specific enough to be used in assessing progress and improving students' learning.

DEFINITIONS OF TERMS

This document is arranged in a logical sequence, giving increasing detail on what students should learn and be able to do. There are several terms used throughout.

LEARNING AREA: A learning area is an academic subject or discipline. The learning areas addressed by the writing teams are English Language Arts, Mathematics, Science, Social Science, Physical Development and Health and Fine Arts. A supplementary draft of advisory goals and standards for Foreign Languages is also being distributed.

APPLICATIONS OF LEARNING: Applications of learning are significant methods of learning and using knowledge which cross academic disciplines. The ability to use these skills will greatly influence students' success later in life.

The five applications of learning are explained below:

- **Solving Problems** - Problem solving is a key mechanism in which students learn to investigate problems and to formulate and propose solutions supported by reason and evidence.

- **Communicating** - Understanding lessons is only the beginning of education. Students also must be able to express and receive information and ideas accurately and clearly in oral and written forms. In fact, communication reinforces learned lessons, helping students to use facts and information to build further knowledge.

- **Using Technology** - Technology, particularly telecommunications and computer technology, puts a wealth of information and expertise at students' fingertips. Skilled use of technology creates a gateway to relevant, up-to-date information well beyond the walls of the classroom.

- **Working on Teams** - Learning is an intensely individual activity, but students also need to know how to contribute as members of teams or work groups. This aspect of learning is essential to adult life.

- **Making Academic Connections** - Every subject is related in some fashion to others. Students must learn to place information within a larger setting—to see the connections among lessons, subjects and everyday life.

GOAL: A goal is a broad statement of knowledge and/or skill to be attained within a learning area. Goals organize subject matter within learning areas. Each goal in this draft has an explanation of why it is important and how it relates to life beyond school. **A comparison of the proposed goals with those adopted in 1985 appears in Appendix A.**

ACADEMIC STANDARD: An academic standard is a specific statement of knowledge and/or skills within a goal. Academic standards clearly define the learning needed to achieve a goal. They state specifically what students should know and be able to do as a result of their education.

LEARNING BENCHMARKS: Learning benchmarks are progress indicators for measuring students' achievement of an academic standard. The benchmark levels are early elementary school, late elementary school, middle school (junior high school), early high school and late high school.

Learning benchmarks also can be seen as bridges between the stated standards and the measurements that will be used to determine

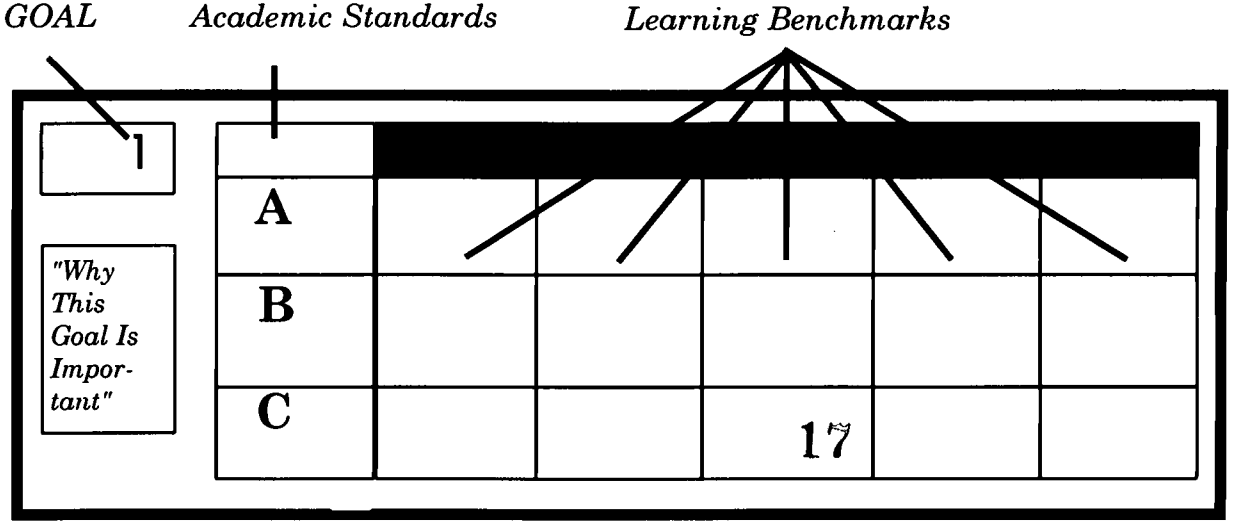
achievement. Learning benchmarks are cumulative, more complex and rigorous from one level to the next. In elementary and middle school, learning benchmarks relate to basic skills—reading comprehension, grammar, writing skills, computation (addition, subtraction, multiplication and division) and others. In early high school, they define the essential knowledge and skills that all students are expected to have. In late high school, learning benchmarks reflect the fact that students have begun to specialize in their studies and career development.

FORMAT

The format for each learning area is displayed in the following parts beginning on page 1.

- An introductory section explaining how the draft goals, academic standards and learning benchmarks were developed, the importance of the learning area, an overview of the main ideas embodied in the goals and standards, and what students will gain through their studies in this learning area.
- A discussion of Applications of Learning relevant to this discipline, in which specific examples of how skills of solving problems, communicating, using technology, working on teams and making academic connections can be achieved through study in this learning area.
- A summary of the goals and academic standards for the learning area on one page so that students, parents and educators can get a picture of the entire learning area "at a glance."
- A table of the academic standards and learning benchmarks for each goal, showing in detail why each goal is important for students to learn, the standards that further define each goal, and the learning benchmarks that will define expected student progress toward achieving each standard.

The diagram below shows how the goals, academic standards and learning benchmarks are displayed in the draft document.



UMMARY CHART

ENGLISH LANGUAGE ARTS

The following is a summary chart showing all goals and academic standards for all learning areas.

Students need knowledge and skills in English language arts to open the doors to learning in all subject areas, to achieve success in the workplace and to be well-informed, productive citizens. English language arts include the basic communication skills of reading, writing, speaking and listening.

Students who achieve these skills will be able to find and use information from many sources, read and understand a broad range of written materials, and write for a variety of purposes and audiences.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

1 **Read with understanding and fluency.**

ACADEMIC STANDARDS FOR GOAL 1

A. Apply word analysis and vocabulary skills to comprehend text.
B. Apply reading strategies to improve fluency and understanding.
C. Demonstrate comprehension of a broad range of reading materials.

PROPOSED 1996 STATE GOAL

2 **Understand the expressed meaning in literature representative of various societies, eras and ideas.**

ACADEMIC STANDARDS FOR GOAL 2

A. Demonstrate an understanding of literary elements and techniques.
B. Explain, analyze and interpret the expressed meaning in literature representing various societies, eras and ideas.

PROPOSED 1996 STATE GOAL

3 **Write to communicate for a variety of purposes.**

ACADEMIC STANDARDS FOR GOAL 3

A. Use correct grammar, spelling, punctuation, capitalization and sentence structure.
B. Compose well-organized and coherent writing for specific purposes and audiences.
C. Communicate ideas in writing to accomplish a variety of purposes.

PROPOSED 1996 STATE GOAL

4 **Listen and speak effectively in a variety of situations.**

ACADEMIC STANDARDS FOR GOAL 4

A. Listen effectively in formal and informal situations.
B. Speak effectively using language appropriate to the situation and audience.

PROPOSED 1996 STATE GOAL

5 **Use reading, writing, listening and speaking skills to research and apply information for specific purposes.**

ACADEMIC STANDARDS FOR GOAL 5

A. Locate, acquire and organize information from various sources to answer questions and solve problems.
B. Analyze and evaluate information acquired from various sources.
C. Apply acquired information, concepts and ideas.

SUMMARY CHART

MATHEMATICS

Mathematics is used to identify, describe and investigate the patterns and challenges of everyday living. It helps us understand past events and predict and prepare for events to come. The study of mathematics includes arithmetic, geometry, algebra, trigonometry, statistics and other fields.

Students meeting these standards will understand how numbers are used and be able to use words and numbers to solve problems. They will be able to investigate, predict and reason using a variety of methods to solve a range of problems.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

6 **Demonstrate a knowledge and sense of numbers and their representations, including basic operations (addition, subtraction, multiplication, division), ratios and proportions, by using multiple ways of obtaining exact values and estimates to understand patterns involving numbers and their applications.**

ACADEMIC STANDARDS FOR GOAL 6

A. Demonstrate knowledge and use of numbers and their relations and representations in a broad range of settings from theoretical to practical.
B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division), algorithms and relationships.
C. Solve problems using multiple approaches to computation including estimation, mental mathematics, paper-and-pencil methods and technology.
D. Solve problems involving the comparisons of quantities using ratios, proportions and percents.

PROPOSED 1996 STATE GOAL

7 **Make, use and estimate measurements of objects, amounts and relationships and determine tolerable levels of error.**

ACADEMIC STANDARDS FOR GOAL 7

A. Measure and compare quantities using appropriate units, instruments and methods.
B. Estimate measurements and determine tolerable levels of error in measurements.
C. Apply appropriate instruments, scales and formulas to solve problems and interpret results.

PROPOSED 1996 STATE GOAL

8 **Identify and describe patterns and relationships in actual data, as well as solve problems and predict results using algebraic methods and symbols, tables, graphs, calculators and computers.**

ACADEMIC STANDARDS FOR GOAL 8

A. Identify numerical relationships using variables and patterns.
B. Analyze and describe numerical relationships using a variety of representations.
C. Solve problems using systems of numbers and their properties.
D. Apply algebraic concepts and procedures to represent, simplify and solve problems.

Continued

PROPOSED 1996 STATE GOAL

9 **Analyze, categorize and draw conclusions about objects and spatial relationships using geometric methods and drawings, sketches, graphs, models, symbols, calculators and computers.**

ACADEMIC STANDARDS FOR GOAL 9

A. Demonstrate and apply basic geometric concepts in one, two and three dimensions.
B. Identify, describe, classify and compare relationships within and among one-, two- and three-dimensional figures.
C. Construct convincing arguments and proofs to represent, transform and solve problems.
D. Apply trigonometric properties to solve problems.

PROPOSED 1996 STATE GOAL

10 **Collect, organize and analyze data using statistical methods and tables, charts, graphs, calculators and computers to represent processes, to predict results and to interpret uncertainty and chance in practical applications.**

ACADEMIC STANDARDS FOR GOAL 10

A. Organize, represent, analyze and make conclusions from existing data.
B. Formulate questions, design data collection methods, gather and analyze data and communicate findings.
C. Determine and describe the probability of an event.

SUMMARY CHART

SCIENCE

Children have a natural curiosity about the world around them. The study of science provides students with the skills to follow areas of inquiry that interest them, to offer practical solutions to problems and to apply what they have learned.

The science standards describe essential knowledge and skills in three areas: scientific inquiry, factual knowledge combined with unifying concepts and the interaction of science and technology. Achieving these standards will prepare students to actively participate in a society that utilizes science and technology.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

11 **Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims.**

ACADEMIC STANDARDS FOR GOAL 11

A. Explain the principles and practices of scientific research.
B. Apply the steps and methods of scientific inquiry to conduct experiments and investigate research questions.
C. Apply the principles and methods of technological design to solve problems.
D. Assess the credibility of scientific claims.

PROPOSED 1996 STATE GOAL

12 **Understand the facts and unifying concepts of the life, physical and earth/space sciences.**

ACADEMIC STANDARDS FOR GOAL 12

A. Apply concepts of systems within the sciences.
B. Apply concepts of form and function within the sciences.
C. Apply concepts of change and constancy within the sciences.
D. Apply concepts of models and explanations within the sciences.

PROPOSED 1996 STATE GOAL

13 **Understand connections and relationships among science, technology and society.**

ACADEMIC STANDARDS FOR GOAL 13

A. Explain the historical development and importance of science and technology.
B. Explain conceptual relationships between science and technology.
C. Describe and analyze relationships among science, technology and society in practical situations.

