Construction Technology I			**Grades 9-12**
Standards		**Benchmarks**	**Activities/Examples**
1. Students will develop an understanding of the characteristics and scope of technology.	J	The nature and development of technological knowledge and processes are functions of the setting.	Students learn how residential buildings are designed to fit within its surroundings and how the design and building materials are based on its setting.
	L	Inventions and innovations are the results of specific, goal-directed research.	Students learn where most frequent problems occur in construction and what is being done to solve and improve the issues.
	M	Most development of technologies these days is driven by the profit motive and the market.	Students learn the cost of various building materials and how construction companies make daily decisions concerning material cost effectiveness which ultimately determines the profit.
2. Students will develop an understanding of the core concepts of technology.	W	Systems thinking applies logic and creativity with appropriate compromises in complex real-life problems.	The home students build will be occupied by a home owner. Everything they work on has to be done carefully and thoughtfully to add to the final functioning product.
	Z	Selecting resources involves trade-offs between competing values, such as availability, cost, desirability, and waste.	Students work with a variety of construction materials and tools that differ in quality, cost, availability, and function. Students also learn how certain building sizes are more cost effective as a result of availability of material sizes.
	BB	Optimization is an ongoing process or methodology of designing or making a product and is dependent on criteria and constraints.	Students read floor plans and discuss efficiency of square footage usage, as well as home traffic flow. They will also understand how homes need certain rooms, and those rooms need to be of minimum sizes and still all fit in a home using minimal square footage.
	CC	New technologies create new processes.	Students are always being exposed to the most up to date materials being produced. As those new materials are used on the construction site, new methods of use need to be practiced.
	DD	Quality control is a planned process to ensure that a product, service, or system meets established criteria.	Students are given the responsibility to build within given specific parameters and that their work needs to pass an actual building inspection.
	EE	Management is the process of planning, organizing, and controlling work.	Students work on the job-site in groups. Each group generally has a leader who receives specific instruction and then is responsible for his or her group for that specified task.

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3. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	G	Technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function.	Students will understand how many different processes are utilized in many systems throughout the house to accomplish the same tasks but utilizing different ways to accomplish it such as building materials, processes, heating, electrical, plumbing and more.
	H	Technological innovation often results when ideas, knowledge or skills are shared within a technology, among technologies, or across other fields.	Students will be working with industry professionals discussing and sharing knowledge about different building processes, products and technologies that are influential in areas shared throughout construction industry.
	J	Technological progress promotes the advancement of science and mathematics.	Students will learn how the building industry has evolved through the advancements in technology in products, tools, processes and house systems.
4. Students will develop an understanding of the cultural, social, economic, and political effects of technology.	H	Changes caused by the use of technology can range from gradual to rapid and from subtle to obvious.	Students use a variety of different building materials and tools. Those varieties give students comparisons of existing and new/improving technologies and how they affect their building project.
	I	Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects.	Students learn the endless options of methods and materials used in construction. With options come discussion concerning positives and negatives of each.
5. Students will develop an understanding of the effects of technology on the environment.	G	Humans can devise technologies to conserve water, soil, and energy through such techniques as reusing, reducing, and recycling.	Many of the materials students use to build the homes are from recycled materials. Material conservation is always being discussed when they are building.
	H	When new technologies are developed to reduce the use of resources, considerations of trade-offs are important.	Students learn the various types of home-energy systems including central-air, air exchangers, geothermal, heat pumps, plenum heaters, propane furnaces, and more.
	J	The alignment of technological processes with natural processes maximizes performance and reduces negative impacts on the environment.	Students learn geothermal concepts which include taking air from underground and using that air to begin heating or cooling a home depending on the season.

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6. Students will develop an understanding of the role of society in the development and use of technology.	J	A number of different factors, such as advertising, the strength of the economy, the goals of a company, and the latest fads contribute to shaping the design of and demand for various technologies.	Students discuss the effect the economy had on the housing market sales and trends. Students also work with a local company who fund the project whose goals and demands have to be met by the students and instructor.
7. Students will develop an understanding of the influence of technology on history.	H	The evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials.	Students learn why new tools and materials are developed in their daily work as they face difficulties and realize that building techniques can always be improved.
8. Students will develop an understanding of the attributes of design.	I	Design problems are seldom presented in a clearly defined form.	Students are required to build a home from a blueprint designed by an architect. There are always oversights and unforeseen problems with all designs and are not obvious until long after the building begins.
	K	Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.	Students learn how the design of a home is influenced by the balance of square footage, utility efficiency, and cost.
10. Students will develop an understanding of the role of troubleshooting, research, and development, invention and innovation, and experimentation in problem solving.	J	Technological problems must be researched before they can be solved.	Students will understand different building designs and processes, and develop an understanding of how different designs relate to ultiple building situations.
	K	Not all problems are technological, and not every problem can be solved using technology.	Students will learn the use of many different pieces of equipment to accomplish, and develop an understanding of how to use them in situations, but also understand how to use basic hand tools where appropriate.
	L	Many technological problems require a multidisciplinary approach.	Students understand how the housebuilding process includes a multitude of industry professions organized in a logical process in order to successfully complete the construction of a house from start to finish.
11. Students will develop the abilities to apply the design process.	M	Identify the design problem to solve and decide whether or not to address it.	There are always problems and flaws in the process of building a home. Students are required to identify faults within their work and decide if it needs to be changed, repaired, or completely re-done.

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12. Students will develop the abilities to use and maintain technological products and systems.	L	Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.	Students receive many written instructions including blueprints that they are required to read, interpret, and communicate specifications to other students.
13. Students will develop the abilities to assess the impact of products and systems.	K	Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment.	The designs of homes are very dependent on current trends, region to be built, and consumer demands. Students are required to build a home that is current with these design constraints as well as realize other options and how they would affect the overall function of the house.
16. Students will develop an understanding of and be able to select and use energy and power technologies.	J	Energy cannot be created nor destroyed; however, it can be converted from one form to another.	Students have to properly insulate, heat, seal, and waterproof the home because building in Minnesota requires strict energy usage techniques to withstand the cold temperatures and abundance of moisture. Students learn that energy usage is very important and how to manage the efficiency of energy used.
	K	Energy can be grouped into major forms: thermal, radiant, electrical, mechanical, chemical, nuclear, and others.	Students work with subcontractors who demonstrate the use of thermal, radiant, and electrical energy in the home being built.
	N	Power systems must have a source of energy, a process, and loads.	Students work on a home which is a perfect example of complete power system. Students use and work around all these system components and identify their uses and how they affect the home.
20. Students will develop an understanding of and be able to select and use construction technologies.	K	Structures are constructed using a variety of processes and procedures.	Students are required to perform and complete all of the subsystems of construction including but not limited to: wall framing, floor systems, roof framing, roof covering, window installation, siding, insulation, electrical, heating, plumbing, drywall, finish carpentry, floor coverings, landscaping, and excavation.
	L	The design of structures includes a number of requirements.	The home the students build has to be within specified parameters given by the benefactor of the project.
	M	Structures require maintenance, alteration, or renovation periodically to improve them or to alter their intended use.	Students build a house in a manner in which is can later be improved, updated, remodeled, or added on to.
	N	Structures can include prefabricated materials.	Several of the materials used by the students are prefabricated to improve efficiency, speed, and consistency.