APPENDIX A

Selections from the *Illinois Learning Standards*

Workplace Skills and Career Development Competencies are available at
http://www.isbe.net/ils/pdf/appendixD_workplace.pdf

Applications of Learning – Mathematics

http://www.isbe.net/ils/math/standards.htm

Through Applications of Learning, students demonstrate and deepen their understanding of basic knowledge and skills. These applied learning skills cross academic disciplines and reinforce the important learning of the disciplines. The ability to use these skills will greatly influence students' success in school, in the workplace and in the community.

Solving Problems

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

The solving of problems is at the heart of "doing mathematics." When people are called on to apply their knowledge of numbers, symbols, operations, measurement, algebraic approaches, geometric concepts and relationships, and data analysis, mathematics' power emerges. Sometimes problems appear well structured, almost like textbook exercises, and simply require the application of an algorithm or the interpretation of a relationship. Other times, particularly in occupational settings, the problems are non-routine and require some imagination and careful reasoning to solve. Students must have experience with a wide variety of problem-solving methods and opportunities for solving a wide range of problems. The ability to link the problem-solving methods learned in mathematics with a knowledge of objects and concepts from other academic areas is a fundamental survival skill for life.

Communicating

Express and interpret information and ideas.

Everyone must be able to read and write technical material to be competitive in the modern workplace. Mathematics provides students with opportunities to grow in the ability to read, write and talk about situations involving numbers, variables, equations, figures and graphs. The ability to shift between verbal, graphical, numerical and symbolic modes of representing a problem helps people formulate, understand, solve and communicate technical information. Students must have opportunities in mathematics classes to confront problems requiring them to translate between representations, both within mathematics and between mathematics and other areas; to communicate findings both orally and in writing; and to develop displays illustrating the relationships they have observed or constructed.

APPENDIX A

Applications of Learning – Mathematics (continued)

Using Technology

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

Technology provides a means to carry out operations with speed and accuracy; to display, store and retrieve information and results; and to explore and extend knowledge. The technology of paper and pencil is appropriate in many mathematical situations. In many other situations, calculators or computers are required to find answers or create images. Specialized technology may be required to make measurements, determine results or create images. Students must be able to use the technology of calculators and computers including spreadsheets, dynamical geometry systems, computer algebra systems, and data analysis and graphing software to represent information, form conjectures, solve problems and communicate results.

Working on Teams

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

The use of mathematics outside the classroom requires sharing expertise as well as applying individual knowledge and skills. Working in teams allows students to share ideas, to develop and coordinate group approaches to problems, and to share and learn from each other in communicating findings. Students must have opportunities to develop the skills and processes provided by team problem-solving experiences to be prepared to function as members of society and productive participants in the workforce.

Making Connections

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

Mathematics is used extensively in business; the life, natural and physical sciences; the social sciences; and in the fine arts. Medicine, architecture, engineering, the industrial arts and a multitude of occupations are also dependent on mathematics. Mathematics offers necessary tools and ways of thinking to unite the concepts, relationships and procedures common to these areas. Mathematics provides a language for expressing ideas across disciplines, while, at the same time, providing connections linking number and operation, measurement, geometry, data and algebra within mathematics itself. Students must have experiences which require them to make such connections among mathematics and other disciplines. They will then see the power and utility that mathematics brings to expressing, understanding and solving problems in diverse settings beyond the classroom.

APPENDIX A

Applications of Learning – Science
http://www.isbe.net/ils/science/standards.htm

Through Applications of Learning, students demonstrate and deepen their understanding of basic knowledge and skills. These applied learning skills cross academic disciplines and reinforce the important learning of the disciplines. The ability to use these skills will greatly influence students' success in school, in the workplace and in the community.

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 more useful 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, to translate their findings into clear understandable language and to compare their results with those of other investigators.

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, analyzing data and communicating 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.

APPENDIX A

Applications of Learning – Science (continued)

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 Connections

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

Science has many disciplines, all interrelated. Understanding the functioning of living things 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, physical development and health, social trends and issues, and many other topics. Science, at its best, provides knowledge and skills that improve the understanding of virtually all subjects.