JMMARY CHART

SOCIAL SCIENCE

Studying social science helps students develop the ability to make informed decisions as citizens and community members. Social science includes the fields of political science and law, economics, history, geography and sociology. Students who achieve these standards will have a broad understanding of political and economic systems and a better understanding of events, trends, personalities and movements. They will also acquire a working knowledge of geography and state, national and world history.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

14 **Understand, analyze and compare political systems, with an emphasis on the United States.**

ACADEMIC STANDARDS FOR GOAL 14

A. Describe and explain basic principles of the United States government.
B. Compare and analyze the structures and functions of the political systems of Illinois, the United States and other nations.
C. Describe and explain election processes and responsibilities of citizens.
D. Analyze the roles and influences of individuals and interest groups in the political systems of Illinois, the United States and other nations.
E. Describe and explain United States foreign policy as it relates to other nations and international issues.

PROPOSED 1996 STATE GOAL

15 **Understand, analyze and compare economic systems, with an emphasis on the United States.**

ACADEMIC STANDARDS FOR GOAL 15

A. Explain and compare how economic systems facilitate the exchange, production, distribution and consumption of goods and services.
B. Analyze the effects of scarcity and choice on consumers.
C. Analyze the effects of scarcity and choice on producers.
D. Explain how trade generates interdependence affecting the economies of nations.

PROPOSED 1996 STATE GOAL

16 **Understand and analyze events, trends, individuals and movements shaping the history of Illinois, the United States and other nations.**

ACADEMIC STANDARDS FOR GOAL 16

A. Describe and explain contributions of selected individuals throughout history.
B. Explain the chronology and significance of major social, economic and political events throughout history.
C. Summarize and analyze historical relationships and developments leading to similarities and differences among people and societies throughout the world.
D. Explain the effects of urbanization, industrialization and technology on society and institutions throughout history.
E. Analyze the roles played by groups in developing a pluralistic society in the United States.

SOCIAL SCIENCE

Continued

PROPOSED 1996 STATE GOAL	ACADEMIC STANDARDS FOR GOAL 17
17 **Demonstrate a knowledge of world geography, as well as an understanding of the effects of geography on society, with an emphasis on the United States.**	A. Locate, describe and explain places, regions and features on the earth using geographic terms, methods and representations. B. Analyze and explain characteristics and interactions of the earth's physical systems. C. Analyze and explain relationships between geographic factors and society. D. Explain the historical significance of geography.

PROPOSED 1996 STATE GOAL	ACADEMIC STANDARDS FOR GOAL 18
18 **Understand, analyze and compare social systems, with an emphasis on the United States.**	A. Identify and compare characteristics of culture as reflected in language, literature, the arts and traditions. B. Analyze the roles of groups and institutions in relation to people and societies.

UMMARY CHART

PHYSICAL DEVELOPMENT AND HEALTH

Research shows that good health improves students' capacity to learn. Understanding the principles of physical development and health can help students develop both the abilities and the habits they need for good health. The standards include the academic knowledge and skills necessary to understand physical development and health, physical fitness, team skills, and prevention and treatment of illness and injury.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

19 **Understand concepts and acquire competent movement skills to engage in health-enhancing physical activity.**

ACADEMIC STANDARDS FOR GOAL 19

A. Demonstrate and analyze various movement concepts and applications.
B. Demonstrate knowledge of rules and strategies during physical activity.
C. Demonstrate physical competency in individual and team sports and recreational activities.

PROPOSED 1996 STATE GOAL

20 **Understand how to assess, achieve and maintain physical fitness for continuing health.**

ACADEMIC STANDARDS FOR GOAL 20

A. Know and apply the physiological principles and components of health-related fitness.
B. Assess individual fitness levels.
C. Set goals based on fitness data and develop, implement and monitor an individual fitness improvement plan.

PROPOSED 1996 STATE GOAL

21 **Develop team-building skills by working with others through physical activity.**

ACADEMIC STANDARDS FOR GOAL 21

A. Demonstrate responsibility during group physical activities.
B. Demonstrate participatory and leadership skills during planned group physical activity.

PROPOSED 1996 STATE GOAL

22 **Understand principles of health promotion and the prevention and treatment of illness and injury.**

ACADEMIC STANDARDS FOR GOAL 22

A. Explain the basic principles of health promotion, illness prevention and safety.
B. Describe and explain the health influences among individuals, groups and communities.
C. Explain how the environment can affect health.

SUMMARY CHART

PHYSICAL DEVELOPMENT AND HEALTH

Continued

PROPOSED 1996 STATE GOAL	ACADEMIC STANDARDS FOR GOAL 23
23 **Understand human body systems and factors that influence growth and development.**	A. Describe and explain the structure and functions of the human body systems and how they interrelate. B. Explain the effects of health-related actions on the body systems. C. Describe factors that affect growth and development.

PROPOSED 1996 STATE GOAL	ACADEMIC STANDARDS FOR GOAL 24
24 **Promote and enhance health and well-being through the use of effective communication and decision-making skills.**	A. Demonstrate procedures for positive communication, resolving differences and preventing violence. B. Apply decision-making skills related to the protection and promotion of individual health. C. Demonstrate skills essential to enhancing health and avoiding dangerous situations.

SUMMARY CHART
FINE ARTS

Before children enter school, they draw, dance, experiment with sounds and act out stories. The arts are basic to a balanced and complete education for all students.

The fine arts include visual art, dance, music and drama. When students learn to create in images, gestures, sounds and words, they discover new ways to shape and share their ideas with others. Achieving standards in the fine arts will help students look at problems from multiple perspectives and understand the role of the arts in civilization.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

25 **Understand the sensory elements, organizational principles and ideas expressed in and among the arts.**

ACADEMIC STANDARDS FOR GOAL 25

A. Describe, analyze and evaluate the sensory elements and organizational principles of works of art.
B. Define, analyze and evaluate how sensory elements and organizational principles are used to express ideas in the arts.
C. Compare and contrast similarities, differences and connections of sensory elements, organizational principles, and ideas expressed within and among the arts.

PROPOSED 1996 STATE GOAL

26 **Through creating and performing, understand how works of art are produced.**

ACADEMIC STANDARDS FOR GOAL 26

A. Demonstrate an understanding of how tools and processes are used in the arts.
B. Apply skills and knowledge necessary to create and perform in the arts.

PROPOSED 1996 STATE GOAL

27 **Understand the role of the arts in civilizations, past and present.**

ACADEMIC STANDARDS FOR GOAL 27

A. Analyze how the arts function in history, society and everyday life.
B. Analyze how the arts reflect history, society and everyday life.

SUMMARY CHART

FOREIGN LANGUAGES

Foreign language is not a fundamental learning area as identified in the School Code, section 28-1. The foreign language goals, academic standards and learning benchmarks presented here are intended to be used as a resource for foreign language programs.

Foreign languages help prepare students to live and work in a diverse society. Learning foreign languages promotes understanding and improves human interaction in our world.

The goals for foreign languages outline four main areas of proficiency: listening, speaking, reading and writing in the "target language," that is, the language being studied. In addition, students study the history and society of the countries where the languages are spoken, as well as the languages' connections to other learning areas.

As a result of their schooling, students will be able to:

PROPOSED 1996 STATE GOAL

28 **Use the target language to communicate within and beyond the classroom setting.**

ACADEMIC STANDARDS FOR GOAL 28

A. Understand oral communication in the target language.
B. Speak effectively in the target language in various settings.
C. Understand written passages in the target language.
D. Write effectively in the target language for a variety of purposes and audiences.

PROPOSED 1996 STATE GOAL

29 **Use the target language to develop an understanding of the customs, arts, literature, history and geography associated with the target language.**

ACADEMIC STANDARDS FOR GOAL 29

A. Demonstrate knowledge of manners and customs.
B. Demonstrate knowledge and understanding of the arts.
C. Demonstrate knowledge and understanding of literature and the media.
D. Demonstrate knowledge and understanding of history.
E. Demonstrate knowledge and understanding of demographics and geography.

PROPOSED 1996 STATE GOAL

30 **Use the target language to make connections and reinforce knowledge and skills across academic, vocational and technical disciplines.**

ACADEMIC STANDARDS FOR GOAL 30

A. Reinforce and further knowledge of other disciplines through the target language.
B. Demonstrate knowledge and understanding of a variety of career options.

The draft Illinois standards for science were developed using the National Science Education Standards, other states' standards and local outcomes from Illinois school districts. Children of all ages have a natural curiosity for all sciences. The study of science should encourage this curiosity and help humans understand events and processes, from the workings of the tiniest cell to the movements of the ocean tides and the formation of galaxies. Knowledge of science and comfort with its concepts allow people to follow areas of inquiry that interest them and offer practical day-to-day applications as well. Our nation's economy and productivity depend on the scientific and technological skills of Americans as well as their ability to discover and invent.

These science standards describe essential knowledge and skills in three areas: scientific inquiry; factual knowledge combined with unifying concepts; and the interaction of science, technology and society. Through these avenues, students will learn how to bring organization and clarity to the large and growing body of scientific information. Achieving these standards will prepare students to actively participate in a society that utilizes science and apply their knowledge and skills in practical situations.

APPLICATIONS OF LEARNING

Applications of learning are significant methods of learning and using knowledge which cross academic disciplines. The ability to use these skills will greatly influence students' success later in life.

SOLVING PROBLEMS

Recognize and investigate problems; formulate and propose solutions supported by reason and evidence.

Asking questions and seeking answers are at the heart of scientific inquiry. Following the steps of scientific inquiry, students learn how to gather evidence, review and understand their findings, and compare their solutions with those of others. They learn that there can be differing solutions to the same problem, some better than others. In the process, they learn and apply scientific principles. They also learn to be objective in deciding whether their solutions meet specifications and perform as desired.

COMMUNICATING

Express and interpret information and ideas.

Scientists must carefully describe their methods and results to a variety of audiences, including other scientists. This requires precise and complete descriptions and the presentation of conclusions supported by evidence. Young science students develop the powers of observation and description. Older students gain the ability to organize and study data, to determine its meaning, and to translate their findings into clear understandable language.

USING TECHNOLOGY

Use appropriate instruments, electronic equipment, computers and networks to access information, process ideas and communicate results.

Technology is invented and improved by the use of scientific principles. In turn, scientists depend on technology in performing experiments and studying the results. Science students learn to use a range of technologies: instruments, computer hardware and software, on-line services and equipment, primary source data and images, and communication networks. They learn how technology, in turn, is the result of a scientific design process that includes continual refinements and improvements.

WORKING ON TEAMS

Learn and contribute productively as individuals and as members of groups.

The practical application of science requires both individual and group efforts. Individuals bring unique insight and focus to the work of inquiry and problem solving. Working in groups, scientists pose questions, share hypotheses, divide their experimental efforts, and share data and results. Science students have the opportunity to work both ways—as individuals and as members of teams organized to conduct complex investigations and solve problems.

MAKING ACADEMIC CONNECTIONS

Recognize and apply connections of important information and ideas within and among academic learning areas.

Science has many disciplines, all interrelated. Understanding the functioning of cells depends on knowing chemistry; understanding chemistry depends on knowing physics. In the same way, science itself is highly dependent on mathematics—and it also relates strongly to medicine, geography, social trends and issues, and many other topics. Science, at its best, provides knowledge and skills that improve the understanding of virtually all subjects.

PROPOSED 1996 STATE GOALS

ACADEMIC STANDARDS

As a result of their schooling, students will be able to:

GOAL 11 Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims.

ACADEMIC STANDARDS FOR GOAL 11

A. Explain the principles and practices of scientific research.
B. Apply the steps and methods of scientific inquiry to conduct experiments and investigate research questions.
C. Apply the principles and methods of technological design to solve problems.
D. Assess the credibility of scientific claims.

GOAL 12 Understand the facts and unifying concepts of the life, physical and earth/space sciences.

ACADEMIC STANDARDS FOR GOAL 12

A. Apply concepts of systems within the sciences.
B. Apply concepts of form and function within the sciences.
C. Apply concepts of change and constancy within the sciences.
D. Apply concepts of models and explanations within the sciences.

GOAL 13 Understand connections and relationships among science, technology and society.

ACADEMIC STANDARDS FOR GOAL 13

A. Explain the historical development and importance of science and technology.
B. Explain conceptual relationships between science and technology.
C. Describe and analyze relationships among science, technology and society in practical situations.

