Advanced Woods — 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 use design principles.
			Students write a contract for the class including a project drawing, a timeline for completion, and a cost estimate.
			Students use the computer numerical controlled router.
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.	Students use design principles.
	Y	The stability of a technological system is influenced by all of the components in the system, especially those in the feedback loop.	Students use design principles.
	Z	Selecting resources involves trade-offs between competing values, such as availability, cost, desirability, and waste.	Students use design principles.
	AA	Requirements involve the identification of the criteria and constraints of a product or system and the determination of how they affect the final design and development.	Students use design principles.
	BB	Optimization is an ongoing process or methodology of designing or making a product and is dependent on criteria and constraints.	Students use design principles.
	CC	New technologies create new processes.	Students use design principles.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	DD	Quality control is a planned process to ensure that a product, service, or system meets established criteria.	Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	EE	Management is the process of planning, organizing, and controlling work.	Students write a contract for the class including a project drawing, a timeline for completion, and a cost estimate.
	FF	Complex systems have many layers of controls and feedback loops to provide information.	Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the

Advanced Woods			**Grades 9-12**
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			project.
5. Students will develop an understanding of the effects of technology on the environment.	J	The alignment of technological processes with natural processes maximizes performance and reduces negative impacts on the environment.	Students use design principles.
7. Students will develop an understanding of the influence of technology on history.	G	Most technological development has been evolutionary, the result of a series of refinements to a basic invention.	
	N	The Industrial Revolution saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.	Students operate stationary woodworking machines.
	O	The Information Age places emphasis on the processing and exchange of information.	Students use the computer numerical controlled router.
8. Students will develop an understanding of the attributes of design.	H	The design process includes defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.	Students use design principles.
			Students read and summarize on e magazine article on any current woodworking topic.
	I	Design problems are seldom presented in a clearly defined form.	Students use design principles.
			Students write a contract for the class including a project drawing, a timeline for completion, and a cost estimate.
			Students read and summarize on e magazine article on any current woodworking topic.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	J	Established design principles are used to evaluate existing designs, to collect data, and to guide the design process.	Students use design principles.
			Students read and summarize on e magazine article on any current woodworking topic.

Advanced Woods			**Grades 9-12**
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			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	K	Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.	Students use design principles.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
9. Students will develop an understanding of engineering design.	I	Established design principles are used to evaluate existing designs, to collect data, and to guide the design process.	Students write a contract for the class including a project drawing, a timeline for completion, and a cost estimate.
			Students select appropriate wood finishes and uses proper techniques in application.
			Students read and summarize on e magazine article on any current woodworking topic.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	J	Engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.	Students read and summarize on e magazine article on any current woodworking topic.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	K	A prototype is a working model used to test a design concept by making actual observations and necessary adjustments.	Students write a contract for the class including a project drawing, a timeline for completion, and a cost estimate.
			Students operate stationary woodworking machines.
10. Students will develop an understanding of the role of troubleshooting, research and	I	Research and development is a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace.	Students read and summarize on e magazine article on any current woodworking topic.

Advanced Woods			**Grades 9-12**
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development, invention and innovation, and experimentation in problem solving.	J	Technological problems must be researched before they can be solved.	Students read and summarize on e magazine article on any current woodworking topic.
	L	Many technological problems require a multidisciplinary approach.	
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.	Students use design principles.
	N	Identify criteria and constraints and determine how these will affect the design process.	Students use design principles.
	O	Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.	Students use design principles.
	P	Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed.	Students use design principles.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	R	Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models.	Students use design principles.
			Students evaluate individual projects with a written summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
12. Students will develop the abilities to use and maintain technological products and systems.	J	Use computers and calculators in various applications.	Students use design principles.
	K	Operate and maintain systems in order to achieve a given purpose.	Students use design principles.
20. Students will develop an understanding of and be able to select and use construction technologies.	J	Infrastructure is the underlying base or basic framework of a system.	Students use design principles.
	K	Structures are constructed using a variety of processes and procedures.	Students use design principles.
	L	The design of structures includes a number of requirements.	Students use design principles.
			Students evaluate individual projects with a written

Advanced Woods			**Grades 9-12**
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			summary which includes problems encountered, new techniques learned, exact cost and the exact time on the project.
	M	Structures require maintenance, alteration, or renovation periodically to improve them or to alter their intended use.	Students use design principles.
	N	Structures can include prefabricated materials.	Students use design principles.