STATE GOAL 11

Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims.

WHY THIS GOAL IS IMPORTANT

The knowledge and skills learned in science enable students to pose scientific questions, use models to enhance understanding, make predictions, gather and work with data, use appropriate measurement methods, analyze results, draw conclusions based on evidence, communicate their methods and results, and think about the implications of scientific research. These are the bases for all science and are valuable skills for virtually all other facets of life.

NOTE: <u>The "e.g.'s" are meant as examples only.</u> There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Explain the principles and practices of scientific research.	**11.A.1a** Explain how knowledge can be gained by careful observation. **11.A.1b** Demonstrate accurate recording and reporting of observations. **11.A.1c** Demonstrate basic safety rules and procedures for science activities.	**11.A.2a** Compare different types of scientific investigations. **11.A.2b** Explain and demonstrate, using appropriate technology, why keeping accurate and detailed records is important. **11.A.2c** Demonstrate ways to avoid injury when conducting science activities.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
11.A.3a Demonstrate how to vary only one experimental component at a time and control external variables. **11.A.3b** Demonstrate ways to record and use data accurately, using appropriate technology. **11.A.3c** Identify and reduce potential hazards in science activities.	**11.A.4a** Compare various sampling techniques and their applications in experimental designs. **11.A.4b** Explain how peer review helps to assure the accurate use of data and improve the scientific process. **11.A.4c** Estimate and reduce the degree of risk involved in science activities.	**11.A.5a** Justify when and how to use experimental designs that involve treatment and comparison (control) groups. **11.A.5b** Investigate and evaluate the effect of scientific peer review in actual examples. **11.A.5c** Design procedures to eliminate or reduce risk in potentially hazardous science activities.	

STATE GOAL 11

Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
B. Apply the steps and methods of scientific inquiry to conduct experiments and investigate research questions.	AS INDIVIDUALS AND AS MEMBERS OF AN INVESTIGATIVE TEAM: **11.B.1a** Develop questions on scientific topics. **11.B.1b** Collect data for investigation using measuring instruments. **11.B.1c** Record and arrange data into logical patterns and describe the patterns. **11.B.1d** Describe an observed event. **11.B.1e** Compare individual and group observations and results.	AS INDIVIDUALS AND AS MEMBERS OF AN INVESTIGATIVE TEAM: **11.B.2a** Formulate questions on a specific science topic and choose the steps needed to answer the questions. **11.B.2b** Collect data for investigation by applying a variety of scientific process skills (e.g., measurement, sampling procedures, recording methods). **11.B.2c** Construct charts and graphs to display data and use the data to produce reasonable explanations. **11.B.2d** Describe individual and group investigations clearly and accurately in oral and written reports.

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
AS INDIVIDUALS AND AS MEMBERS OF AN INVESTIGATIVE TEAM: **11.B.3a** Formulate hypotheses in a way that can be addressed by collecting data. **11.B.3b** Conduct scientific experiments that control all but one variable. **11.B.3c** Collect data using consistent measuring and recording techniques. **11.B.3d** Make and support conclusions with statistical evidence from data and explain unexpected results. **11.B.3e** Report the process and results of a scientific investigation in oral and written classroom presentations.	**AS INDIVIDUALS AND AS MEMBERS OF AN INVESTIGATIVE TEAM:** **11.B.4a** Formulate hypotheses, referencing prior research and knowledge. **11.B.4b** Conduct controlled experiments to test hypotheses. **11.B.4c** Collect, organize and analyze data accurately and precisely. **11.B.4d** Explain the existence of unexpected results in a data set. **11.B.4e** Make, present and defend conclusions drawn from investigation to a classroom audience in oral and written forms.	**AS INDIVIDUALS AND AS MEMBERS OF AN INVESTIGATIVE TEAM:** **11.B.5a** Formulate hypotheses informed by the research of others. **11.B.5b** Design procedures to test selected hypotheses. **11.B.5c** Conduct systematic controlled experiments to test the selected hypotheses. **11.B.5d** Apply statistical methods to make projections and to test the accuracy of results. **11.B.5e** Defend the results of investigations in oral and written presentations to audiences that may include professionals and technical experts.	

STATE GOAL 11

Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
C. Apply the principles and methods of technological design to solve problems.	AS INDIVIDUALS AND AS MEMBERS OF A DESIGN TEAM:	AS INDIVIDUALS AND AS MEMBERS OF A DESIGN TEAM:
	11.C.1a Describe a given design problem and discuss steps necessary to solve the problem.	**11.C.2a** Formulate a design problem and plan steps necessary to solve the problem.
	11.C.1b Propose a design to solve a problem based on given criteria (e.g., invent something to accomplish a task, improve the way something works).	**11.C.2b** Describe the plan, identifying simple constraints and considering them in the design process.
	11.C.1c Test the design using given instruments, techniques and measurement methods.	**11.C.2c** Test the design using suitable instruments, techniques and quantitative measurement.
	11.C.1d Assess the effectiveness of test results and solutions, using given criteria.	**11.C.2d** Assess test results and the effectiveness of solutions using given criteria and noting sources of error.
	11.C.1e Report the design, the test process and the results in oral and written forms.	**11.C.2e** Report the design, the process and the test results in relation to the criteria in oral and written forms.

NOTE: ***<u>The "e.g.'s" are meant as examples only.</u> There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.***

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
AS INDIVIDUALS AND AS MEMBERS OF A DESIGN TEAM: **11.C.3a** Formulate a design problem and establish criteria for determining the success of a solution. **11.C.3b** Propose and compare different plans and solutions based on given constraints (e.g., cost, time, trade-offs, materials, space, safety). **11.C.3c** Test a solution using available materials, instruments and technology. **11.C.3d** Evaluate the test results based on established criteria, note sources of error, and recommend improvements. **11.C.3e** Report, in oral and written forms, the relative success of the design based on the test results and criteria.	**AS INDIVIDUALS AND AS MEMBERS OF A DESIGN TEAM:** **11.C.4a** Propose improvements to current technological designs and establish criteria for determining the success of a solution. **11.C.4b** Design and compare different plans, based on constraints (e.g., cost, time, trade-offs, materials, safety, space), and select appropriate solutions using models, prototypes, and/or simulations and appropriate technology. **11.C.4c** Build and test the selected design, choosing suitable materials, instruments and technology. **11.C.4d** Apply established criteria to evaluate the acceptability, suitability, benefits and drawbacks of the design and recommend a course of action and improvements. **11.C.4e** Report the design steps and findings in oral and written forms, using technology to prepare and present the report to an audience of peers.	**AS INDIVIDUALS AND AS MEMBERS OF A DESIGN TEAM:** **11.C.5a** Identify design problems that have practical applications and establish criteria for a successful solution. **11.C.5b** Construct models, prototypes and/or simulations to compare and select appropriate solutions based on identified constraints. **11.C.5c** Build and test a design solution using suitable materials, instruments and technology. **11.C.5d** Modify and retest the design based on the test results. **11.C.5e** Apply established criteria to evaluate the suitability, acceptability, benefits, drawbacks and consequences of the tested solution, recommending actions, modifications and refinements. **11.C.5f** Report the design and findings in oral and written forms, using technology to prepare and present the report to an audience that may include technical professionals.	

STATE GOAL 11 *Continued*

Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims.

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
D. Assess the credibility of scientific claims.	**11.D.1** Explain why similar results are expected when procedures are done the same way.	**11.D.2** Explain why similar investigations may not conclude with similar results.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
11.D.3a Analyze sources of error in repeated experiments that yield different or variable results. **11.D.3b** Analyze cases in which the work of science has been affected by sound (e.g., supported by valid reasoning) or unsound (e.g., biased) scientific practices.	**11.D.4** Evaluate claims made from actual experiments, taking into account methods, sample size, sources of error and existing scientific knowledge.	**11.D.5a** Evaluate the credibility of claims from actual experiments. **11.D.5b** Analyze the validity of scientific evidence and reasoning in a public policy issue.	

STATE GOAL 12

Understand the facts and unifying concepts of the life, physical and earth/space sciences.

SCIENCE

WHY THIS GOAL IS IMPORTANT

A set of unifying facts and concepts connects and underlies the life, physical and earth/space sciences. These include the concepts of systems, form and function, change and constancy, and models and explanations. These concepts are useful in science and other fields. They help students understand what they observe in scientific experimentation and in nature. They also allow students to relate new subject matter to material previously learned and to create deeper and more meaningful levels of understanding.

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As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Apply concepts of systems within the sciences.	*Life Sciences* **12.A.1a** Describe and compare characteristics of living things in their region (e.g., trees, herbaceous plants, fungi, birds, insects, mammals).	**12.A.2a** Describe relationships among various organisms in their regional environment (e.g., predator/prey, parasite/host, food chains and webs).
	Physical Sciences **12.A.1b** Identify and compare various sources of energy (e.g., batteries, the sun).	**12.A.2b** Describe and compare characteristics of different kinds of energy (e.g., mechanical, electrical, magnetic, light, heat, chemical).
	Earth/Space Sciences **12.A.1c** Describe components and characteristics of the earth's land, water and atmospheric systems and familiar solar system objects (e.g., sun, stars, planets, moon).	**12.A.2c** Identify and explain natural cycles and patterns in the earth's land, water and atmospheric systems (e.g., rock cycle, water cycle, weather patterns) and in the solar system (e.g., the sun as the center of the solar system, the order of the planets, earth/moon relationship, orbits).

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
12.A.3a Analyze factors that influence the size and stability of populations (e.g., determine the influence that birth rate, death rate, migration patterns have on a population size).	**12.A.4a** Compare physical, ecological and behavioral factors that influence interactions among organisms.	**12.A.5a** Analyze and explain biodiversity issues and interactions related to organisms and the resources they need to survive.	
12.A.3b Explain interactions of energy with matter (e.g., changes of state due to heating and cooling; heat absorption and release when chemicals combine).	**12.A.4b** Apply the principles of energy conservation and entropy (e.g., chemical reactions, energy conversions) to naturally occurring systems.	**12.A.5b** Analyze reactant/product transformations in natural and man-made energy systems (e.g., detonation of a nuclear bomb, burning of fuel, decomposition of waste).	
12.A.3c Analyze and explain events, forces and effects occurring in the earth's land, water and atmospheric systems (e.g., volcanic eruptions, continental drift, sedimentation, tides, salinity changes, jet stream, ozone depletion) and in the solar system (e.g., phases of the moon, eclipses).	**12.A.4c** Analyze and compare interrelationships among the earth's systems (e.g., sea levels and coastal features, erosion and silting, land features and weather patterns) and among celestial objects (e.g., the moon and tidal action, the sun, planetary orbits).	**12.A.5c** Analyze and explain naturally occurring earth and space events (e.g., floods, earthquakes, droughts, heat waves, storms, precession, retrograde motion, sunspots, novas).	

STATE GOAL 12

Understand the facts and unifying concepts of the life, physical and earth/space sciences.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
B. Apply concepts of form and function within the sciences.	*Life Sciences* **12.B.1a** Describe how objects are often made of component blocks or parts (e.g., buildings are made of wood or bricks; birds have feathers; people have bones, blood, hair, skin).	**12.B.2a** Explain how cells function as "building blocks" of organisms and determine the requirements for cells to live (e.g., use a pond water sample to test a single-celled organism's need for food, air, waste disposal).
	Physical Sciences **12.B.1b** Compare large-scale physical properties of matter (e.g., size, shape, color, texture, odor).	**12.B.2b** Describe and demonstrate the properties of the states of matter (e.g., solids, liquids, gases).
	Earth/Space Sciences **12.B.1c** Identify and describe diverse features of the earth (e.g., rocks, soil, clouds, snow, mountains, oceans) and characteristics related to the earth's position, rotation and revolution (e.g., day and night, seasons, length of year).	**12.B.2c** Describe and explain interactions of earth components (e.g., land, air, water) and solar system components (e.g., sun, planets, moons).

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
12.B.3a Compare and contrast how different forms and structures reflect different functions (e.g., identify similarities and differences among animals that fly, walk or swim; compare structures of plant cells to those of animal cells).	**12.B.4a** Investigate and explain how cells and organisms react to stimuli and maintain stability (e.g., plant cells in salt solution, bacteria in contact with antibiotics, cell components for photosynthesis, respiration and waste removal, enzyme and hormone actions).	**12.B.5a** Test and draw conclusions about changes within cells and organisms in response to stimuli and changing environmental conditions (e.g., homeostasis, dormancy, cells reacting to the presence of various chemicals).	
12.B.3b Describe and demonstrate the chemical and physical characteristics of matter (e.g., atoms, molecules, compounds, mixtures, solutions).	**12.B.4b** Analyze the atomic and nuclear structure of matter (e.g., electron charge, mass, location, bonding properties, protons, neutrons, subnuclear particles), and the relationship of structure to function.	**12.B.5b** Analyze the properties of physical materials in relation to their physical and/or chemical structures.	
12.B.3c Describe and compare the properties and functions of the earth's component features (e.g., size, shape and age of the earth; land forms, minerals and rocks; fossils; lakes, rivers, oceans; groundwater) and solar system objects (e.g., sun, planets, planetary satellites, asteroids).	**12.B.4c** Analyze factors that affect the forms and functions of components of the earth (e.g., plate tectonics, climate) and the solar system (e.g., gravitational influences, chemical composition, chemical reactions).	**12.B.5c** Describe internal and external sources of energy that drive formation of the earth's features and those of celestial objects (e.g., solar/stellar radiation, naturally occurring radioactive isotopes, gravitational energy).	

STATE GOAL 12

Understand the facts and unifying concepts of the life, physical and earth/space sciences.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
C. Apply concepts of change and constancy within the sciences.	*Life Sciences* **12.C.1a** Categorize living organisms in relation to each other using a variety of observable features (e.g., size, color, shape, backbone, cell structure).	**12.C.2a** Identify plant and animal features that help them live in different environments (e.g., specialized teeth for specialized foods, thorns, insulation for cold temperature).
	Physical Sciences **12.C.1b** Describe and demonstrate examples of motion in the world (e.g., natural motions, man-made motions).	**12.C.2b** Distinguish among different types of motion (e.g., uniform, variable, periodic).
	Earth/Space Sciences **12.C.1c** Identify repeating patterns of weather and climate (e.g., rain, snow, heat, humidity) and patterns related to the earth's motion in the solar system (e.g., day/night, seasons, annual events).	**12.C.2c** Compare and explain short-term and long-term planetary and celestial variations (e.g., latitudinal effects on weather and climate, relative positions of planets and stars).

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NOTE: ***The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.***

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SCIENCE

MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
12.C.3a Compare and assess features of organisms for their adaptive, competitive and survival values (e.g., appendages, reproductive rates, camouflage, defensive structures).	**12.C.4a** Explain the relationship of genetic codes to the observable variations among physical features and cellular functions of organisms.	**12.C.5a** Apply concepts of change and constancy to compare and predict how life forms can adapt to changes in the environment (e.g., examples of variations within a population that may increase the likelihood of survival under new conditions, computer simulations of the effects of changing external factors on individual and population survival rates).	
12.C.3b Compare the causes and characteristics of motion (e.g., inertia, action/reaction, equilibrium conditions, distance vs. time relationships).	**12.C.4b** Explain observable physical events by applying the principles of accelerated and relative motion (e.g., force/mass relationships, acceleration relationship to distance, velocity and time, reaction rates).	**12.C.5b** Analyze natural and man-made physical systems by applying the principles of motion.	
12.C.3c Compare and explain large-scale dynamic processes that affect the biosphere (e.g., cloud cover, geological events, jet stream) and movements of celestial objects (e.g., gravitational interactions, chemical reactions).	**12.C.4c** Analyze and compare the effects of processes that shape the surface of the earth (e.g., glaciation, landslides, erosion, earthquakes) and theories that explain observable changes in the celestial objects.	**12.C.5c** Investigate and explain earth processes (e.g., ice ages, sea-level fluctuations, long-term climate change) and celestial events (e.g., movements of stars and galaxies, formation and destruction of stars).	

STATE GOAL 12

Understand the facts and unifying concepts of the life, physical and earth/space sciences.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
D. Apply concepts of models and explanations within the sciences.	*Life Sciences* **12.D.1a** Describe how offspring are very much, but not exactly, like their parents and one another.	**12.D.2a** Categorize features as either inherited or learned (e.g., flower color or eye color is inherited, but language is learned).
	Physical Sciences **12.D.1b** Identify and compare observable forces in nature (e.g., pushing, pulling on objects, gravity, magnetism).	**12.D.2b** Demonstrate and explain ways that forces acting on objects cause actions and reactions (e.g., magnets attracting and repelling; objects falling, rolling and bouncing; materials changing shape).
	Earth/Space Sciences **12.D.1c** Identify and describe characteristics of the star-filled universe (e.g., stars are innumerable, unevenly dispersed, unequally bright).	**12.D.2c** Identify and explain patterns in the night sky (e.g., circumpolar constellations, seasonal constellations).

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

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SCIENCE

MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
12.D.3a Compare characteristics of organisms produced from a single parent (e.g., bacteria, protists, some plants and animals) with those of organisms produced by two parents (e.g., most plants and animals).	**12.D.4a** Investigate and explain how new genetic combinations arise and produce visible effects (e.g., protein synthesis, dominant/recessive traits, probability of gene combinations, neutral and harmful gene effects, tracing the occurrence of a genetic disease in a family, using electrophoretic techniques for comparing specific DNA sequences).	**12.D.5a** Investigate and analyze, using contemporary statistical technologies, the transmission of genetic traits, diseases or defects.	
12.D.3b Apply the model of the gravitational force (e.g., relationships to mass and distance) to explain observed behaviors of objects.	**12.D.4b** Demonstrate the effects of electromagnetic and nuclear forces (e.g., chemical bond strength, tensile strength, electromagnetic induction, radiation).	**12.D.5b** Develop models and explanations for effects of the forces of nature in natural or man-made systems.	
12.D.3c Explain the relationship of our sun to other elements of our galaxy (e.g., our sun as a normal-sized star, multiple star systems, star clusters, galaxies).	**12.D.4c** Analyze and compare the formation of galactic elements (e.g., fusion process in stars, gravitational condensation).	**12.D.5c** Analyze the evidence that supports models for explaining changes in the universe (e.g., red shift data, steady state and inflationary descriptions of the universe).	

STATE GOAL 13

Understand connections and relationships among science, technology and society.

As a result of their schooling, students will be able to:

WHY THIS GOAL IS IMPORTANT

Throughout history, technology has given humans the ability to change and improve their surroundings. Examples can be found in the areas of agriculture, sanitation, transportation and many others. Science advances technology; in turn, technology serves scientific inquiry and progress. Students who understand this relationship will better understand the processes of invention and design. They will also be able to appreciate the effects of scientific discovery and the applications of technology.

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Explain the historical development and importance of science and technology.	**13.A.1a** Describe the lives and contributions of famous scientists and inventors. **13.A.1b** Identify and describe ways that science and technology affect people's everyday lives.	**13.A.2a** Explain the effects of significant scientific discoveries and technological innovations over the centuries. **13.A.2b** Identify and explain ways that science and technology have had and will continue to have an important influence on the lives and careers of everyone.
B. Explain conceptual relationships between science and technology.	**13.B.1a** Identify and use common scientific instruments and technology (e.g., thermometer, calculator, stopwatch, balance, magnifying glass, microscope). **13.B.1b** Compare the accuracy of measurements made with and without instruments.	**13.B.2a** Identify and explain ways that scientific knowledge drives technological developments. **13.B.2b** Demonstrate the use of scientific instruments and technology for various purposes and levels of precision (e.g., triple beam and electronic balances, graduated cylinders, timers, meters, calculators, computers).

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
13.A.3a Identify important contributions to science and technology that have been made by individuals/groups from various nations at various times. **13.A.3b** Provide examples of careers that use scientific and technological knowledge and skills.	**13.A.4a** Describe how scientific knowledge, explanations and technological designs may change with new information over time. **13.A.4b** Compare the knowledge and skills required for various science-related, science-affected and technical occupations.	**13.A.5a** Research, analyze and report on the effects of scientific and technological breakthroughs that have occurred through long-term research, chance and cooperation. **13.A.5b** Assess how scientific and technological progress has affected other fields of study and aspects of everyday life.	
13.B.3 Demonstrate how technology is useful in science for a variety of purposes (e.g., sample collection, storage and treatment; measurement; data collection, storage and retrieval; communication of information).	**13.B.4** Compare scientific inquiry and technological design including the purpose that each process achieves and how the processes are related.	**13.B.5** Analyze specific challenges created through international competition for increases in scientific knowledge and improvements in technical capabilities; propose and evaluate possible solutions; present results to an audience as individuals and as members of a research team.	

STATE GOAL 13

Understand connections and relationships among science, technology and society.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
C. Describe and analyze relationships among science, technology and society in practical situations.	**13.C.1a** Identify and compare ways that populations of living things, including people, depend on each other. **13.C.1b** Identify renewable and nonrenewable natural resources. **13.C.1c** Demonstrate ways to reduce, reuse and recycle materials. **13.C.1d** Identify and describe ways that science and technology have been able to meet the needs of people (e.g., transportation, medicine, agriculture, sanitation, communication).	**13.C.2a** Analyze how specific choices that humans make affect local, regional and world ecosystems. **13.C.2b** Identify and explain ways that technology can increase or decrease the pace of natural changes in an ecosystem (e.g., irrigation, dams, rural electrification, highways, manufacturing). **13.C.2c** Compare the relative effectiveness of reducing, reusing and recycling in actual situations. **13.C.2d** Investigate the historical development and current status of specific examples of science and technology advancements; make predictions about future development; report findings in oral and written forms.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
13.C.3a Analyze the dynamics of competitive and mutually beneficial populations. **13.C.3b** Analyze case studies of the interaction of resource acquisition and technological development with ecosystems. **13.C.3c** Investigate costs and benefits of resource use, technology use and conservation programs (e.g., recycling programs, game reserves, alternate fuels), report findings and make recommendations to an audience of peers. **13.C.3d** Analyze the impact of specific technologies within a society, including benefits and consequences (e.g., industrialization throughout history). **13.C.3e** Apply criteria to analyze the effects of policies on local science and technology issues (e.g., decisions about landfills, water quality, energy use, transportation).	**13.C.4a** Analyze the relationships between available resources and population fluctuations. **13.C.4b** Analyze trade-offs that result from technological and ecological changes. **13.C.4c** Conduct a case study of a local example of resource use, technology use or conservation program; analyze and report findings and make recommendations to an audience of peers, technical professionals and policy makers. **13.C.4d** Analyze the costs, benefits and effects of specific scientific and technological policies at the local, regional and national levels.	**13.C.5a** As members of an investigative team, design and conduct an ecosystem impact study; analyze results using appropriate technology; report results and findings to an audience of peers, professionals and policy makers; publish results in a public forum. **13.C.5b** Research the economics, policies and politics of various science and technology issues.	

SOCIAL SCIENCE

The social science draft goals and academic standards were developed using the 1985 State Goals for Social Sciences and a variety of national and state resources as well as local Illinois examples contributed by team members. A primary purpose of studying social science is to help people develop the ability to make informed and reasoned decisions as citizens and community members.

Social science includes political science and law, economics, history, geography, and sociology as well as content related to the humanities, mathematics and the natural sciences. Students who achieve the academic standards for social science will have a broad understanding of political and economic systems. They will better understand events, trends, personalities and movements in state, national and world history. They will know United States and world geography. They also will grasp how the concepts of social science can help interpret human actions.

APPLICATIONS OF LEARNING

Applications of learning are significant methods of learning and using knowledge which cross academic disciplines and are the skills which will greatly influence students' success later in life.

SOLVING PROBLEMS

Recognize and investigate problems; formulate and propose solutions supported by reason and evidence.

In social science, solving problems helps students to recognize that individual decisions and actions have consequences—and these consequences affect the way people, groups and nations associate with each other. Students of social science are asked to analyze information from a variety of sources and to solve problems through a rational process based on goals and criteria.

COMMUNICATING

Express and interpret information and ideas.

To gather a range of opinions and determine the best course of action, students must interpret information. To study and draw conclusions about social science issues, students need to have a command of facts, be able to listen carefully to others, and be able to organize and explain their own ideas using various media.

USING TECHNOLOGY

Use appropriate instruments, electronic equipment, computers and networks to access information, process ideas and communicate results.

Technology today provides a channel through which students can gain knowledge of the past, information about today and hypotheses regarding the future. This technology includes databases, computer programs, on-line services and interactive telecommunications. It allows students to see and understand events and consequences that otherwise would be beyond their classroom and group.

WORKING ON TEAMS

Learn and contribute productively as individuals and as members of groups.

Social science is about people's interactions. Study in this field encourages students to listen carefully to the views of all members of a group and to represent their own points of view appropriately and effectively. The group benefits from the individual knowledge and skills of its members. Each individual—like each part of social science itself—holds an important relationship to the whole.

MAKING ACADEMIC CONNECTIONS

Recognize and apply connections of important information and ideas within and among academic learning areas.

Social science is a highly integrated set of disciplines. Understanding economics requires knowing mathematics; understanding geography requires knowledge of several sciences. Students must grasp that the connections between the parts of social science—and their relations to other academic areas—are the key to better understanding how people and groups interact. Students in social science must know data collection and analysis, library and field research, debate, discussion and decision making.

PROPOSED 1996 STATE GOALS

ACADEMIC STANDARDS

As a result of their schooling, students will be able to:

GOAL 14 Understand, analyze and compare political systems, with an emphasis on the United States.

ACADEMIC STANDARDS FOR GOAL 14

A. Describe and explain basic principles of the United States government.
B. Compare and analyze the structures and functions of the political systems of Illinois, the United States and other nations.
C. Describe and explain election processes and responsibilities of citizens.
D. Analyze the roles and influences of individuals and interest groups in the political systems of Illinois, the United States and other nations.
E. Describe and explain United States foreign policy as it relates to other nations and international issues.

GOAL 15 Understand, analyze and compare economic systems, with an emphasis on the United States.

ACADEMIC STANDARDS FOR GOAL 15

A. Explain and compare how economic systems facilitate the exchange, production, distribution and consumption of goods and services.
B. Analyze the effects of scarcity and choice on consumers.
C. Analyze the effects of scarcity and choice on producers.
D. Explain how trade generates interdependence affecting the economies of nations.

GOAL 16 Understand and analyze events, trends, individuals and movements shaping the history of Illinois, the United States and other nations.

ACADEMIC STANDARDS FOR GOAL 16

A. Describe and explain contributions of selected individuals throughout history.
B. Explain the chronology and significance of major social, economic and political events throughout history.
C. Summarize and analyze historical relationships and developments leading to similarities and differences among people and societies throughout the world.
D. Explain the effects of urbanization, industrialization and technology on society and institutions throughout history.
E. Analyze the roles played by groups in developing a pluralistic society in the United States.

GOAL 17 Demonstrate a knowledge of world geography, as well as an understanding of the effects of geography on society, with an emphasis on the United States.

ACADEMIC STANDARDS FOR GOAL 17

A. Locate, describe and explain places, regions and features on the earth using geographic terms, methods and representations.
B. Analyze and explain characteristics and interactions of the earth's physical systems.
C. Analyze and explain relationships between geographic factors and society.
D. Explain the historical significance of geography.

GOAL 18 Understand, analyze and compare social systems, with an emphasis on the United States.

ACADEMIC STANDARDS FOR GOAL 18

A. Identify and compare characteristics of culture as reflected in language, literature, the arts and traditions.
B. Analyze the roles of groups and institutions in relation to people and societies.

STATE GOAL 14

Understand, analyze and compare political systems, with an emphasis on the United States.

WHY THIS GOAL IS IMPORTANT

The existence and advancement of a free society depend on the knowledge, skills and understanding of its citizenry. Through the study of various forms and levels of government and the documents and institutions of the United States, students will develop the skills and knowledge that they must have to be contributing citizens, now and in the future.

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

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As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Describe and explain basic principles of the United States government.	**14.A.1** Identify the fundamental principles of government as expressed and implied in major documents (e.g., United States Constitution, Declaration of Independence, Gettysburg Address, Magna Carta, Mayflower Compact).	**14.A.2** Explain the importance of fundamental concepts expressed and implied in major documents (e.g., United States Constitution, Declaration of Independence, Gettysburg Address, Magna Carta, Mayflower Compact).
B. Compare and analyze the structures and functions of the political systems of Illinois, the United States and other nations.	**14.B.1** Identify local, state and national political systems (e.g., local councils, legislatures, Congress).	**14.B.2** Give examples of government responsibilities at the local, state and national levels and distinguish among them.
C. Describe and explain election processes and responsibilities of citizens.	**14.C.1** Identify the concepts of responsible citizenship (e.g., respect for the law, patriotism, civility).	**14.C.2** Explain why rights and responsibilities (e.g., voting, protection under law) are important to the individual, family, community, state and nation.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
14.A.3 Explain how and why responsibility is distributed, shared and limited by the United States and Illinois constitutions and significant court decisions (e.g., Marbury vs. Madison).	**14.A.4** Describe and evaluate how local, state and national governments serve the purposes for which they were created.	**14.A.5** Research and report various positions on issues regarding the distribution of the powers and responsibilities of the federal system of government.	
14.B.3 Identify and analyze basic features of the political systems of Illinois and the United States.	**14.B.4** Compare and analyze the political systems of Illinois and the United States.	**14.B.5** Compare and analyze political systems among nations through analysis of significant contemporary political events and court decisions.	
14.C.3 Identify and analyze historical issues involving rights, roles and status of individuals in relation to municipalities, states and the nation.	**14.C.4** Explain the meaning of participatory citizenship (e.g., *Bill of Rights*, volunteerism, voting) at all levels of government and society in the United States.	**14.C.5** Analyze the historical trends of voting rights from the first election in the United States up to the most recent national election.	

STATE GOAL 14

Understand, analyze and compare political systems, with an emphasis on the United States.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
D. Analyze the roles and influences of individuals and interest groups in the political systems of Illinois, the United States and other nations.	**14.D.1** Describe and compare the roles of local leaders (e.g., governmental, community).	**14.D.2** Identify and compare ways that individuals and groups influence and shape public policy (e.g., general public opinion, special interest groups, formal parties, organizations).
E. Describe and explain United States foreign policy as it relates to other nations and international issues.	**14.E.1** Identify the interaction of citizens in trade and communication.	**14.E.2** Describe the leadership role of the United States in international settings (e.g., diplomacy).

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
14.D.3a Identify and compare the roles and effectiveness of groups in influencing and shaping public policy and decision making. **14.D.3b** Explain roles and influences of individuals and interest groups in shaping a current debate on public policy, using information search methods and telecommunication networks.	**14.D.4a** Explain the roles and effectiveness of individuals in influencing and shaping public policy and decision making. **14.D.4b** Analyze roles and influences of individuals and interest groups in shaping a current debate on public policy and make predictions regarding possible results, using information search methods and telecommunication networks.	**14.D.5** Compare and contrast a variety of public policies and issues from the perspective of different individuals and groups.	
14.E.3 Describe the relationship between national sovereignty and international interests (e.g., territory, natural resources, trade, use of technology).	**14.E.4** Compare and contrast relationships and tensions among members of the international community (e.g., sovereignty issues, international interests).	**14.E.5** Analyze the historical trends of United States foreign policy and report the findings in oral and written forms using technology to prepare and present the report, as individuals and as members of a design team.	

STATE GOAL 15

Understand, analyze and compare economic systems, with an emphasis on the United States.

As a result of their schooling, students will be able to:

WHY THIS GOAL IS IMPORTANT

People's lives are directly affected by the economies of cities, states, nations and the world. All people engage in economic activity: buying, selling, producing and consuming. By understanding economic systems—and how economics blends with other social sciences, students will be able to make more-informed choices, prudently apply resources, and function as effective participants in the economies around them.

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Explain and compare how economic systems facilitate the exchange, production, distribution and consumption of goods and services.	**15.A.1** Distinguish between producers and consumers and explain how their choices affect business decisions.	**15.A.2** Describe and compare how segments of the economy interact (e.g., producers, consumers, government, currency, banking).
B. Analyze the effects of scarcity and choice on consumers.	**15.B.1** Describe how demand and scarcity affect people's choices about goods and services (e.g., energy, food, cars, jobs).	**15.B.2** Describe connections among price, quantity demanded and opportunity costs.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
15.A.3 Identify and compare traditional, market and command economic systems.	**15.A.4a** Explain the roles of savings, investment and international trade in the circular flow of the economy. **15.A.4b** Explain how economies (e.g., traditional, market, command) resolve problems (e.g., prices, incentives, profit, mandates). **15.A.4c** Explain the costs and benefits of providing public and private approaches to economic issues (e.g., taxation, assistance programs, correction of market failure).	**15.A.5a** Compare types of unemployment (e.g., fractional, structural, cyclical, seasonal) and propose ways to maximize employment and productivity. **15.A.5b** Evaluate how monetary policy (e.g., taxing, spending, Federal Reserve System) affects government decisions.	
15.B.3a Explain market forces (e.g., supply, demand, price, quality, features, opportunity cost, income, substitutes, complements). **15.B.3b** Describe a market trend over time using information search methods and telecommunication networks.	**15.B.4a** Explain how interactions of supply, demand and current events affect shortages, surpluses and consumer prices. **15.B.4b** Compare the costs and benefits of paying for consumer purchases through differing means (e.g., credit, cash). **15.B.4c** Analyze a current economic issue, using information search methods and telecommunication networks.	**15.B.5a** Explain and evaluate the concept of elasticity as it applies to supply and demand and consumer decisions. **15.B.5b** Analyze how changes in inflation and interest rates affect consumers. **15.B.5c** Describe how the relationship between aggregate supply and demand determines levels of unemployment and inflation.	

STATE GOAL 15

Understand, analyze and compare economic systems, with an emphasis on the United States.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
C. Analyze the effects of scarcity and choice on producers.	**15.C.1a** Identify human, natural and capital resources (e.g., skills, minerals, tools, machines) used to produce different goods and services. **15.C.1b** Determine how scarcity forces producers to make choices.	**15.C.2a** Explain connections between price and what producers choose to make available. **15.C.2b** Demonstrate how the availability of resources affects what to produce. **15.C.2c** Identify natural resources, human resources and capital equipment in production relative to a variety of markets.
D. Explain how trade generates interdependence affecting the economies of nations.	**15.D.1a** Describe United States currency and its use in economic exchange. **15.D.1b** Identify the origin of products purchased by consumers.	**15.D.2a** Describe the costs and benefits of international trade to businesses (e.g., producers, distributors, importers, exporters). **15.D.2b** Explain costs and benefits of specialization in the economy.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
15.C.3a Analyze potential uses of a resource (e.g., iron ore, oil) showing the impact on supply of changes in the number of producers, prices of inputs and prices of related goods. **15.C.3b** Explain the effect on supply and demand when price changes.	**15.C.4a** Analyze how competition in the United States is maintained and how competition affects market structures (e.g., free enterprise system, monopoly, oligopoly, monopolistic and perfect competition). **15.C.4b** Explain the importance of research, development, invention and entrepreneurship to the United States economy.	**15.C.5a** Analyze the relationship between Gross Domestic Product and natural as well as human resources. **15.C.5b** Compare Gross Domestic Product of the United States and other countries in relation to the productive resources each has available. **15.C.5c** Assess how the production of resources could be affected by current events (e.g., wars, revolutions, legislation).	
15.D.3a Explain how international trade affects consumers. **15.D.3b** Describe absolute/comparative advantages and how they form the basis for specialization and trade now and in the past.	**15.D.4a** Explain how transaction costs affect people's decisions to produce or consume. **15.D.4b** Describe the effects of trade barriers on the flow of goods and services among nations.	**15.D.5a** Analyze how exchange rates affect the flow of trade between nations. **15.D.5b** Assess the impact of government decisions related to trade (e.g., tariffs, limits, sanctions).	

STATE GOAL 16

Understand and analyze events, trends, individuals and movements shaping the history of Illinois, the United States and other nations.

WHY THIS GOAL IS IMPORTANT

George Santayana said "those who cannot remember the past are condemned to repeat it." In a broader sense, students who can examine and analyze the events of the past have a powerful tool for understanding the events of today and the future. They develop an understanding of how people, nations, actions and interactions have led to today's realities. In the process, they can better define their own roles as participating citizens.

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Describe and explain contributions of selected individuals throughout history.	**16.A.1** Identify contributions of selected individuals (e.g., founders, current leaders, business persons, athletes, artists) in the history of the local community.	**16.A.2** Describe the contributions of selected individuals in major eras of Illinois and United States history drawing information from a variety of traditional, electronic and on-line sources.
B. Explain the chronology and significance of major social, economic and political events throughout history.	**16.B.1** Explain the significance of events in the development of Illinois and the United States (e.g., settlement, statehood, wars, technological advancement).	**16.B.2** Describe and place in chronological order major events in the development of the community, Illinois and the United States.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
16.A.3 Describe reactions of various individuals and groups to key events associated with the historical development of Illinois and the United States drawing information from a variety of traditional, electronic and on-line sources.	**16.A.4** Analyze contributions of individuals (e.g., business and political leaders, scientists, scholars, reformers) to the development of modern economic eras in the United States (e.g., agricultural, industrial, post-industrial), drawing information from a variety of traditional, electronic and on-line sources.	**16.A.5** Assess the long-term consequences of major decisions by leaders in various nations of the world, drawing information from a variety of traditional, electronic and on-line sources.	
16.B.3 Explain the historic connections of the United States with other nations (e.g., immigration and migration of the 5th, 19th and 20th centuries; 20th century economic and political ties).	**16.B.4** Analyze key events and enduring issues that led to the framing and adoption of the *United States* and *Illinois Constitutions* (e.g., economic, political, social).	**16.B.5** Compare and contrast varying interpretations of major events in selected periods of history.	

STATE GOAL 16

Continued

Understand and analyze events, trends, individuals and movements shaping the history of Illinois, the United States and other nations.

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
C. Summarize and analyze historical relationships and developments leading to similarities and differences among people and societies throughout the world.	**16.C.1** Identify characteristics that are useful to describe societies (e.g., organization, roles of members, ways of using resources).	**16.C.2** Recognize major characteristics of societies (e.g., political organization, art, technology) that have emerged throughout the world.
D. Explain the effects of urbanization, industrialization and technology on society and institutions throughout history.	**16.D.1** Explain the influence of transportation and communication changes throughout history (e.g., wheel, sailing improvements, steam power, fossil fuels, automobiles, telephones, broadcast media, Internet).	**16.D.2** Identify the impact of selected technological changes over time (e.g., wheel, printing press, horse collar, steel plow, broadcast media, automobile, airplane, heavy machinery, computer, Internet).
E. Analyze the roles played by groups in developing a pluralistic society in the United States.	**16.E.1** Explain the influence of historical customs and traditions in American society (e.g., clothing, food, holidays).	**16.E.2** Compare people, places and customs of the Americas prior to European colonization and settlement (e.g., Aztec, Inca, Iroquois, Hopi, Olmec, Maya, Huron).

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
16.C.3a Summarize the basic characteristics of great empires and civilizations from 2000 BC - 450 AD (e.g., Greek, Roman, Chou, Persian, Mayan, Gupta, Tang, Islamic, Byzantine, Egyptian, Mali). **16.C.3b** Analyze and summarize, orally and in writing, major influences (e.g., scientific, economic, religious, political) on the development of civilizations 2000 BC - 450 AD.	**16.C.4a** Compare major intellectual periods from 450 - 1900 AD. **16.C.4b** Describe the rise and impact of political systems prior to the 19th century.	**16.C.5a** Analyze the creation and impact of structures of power and authority (e.g., democracy, communism, socialism, fascism) in the 20th century. **16.C.5b** Analyze the impact of major human-generated events that affected a wide segment of the world's population in the 20th century.	
16.D.3 Trace the historic origins of selected contemporary conditions in nations of the world other than the United States.	**16.D.4** Compare and evaluate selected scientific and technological developments (e.g., wheel, horse collar, steel plow, radio, automobile, airplane, computer) that have had a significant impact on the nation and the world.	**16.D.5** Apply criteria to assess the impact of selected 20th century social trends and technological innovations on people, societies and institutions (e.g., Sputnik, nuclear weaponry, plastics, voting rights).	
16.E.3 Describe the cultural, economic and political contributions of groups in Illinois and the United States.	**16.E.4** Analyze the effects of group immigration and migration patterns on the development of the United States.	**16.E.5** Analyze the roles played by selected groups in civic issues (e.g., citizenship, immigration policy, suffrage, civil rights) at significant periods in the development of the United States.	

STATE GOAL 17

Demonstrate a knowledge of world geography, as well as an understanding of the effects of geography on society, with an emphasis on the United States.

WHY THIS GOAL IS IMPORTANT

The need for geographic literacy has never been greater or more obvious than in today's tightly interrelated world. Students must understand the world's physical features, how they blend with social systems and how they affect economies, politics and human interaction. Isolated geographic facts are not enough. To grasp geography and its effect on individuals and societies, students must know the broad concepts of spatial patterns, mapping, population and physical systems (land, air, water). The combination of geographic facts and broad concepts provides for a deeper understanding of geography and its effect on individuals and societies.

NOTE: <u>The "e.g.'s" are meant as examples only.</u> There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

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As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Locate, describe and explain places, regions and features on the earth using geographic terms, methods and representations.	**17.A.1a** Describe the physical characteristics of places, both local and global, using the spatial elements of point, line, area and volume (e.g., locations, roads, regions, bodies of water). **17.A.1b** Identify the characteristics and purposes of geographic representations (e.g., maps, globes, graphs, photographs) and be able to locate specific places using each.	**17.A.2a** Compare the physical characteristics of places (e.g., soils, land forms, vegetation, wildlife, climate, natural hazards). **17.A.2b** Demonstrate how to use maps (including mental maps) and other geographic representations and instruments to gather information (e.g., about people, places, and environments).
B. Analyze and explain characteristics and interactions of the earth's physical systems.	**17.B.1a** Identify various components of the earth's physical systems (e.g., atmosphere, lithosphere, hydrosphere and biosphere). **17.B.1b** Describe the physical components of ecosystems (e.g., climate, altitude, latitude, water, soil characteristics).	**17.B.2a** Describe physical and human processes (e.g., erosion, agriculture, settlement) that shape spatial patterns on the earth. **17.B.2b** Explain and compare how physical and living components interact in a variety of ecosystems (e.g., desert, prairie, flood plain, forest, tundra).

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
17.A.3a Explain how people use geographic markers and boundaries (e.g., hemispheres, meridians, continents, flood plains) to analyze and navigate the earth. **17.A.3b** Explain how to make and use geographic representations (e.g., maps, graphs, charts, models, aerial photographs, satellite images) to provide and enhance spatial information.	**17.A.4a** Answer complex geographic questions (e.g., how physical features have deterred or enabled migration) using mental maps of physical and human features. **17.A.4b** Demonstrate how to use maps and other geographic instruments and technologies to analyze spatial patterns and distributions on earth.	**17.A.5** Use knowledge of maps and other geographic instruments and technologies to derive solutions to spatial problems (e.g., land use, ecological concerns).	
17.B.3a Explain how physical processes (e.g., climate, meteorology, plate tectonics, erosion, soil formation, water cycle, circulation patterns in the ocean) shape patterns in the environment and influence availability and quality of natural resources. **17.B.3b** Explain how changes in components of an ecosystem affect the system overall.	**17.B.4a** Explain the dynamics of the earth's physical systems (e.g., variation, productivity, constructive and destructive processes). **17.B.4b** Analyze trends in world demographics as they relate to physical systems.	**17.B.5** Analyze international issues and problems using ecosystem and physical geography concepts.	

STATE GOAL 17

Demonstrate a knowledge of world geography, as well as an understanding of the effects of geography on society, with an emphasis on the United States.

Continued

As a result of their schooling, students will be able to:

ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
C. Analyze and explain relationships between geographic factors and society.	**17.C.1a** Identify ways people depend on and interact with the physical environment. **17.C.1b** Identify opportunities and constraints of the physical environment. **17.C.1c** Differentiate between renewable and nonrenewable resources.	**17.C.2a** Identify how events in the physical environment (e.g., natural hazards) affect human activities. **17.C.2b** Describe the relationships among location of resources, population distribution and economic activities (e.g., transportation and communications). **17.C.2c** Identify different settlement patterns in Illinois and the United States and relate them to physical features and resources.
D. Explain the historical significance of geography.	**17.D.1** Describe how the geographic characteristics of a region have changed over time.	**17.D.2** Describe how physical characteristics of places influence people's perceptions and their roles in the world over time.

NOTE: ***The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.***

MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
17.C.3a Explain how human activity is affected by geographic factors. **17.C.3b** Compare patterns of resource use throughout the world using traditional, electronic and on-line resources. **17.C.3c** Analyze how human processes (e.g., migration and population growth) influence settlement patterns; report results in oral and written forms; defend results to an audience of peers.	**17.C.4a** Explain the ability of modern technology to alter geographic features and the impacts of these modifications on human activities. **17.C.4b** Analyze growth trends in selected urban areas as they relate to geographic factors, using data from a variety of traditional, electronic and on-line sources; report results in oral and written forms. **17.C.4c** Explain how places with various population distributions (e.g., rural, suburban, urban) function as centers of economic activity.	**17.C.5a** Research and compare resource management methods and policies in different regions of the world (e.g., dams, canal systems, dredging, irrigation) using data from a variety of traditional, electronic and on-line sources. **17.C.5b** Describe the impact of human migrations and increased urbanization on geography. **17.C.5c** Examine geographic factors that affect cooperation and conflict among societies.	
17.D.3a Explain how and why spatial patterns of settlement change over time. **17.D.3b** Analyze how interactions of geographic factors and societal activities shape present conditions.	**17.D.4** Investigate and analyze how processes of spatial change (e.g., resource development and use, natural disasters) have affected history.	**17.D.5** Analyze the historical development of a current issue involving the interaction of people and geographic factors; propose and defend with data a potential solution to the issue (e.g., high speed rail lines, changes in agricultural subsidies, flood control).	

STATE GOAL 18

Understand, analyze and compare social systems, with an emphasis on the United States.

As a result of their schooling, students will be able to:

WHY THIS GOAL IS IMPORTANT

A study of social systems has two important aspects that help people understand their roles as individuals and members of society.

The first aspect is culture, consisting of the language, literature, arts and traditions of various groups of people. Students should understand common characteristics of different cultures and explain how cultural contributions shape societies over time.

The second aspect is the interaction among individuals, groups and institutions. Students should know how and why groups and institutions are formed, what roles they play in society, and how individuals and groups interact with and influence institutions.

NOTE: The "e.g.'s" are meant as examples only. There has been no attempt to identify all possible items, but rather to give guidance to the teacher as to the general intent of the standards and benchmarks.

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ACADEMIC STANDARD	EARLY ELEMENTARY LEARNING BENCHMARKS	LATE ELEMENTARY LEARNING BENCHMARKS
A. Identify and compare characteristics of culture as reflected in language, literature, the arts and traditions.	**18.A.1** Compare folklore (e.g., songs, stories, fables) from different cultures and identify those included in the heritage of the United States.	**18.A.2** Analyze ways in which language, stories, folk tales, music, and artistic creations serve as expressions of culture.
B. Analyze the roles of groups and institutions in relation to people and societies.	**18.B.1** Compare the roles of individuals in group situations (e.g., student, committee member, team leader).	**18.B.2a** Compare roles of social institutions (e.g., educational, military, charitable, governmental) and describe the interactions of people with institutions. **18.B.2b** Describe the impact of media (e.g., print, electronic) on institutions (e.g., schools, governments).

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MIDDLE/JUNIOR HIGH SCHOOL LEARNING BENCHMARKS	EARLY HIGH SCHOOL LEARNING BENCHMARKS	LATE HIGH SCHOOL LEARNING BENCHMARKS	NOTES
18.A.3 Explain and give examples of how language, literature, the arts, architecture, other artifacts and traditions contribute to the development and transmission of culture.	**18.A.4** Analyze the influence of cultural factors in developing pluralistic societies (e.g., customs, traditions, language, art, architecture).	**18.A.5** Compare and analyze ways that culture is affected by environmental, technological or social change.	
18.B.3a Analyze the interaction of individuals, groups and institutions in situations drawn from the local community. **18.B.3b** Analyze the role of mass media (e.g., commercials, polls, news) in decision making.	**18.B.4a** Analyze the various forms social institutions (e.g., educational, military, charitable, governmental) take and explain how they develop and change over time. **18.B.4b** Assess the influence of mass media on events and perceptions of the world.	**18.B.5** Apply methods of social science inquiry (e.g., pose questions, collect and analyze data, make and support conclusions with evidence, report findings) to compare the development and functions of groups and institutions (e.g., schools, organizations, mass media) in practical settings.	

CROSSWALK

APPENDIX A

ENGLISH LANGUAGE ARTS

The purpose of the crosswalk is to allow quick comparisons between the 1985 State Goals for Learning and the draft goals and academic standards for 1996. The 1996 draft goals and academic standards amplify and clarify the 1985 goals. It is the view of the writing teams that all of the essential elements from the 1985 state goals have been addressed in the draft goals or embedded in the 1996 draft goals and academic standards.

The fundamentals of using language—reading, writing, listening, and speaking, as well as the study of literature—remain highlighted in the draft goals. Goal 5 attempts to move forward from the 1985 goals to address application of the fundamentals toward real-life situations such as research and the use of information. The 1996 goals, while accommodating a variety of teaching and learning styles, acknowledge that language processes develop in a dynamic, fluid manner.

As a result of their schooling, students will be able to:

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Understand how and why language functions and evolves. Read, comprehend, interpret, evaluate and use written material.	**1** Read with understanding and fluency. A. Apply word analysis and vocabulary skills to comprehend text. B. Apply reading strategies to improve fluency and understanding. C. Demonstrate comprehension of a broad range of reading materials.

1985 STATE GOAL	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Understand the various forms of significant literature representative of different cultures, eras and ideas.	**2** Understand the expressed meaning in literature representative of various societies, eras and ideas. A. Demonstrate an understanding of literary elements and techniques. B. Explain, analyze and interpret the expressed meaning in literature representing various societies, eras and ideas.

1985 STATE GOAL	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Write standard English in a grammatical, well-organized and coherent manner for a variety of purposes.	**3** Write to communicate for a variety of purposes. A. Use correct grammar, spelling, punctuation, capitalization and sentence structure. B. Compose well-organized and coherent writing for specific purposes and audiences. C. Communicate ideas in writing to accomplish a variety of purposes.

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Listen critically and analytically. Use spoken language effectively in formal and informal situations to communicate ideas and information and to ask and answer questions.	**4** Listen and speak effectively in a variety of situations. A. Listen effectively in formal and informal situations. B. Speak effectively using language appropriate to the situation and audience.

1985 STATE GOAL	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Understand the various forms of significant literature representative of different cultures, eras and ideas.	**5** Use reading, writing, listening and speaking skills to research and apply information for specific purposes. A. Locate, acquire and organize information from various sources to answer questions and solve problems. B. Analyze and evaluate information acquired from various sources. C. Apply acquired information, concepts and ideas.

MATHEMATICS

In 1985, there were seven state goals for learning in mathematics; this document proposes five. The mathematics writing team concluded that understanding and use of ratios and percentages are subsets of computation and having a sense of numbers and included those topics under that goal. Another 1985 goal stated that students would be able to use mathematics skills to estimate, approximate and predict outcomes and to judge reasonableness of results. The team concluded that these important abilities should be applied and included across all mathematics goals.

As a result of their schooling, students will be able to:

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Perform the computations of addition, subtraction, multiplication and division using whole numbers, integers, fractions and decimals. Understand and use ratios and percentages. Use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.	**6** Demonstrate a knowledge and sense of numbers and their representations, including basic operations (addition, subtraction, multiplication, division), ratios and proportions, by using multiple ways of obtaining exact values and estimates to understand patterns involving numbers and their applications. A. Demonstrate knowledge and use of numbers and their relations and representations in a broad range of settings from theoretical to practical. B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division), algorithms and relationships. C. Solve problems using multiple approaches to computation including estimation, mental mathematics, paper-and-pencil methods and technology. D. Solve problems involving the comparisons of quantities using ratios, proportions and percents.

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Make and use measurements, including those of area and volume. Use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.	**7** Make, use and estimate measurements of objects, amounts and relationships and determine tolerable levels of error. A. Measure and compare quantities using appropriate units, instruments and methods. B. Estimate measurements and determine tolerable levels of error in measurements. C. Apply appropriate instruments, scales and formulas to solve problems and interpret results.

1985 STATE GOALS

Identify, analyze and solve problems using algebraic equations, inequities, functions and their graphs.

Use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

8 Identify and describe patterns and relationships in actual data, as well as solve problems and predict results using algebraic methods and symbols, tables, graphs, calculators and computers.

A. Identify numerical relationships using variables and patterns.
B. Analyze and describe numerical relationships using a variety of representations.
C. Solve problems using systems of numbers and their properties.
D. Apply algebraic concepts and procedures to represent, simplify and solve problems.

1985 STATE GOALS

Understand and apply geometric concepts and relations in a variety of forms.

Use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

9 Analyze, categorize and draw conclusions about objects and spatial relationships using geometric methods and drawings, sketches, graphs, models, symbols, calculators and computers.

A. Demonstrate and apply basic geometric concepts in one, two and three dimensions.
B. Identify, describe, classify and compare relationships within and among one-, two- and three-dimensional figures.
C. Construct convincing arguments and proofs to represent, transform and solve problems.
D. Apply trigonometric properties to solve problems.

1985 STATE GOALS

Understand and use methods of data collection and analysis, including tables, charts and comparisons.

Use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

10 Collect, organize and analyze data using statistical methods and tables, charts, graphs, calculators and computers to represent processes, to predict results and to interpret uncertainty and chance in practical applications.

A. Organize, represent, analyze and make conclusions from existing data.
B. Formulate questions, design data collection methods, gather and analyze data and communicate findings.
C. Determine and describe the probability of an event.

SCIENCE

In this draft, proposed Goal 11 consolidates two 1985 goals addressing scientific research and methods and unifies the processes with the purposes of the scientific method. By emphasizing inquiry, it promotes a deeper understanding of research methods and applications. Proposed goal 12 focuses on unifying concepts and knowledge in the sciences, fostering greater depth of understanding across and beyond traditional science technology disciplines. The relationships among science and society can be understood more clearly through the wording of proposed Goal 13. Within these proposed goals, emphasis is equally distributed among process (Goal 11), content (Goal 12) and relationships (Goal 13).

As a result of their schooling, students will be able to:

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Have a working knowledge of the principles of scientific research and their application in simple research projects. Have a working knowledge of the processes, techniques, methods, equipment and available technology of science.	**11** Understand and apply the methods of scientific inquiry and technological design to investigate questions, solve problems and analyze claims. A. Explain the principles and practices of scientific research. B. Apply the steps and methods of scientific inquiry to conduct experiments and investigate research questions. C. Apply the principles and methods of technological design to solve problems. D. Assess the credibility of scientific claims.

1985 STATE GOAL	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Know the concepts and basic vocabulary of biological, physical and environmental sciences and the application to life and work in contemporary technological society.	**12** Understand the facts and unifying concepts of the life, physical and earth/space sciences. A. Apply concepts of systems within the sciences. B. Apply concepts of form and function within the sciences. C. Apply concepts of change and constancy within the sciences. D. Apply concepts of models and explanations within the sciences.

85 STATE GOALS

Have a working knowledge of the social and environmental implications and limitations of technological development.

Know the concepts and basic vocabulary of biological, physical and environmental sciences and the application to life and work in contemporary technological society.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

13 Understand connections and relationships among science, technology and society.

A. Explain the historical development and importance of science and technology.

B. Explain conceptual relationships between science and technology.

C. Describe and analyze relationships among science, technology and society in practical situations.

SOCIAL SCIENCE

The first 1985 goal for social science dealt with both civics and economics. These have been separated and more clearly defined in Goals 14 and 15 and their related academic standards. This approach will help students better understand the related but separate ideas in these two disciplines.

The 1985 goal that addressed application and decision making has been incorporated into the Applications of Learning and the standards and benchmarks under all 1996 goals for social science.

As a result of their schooling, students will be able to:

1985 STATE GOAL	PROPOSED 1996 STATE GOALS & ACADEMIC STANDARDS
Understand and analyze comparative political and economic systems, with an emphasis on the political and economic systems of the United States.	**14** Understand, analyze and compare political systems, with an emphasis on the United States. A. Describe and explain basic principles of the United States government. B. Compare and analyze the structures and functions of the political systems of Illinois, the United States and other nations. C. Describe and explain election processes and responsibilities of citizens. D. Analyze the roles and influences of individuals and interest groups in the political systems of Illinois, the United States and other nations. E. Describe and explain United States foreign policy as it relates to other nations and international issues. **15** Understand, analyze and compare economic systems, with an emphasis on the United States. A. Explain and compare how economic systems facilitate the exchange, production, distribution and consumption of goods and services. B. Analyze the effects of scarcity and choice on consumers. C. Analyze the effects of scarcity and choice on producers. D. Explain how trade generates interdependence affecting the economies of nations.

985 STATE GOAL

Understand and analyze events, trends, personalities and movements shaping the history of the world, the United States and Illinois.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

16 Understand and analyze events, trends, individuals and movements shaping the history of Illinois, the United States and other nations.

A. Describe and explain contributions of selected individuals throughout history.
B. Explain the chronology and significance of major social, economic and political events throughout history.
C. Summarize and analyze historical relationships and developments leading to similarities and differences among people and societies throughout the world.
D. Explain the effects of urbanization, industrialization and technology on society and institutions throughout history.
E. Analyze the roles played by groups in developing a pluralistic society in the United States.

1985 STATE GOAL

Demonstrate a knowledge of world geography with emphasis on the United States.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

17 Demonstrate a knowledge of world geography, as well as an understanding of the effects of geography on society, with an emphasis on the United States.

A. Locate, describe and explain places, regions and features on the earth using geographic terms, methods and representations.
B. Analyze and explain characteristics and interactions of the earth's physical systems.
C. Analyze and explain relationships between geographic factors and society.
D. Explain the historical significance of geography.

1985 STATE GOALS

Demonstrate knowledge of the basic concepts of the social sciences and how these help interpret human behavior.

Apply the skills and knowledge gained in the social sciences to decision making in life situations.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

18 Understand, analyze and compare social systems, with an emphasis on the United States.

A. Identify and compare characteristics of culture as reflected in language, literature, the arts and traditions.
B. Analyze the roles of groups and institutions in relation to people and societies.

PHYSICAL DEVELOPMENT & HEALTH

The 1985 goals for physical development and health varied greatly from the very broad to the very specific. The proposed 1996 goals and standards "smooth out" and organize student learning while updating the goals in light of the last decade of education research.

For example, personal fitness plans have been incorporated within the standards and benchmarks for proposed Goal 19.

Overall, physical development and health have become more interrelated in the new goals/standards structure, with general emphasis on promoting health and acquiring skills that will be valuable beyond the school setting.

As a result of their schooling, students will be able to:

1985 STATE GOALS

Demonstrate basic skills and physical fitness necessary to participate in a variety of conditioning exercises or leisure activities such as sports and dance.

Plan a personal physical fitness and health program.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

19 Understand concepts and acquire competent movement skills to engage in health-enhancing physical activity.

A. Demonstrate and analyze various movement concepts and applications.
B. Demonstrate knowledge of rules and strategies during physical activity.
C. Demonstrate physical competency in individual and team sports and recreational activities.

1985 STATE GOAL

Perform a variety of complex motor activities.

PROPOSED 1996 STATE GOALS & ACADEMIC STANDARDS

20 Understand how to assess, achieve and maintain physical fitness for continuing health.

A. Know and apply the physiological principles and components of health-related fitness.
B. Assess individual fitness levels.
C. Set goals based on fitness data and develop, implement and monitor an individual fitness improvement plan.

21 Develop team-building skills by working with others through physical activity.

A. Demonstrate responsibility during group physical activities.
B. Demonstrate participatory and leadership skills during planned group physical activity.

1985 STATE GOALS

Demonstrate a variety of basic life-saving activities.

Understand principles of nutrition, exercise, efficient management of emotional stress, positive self-concept development, drug use and abuse, and the prevention and treatment of illness.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

22 Understand principles of health promotion and the prevention and treatment of illness and injury.

A. Explain the basic principles of health promotion, illness prevention and safety.
B. Describe and explain the health influences among individuals, groups and communities.
C. Explain how the environment can affect health.

1985 STATE GOAL

Understand the physical development, structure and functions of the human body.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

23 Understand human body systems and factors that influence growth and development.

A. Describe and explain the structure and functions of the human body systems and how they interrelate.
B. Explain the effects of health-related actions on the body systems.
C. Describe factors that affect growth and development.

1985 STATE GOAL

Understand consumer health and safety, including environmental health.

PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS

24 Promote and enhance health and well-being through the use of effective communication and decision-making skills.

A. Demonstrate procedures for positive communication, resolving differences and preventing violence.
B. Apply decision-making skills related to the protection and promotion of individual health.
C. Demonstrate skills essential to enhancing health and avoiding dangerous situations.

FINE ARTS

The proposed goals simplify and clarify the language of the 1985 State Goals, with attention to relationships within the arts and to other disciplines. The addition of the standards for each goal will allow students and teachers to better organize and plan arts studies.

The proposed goals are intended to address the larger issues of how arts allow expression, convey meaning and reflect society and culture, rather than directing attention to smaller pieces of information such as identification of individual art works.

As a result of their schooling, students will be able to:

1985 STATE GOAL	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Understand the principal sensory, formal, technical and expressive qualities of each of the arts.	**25** Understand the sensory elements, organizational principles and ideas expressed in and among the arts. A. Describe, analyze and evaluate the sensory elements and organizational principles of works of art. B. Define, analyze and evaluate how sensory elements and organizational principles are used to express ideas in the arts. C. Compare and contrast similarities, differences and connections of sensory elements, organizational principles, and ideas expressed within and among the arts.

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Identify processes and tools required to produce visual art, music, drama and dance. Demonstrate the basic skills necessary to participate in the creation and/or performance of one of the arts. Describe the unique characteristics of each of the arts.	**26** Through creating and performing, understand how works of art are produced. A. Demonstrate an understanding of how tools and processes are used in the arts. B. Apply skills and knowledge necessary to create and perform in the arts.

1985 STATE GOALS	PROPOSED 1996 STATE GOAL & ACADEMIC STANDARDS
Identify significant works in the arts from major historical periods and how they reflect societies, cultures and civilizations, past and present. Describe the unique characteristics of each of the arts.	**27** Understand the role of the arts in civilizations, past and present. A. Analyze how the arts function in history, society and everyday life. B. Analyze how the arts reflect history, society and everyday life.

APPENDIX A

FOREIGN LANGUAGES

Foreign language is not a fundamental learning area as identified in the School Code, section 28-1. The foreign language goals, academic standards and learning benchmarks presented here are intended to be used as a resource for foreign language programs.

Although Foreign Languages were not included in the 1985 State Goals for Learning, languages are being taught and learned in many Illinois schools. The proposed goals and standards focus on the study of the target language to communicate within and beyond the classroom, to understand the customs, arts, literature, history and geography of the target language, and to make connections and reinforce knowledge and skills across academic vocational and technical disciplines.

As a result of their schooling, students will be able to:

1985 STATE GOAL

There were no goals in 1985 for Foreign Languages.

PROPOSED 1996 STATE GOALS & ACADEMIC STANDARDS

28 Use the target language to communicate within and beyond the classroom setting.

A. Understand oral communication in the target language.
B. Speak effectively in the target language in various settings.
C. Understand written passages in the target language.
D. Write effectively in the target language for a variety of purposes and audiences.

29 Use the target language to develop an understanding of the customs, arts, literature, history and geography associated with the target language.

A. Demonstrate knowledge of manners and customs.
B. Demonstrate knowledge and understanding of the arts.
C. Demonstrate knowledge and understanding of literature and the media.
D. Demonstrate knowledge and understanding of history.
E. Demonstrate knowledge and understanding of demographics and geography.

30 Use the target language to make connections and reinforce knowledge and skills across academic, vocational and technical disciplines.

A. Reinforce and further knowledge of other disciplines through the target language.
B. Demonstrate knowledge and understanding of a variety of career options.

APPENDIX B

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DBACK
TRUMENT ONE

APPENDIX D

Your feedback is vital. Given the scope and importance of the Illinois Academic Standards Project, this draft is being distributed statewide—to educators and others—for review and comment. Your observations will help make these standards a truly effective tool for teaching and learning. The teams who worked on the project have asked that you complete this instrument and return it by November 29, 1996.

Please duplicate as needed.

Questions concerning this feedback instrument may be directed to your Regional Office of Education or the Illinois State Board of Education at 1-800-387-1470 or rschaljo@spr6.isbe.state.il.us

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Springfield, Illinois 62777-0001

RESPONDENT INFORMATION

This response represents the opinion of (check one):

☐ An individual ☐ A group (if group, how many?) _____

Geographic Location:

County _____ (If Cook, Chicago?) ☐Yes ☐No

Portion(s) of the Document Reviewed by Respondent(s):

☐ Introduction ☐ Science ☐ Fine Arts
☐ English Language Arts ☐ Social Science ☐ Foreign Languages
☐ Mathematics ☐ Physical Education/Health

Level(s) of Benchmarks Reviewed:

☐ Early Elementary ☐ Early High School
☐ Late Elementary ☐ Late High School
☐ Middle/Jr. High

RESPONDENT AFFILIATION *(Check all that apply.)*

☐ **Parent** ☐ **Student**
☐ **Community Member** ☐ **Other** _____
☐ **Higher Education**
☐ **Corporate or Business Community**
☐ **School Board or Council Member (past or present)**

Teacher or Other Professional Staff

☐ Elementary ☐ Middle/Jr. High ☐ High School
☐ Other _____

Administrator

☐ School-Level ☐ District-Level ☐ Regional

HELPFULNESS TO TEACHING AND LEARNING

Please circle the one response which most closely reflects your agreement or disagreement with the following statements regarding the draft Illinois Academic Standards:

The Academic Standards have the potential to help

	Disagree		*No Opinion*		*Agree*
1. improve student learning.	1	2	3	4	5
2. clarify the aims and results of schooling.	1	2	3	4	5
3. build a common understanding of the purpose of schooling among educators and the public.	1	2	3	4	5
4. refine assessment of student learning.	1	2	3	4	5
5. report student achievement and success.	1	2	3	4	5
6. build a practical, yet effective accountability system.	1	2	3	4	5
7. connect important learning within and among learning areas.	1	2	3	4	5
8. reduce difficulties associated with student transition from school to school.	1	2	3	4	5

QUESTIONS & COMMENTS *(Attach additional sheets as necessary.)*

Continued on next page

GOAL AND ACADEMIC STANDARDS COMMENTS

Please indicate your opinion about any specific draft goals and academic standards. Academic standards are statements that help interpret a goal.

GOAL NUMBER	STANDARD LETTER	IMPORTANT FOR STUDENTS TO KNOW AND BE ABLE TO DO?					CLEARLY WRITTEN?					SUGGESTIONS FOR IMPROVEMENT
		DISAGREE		NO OPINION		AGREE	DISAGREE		NO OPINION		AGREE	
		1	2	3	4	5	1	2	3	4	5	
		1	2	3	4	5	1	2	3	4	5	
		1	2	3	4	5	1	2	3	4	5	

LEARNING BENCHMARK COMMENTS

Please indicate your opinion about specific draft learning benchmarks. Learning benchmarks are more detailed statements that help interpret the academic standards. Learning benchmarks have been prepared at five developmental levels: early elementary, late elementary, middle or junior high school, early high school and late high school.

GOAL NUMBER	STANDARD LETTER	BENCHMARK NUMBER	UNDERSTANDABLE?					ACADEMICALLY RIGOROUS?					ATTAINABLE FOR BENCHMARK LEVEL?					MEASURABLE?					SUGGESTIONS FOR IMPROVEMENT
			DISAGREE		NO OPINION		AGREE	DISAGREE		NO OPINION		AGREE	DISAGREE		NO OPINION		AGREE	DISAGREE		NO OPINION		AGREE	
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	

RESOURCES NEEDED

Please list the services, resources or materials you anticipate needing in order to make the standards and benchmarks effective (attach additional sheets as necessary). Teachers may want to attach examples of student work that meets specific standards.

DBACK
TRUMENT TWO

APPENDIX E

Please duplicate as needed.

Questions concerning this feedback instrument may be directed to your Regional Office of Education or the Illinois State Board of Education at 1-800-387-1470 or rschaljo@spr6.isbe.state.il.us

This instrument is designed specifically for review and comment on the applicability of the goals and academic standards to school improvement. It may be particularly useful for group discussion and response. The teams who worked on the project have asked that you complete this information, attaching additional pages as needed, and return it by November 29, 1996.

SEND TO:
Academic Standards Project
Illinois State Board of Education
100 North First Street
Springfield, Illinois 62777-0001

RESPONDENT INFORMATION

This response represents the opinion of (check one):
☐ An individual ☐ A group (if group, how many?) _____

Geographic Location:
County_____ (If Cook, Chicago?) ☐Yes ☐No

Portion(s) of the Document Reviewed by Respondent(s):

☐ Introduction ☐ Science ☐ Fine Arts
☐ English Language Arts ☐ Social Science ☐ Foreign Languages
☐ Mathematics ☐ Physical Education/Health

Level(s) of Benchmarks Reviewed:

☐ Early Elementary ☐ Early High School
☐ Late Elementary ☐ Late High School
☐ Middle/Jr. High

RESPONDENT AFFILIATION *(Check all that apply.)*

☐ **Parent** ☐ **Student**
☐ **Community Member** ☐ **Other** _____
☐ **Higher Education**
☐ **Corporate or Business Community**
☐ **School Board or Council Member (past or present)**

Teacher or Other Professional Staff
☐ Elementary ☐ Middle/Jr. High ☐ High School
☐ Other _____

Administrator
☐ School-Level ☐ District-Level ☐ Regional

FOCUS ON STANDARDS

Listed below are several questions that are intended to provide focus for individuals or discussion groups. Review and comment are invited for these and other areas of interest or concern. Please provide comments in typewritten form to facilitate analyzing responses. An efficient strategy may be to select only those questions that respondents feel strongly about or those which match their expertise.

1. **Do the draft Goals, Academic Standards and Learning Benchmarks meet the criteria for standards by**
   a. being clear and understandable to students, parents, educators, business representatives and the community at large?
   b. including an appropriate combination of knowledge and skills, not just facts alone or skills alone?
   c. building upon, but being rigorous enough to go beyond the basics within each of the academic disciplines and at each benchmark? 174
   d. being specific enough to convey what each student should learn but broad enough to allow for a variety of approaches to teaching, curriculum, course design and assessment?
   e. being specific enough to be used in assessing progress (measurable) and improving students' learning?
2. **Are the draft goals, academic standards and learning benchmarks attainable, too high or too low?**

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Continued on next page

3. **How could the draft goals, academic standards and learning benchmarks be refined to**
   a. enhance student learning?
   b. become more helpful for educators?
   c. communicate the intended results of schooling to parents, business representatives and the community?
4. **What parts of this draft document are**
   a. most informative?
   b. least informative?
5. **What services, resources or materials do you anticipate students needing in order to make the goals, academic standards and benchmarks useful?**
6. **What services, resources or materials do you anticipate educators needing in order to make the goals, academic standards and benchmarks useful?**
7. **What services, resources or materials do you anticipate the public needing in order to further understand the goals, academic standards and benchmarks?**

GENERAL COMMENTS

NOTES

ILLINOIS ACADEMIC STANDARDS PROJECT
100 North First Street · Springfield, Illinois 62777-0001

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Office of Educational Research and Improvement (OERI)
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