## Machine Tool Technology

| Grades 5   |    |  |  |  |
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| Standards  |    | Benchmarks   | Activities/Examples  |  |
| <ol> <li>Students will develop an<br/>understanding of the<br/>characteristics and scope of<br/>technology.</li> </ol>   | L  | Inventions and innovations are the results of specific, goal-directed research.  | Students design and create Hammer with a variety of metals, plastics and wood. The Hammer is evaluated upon completion.  |  |
| 2. Students will develop an<br>understanding of the core<br>concepts of technology.  | AA | Requirements involve the identification of the criteria<br>and constraints of a product or system and the<br>determination of how they affect the final design and<br>development. | Students are required to make 3 darts in class. The dart barrels can<br>be made with any material the students choose, but must be a<br>certain weight. Students must evaluate the product material for<br>strength, weight and functionality. |  |
| 3. Students will develop an<br>understanding of the<br>relationships among<br>technologies and the<br>connections between technology<br>and other fields of study. | J  | Technological progress promotes the advancement of science and mathematics.  | Measurement unit worksheet. Inch and metric systems, Fractions<br>Micrometers, vernier scales and the theory of thousands/decimals<br>and conversions.   |  |
| 4. Students will develop an<br>understanding of the cultural,<br>social, economic, and political<br>effects of technology.   | К  | The transfer of a technology from one society to<br>another can cause cultural, social, economic, and<br>political changes affecting both societies to varying<br>degrees.         | We discuss the use of Imperial measurement and the metric system in a Global system.   |  |
| 5. Students will develop an<br>understanding of the effects of<br>technology on the environment.   | L  | Decisions regarding the implementation of<br>technologies involve the weighing of trade-offs<br>between predicted positive and negative effects on<br>the environment.             | Students understand the use of natural resources to create things within our planet.   |  |
| 6. Students will develop an<br>understanding of the role of<br>society in the development and<br>use of technology.  | Ι  | The decision whether to develop a technology is influenced by societal opinions and demands, in addition to corporate cultures.  | Students are exposed to the use of automated equipment, which has been known to replace the skilled worker in a factory.   |  |
| 7. Students will develop an<br>understanding of the influence<br>of technology on history.   | G  | Most technological development has been<br>evolutionary, the result of a series of refinements to<br>a basic invention.  | Chapter 1 reading and questions about history and evolution of machine tools starting with the File to modern day automation.  |  |

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| 8. Students will develop an<br>understanding of the attributes<br>of design.  | H   | The design process includes defining a problem,<br>brainstorming, researching and generating ideas,<br>identifying criteria and specifying constraints,<br>exploring possibilities, selecting an approach,<br>developing a design proposal, making a model or<br>prototype, testing and evaluating the design using<br>specifications, refining the design, creating or making<br>it, and communicating processes and results. | Students design and create Hammer with a variety of metals, plastics and wood. The Hammer is evaluated upon completion.   |
| 9. Students will develop an<br>understanding of engineering<br>design.  | К   | A prototype is a working model used to test a design<br>concept by making actual observations and necessary<br>adjustments.  | Students often create prototypes before they make a working object.   |
| 10. Students will develop an<br>understanding of the role of<br>troubleshooting, research and<br>development, invention and<br>innovation, and experimentation<br>in problem solving. | I   | Research and development is a specific problem-<br>solving approach that is used intensively in business<br>and industry to prepare devices and systems for the<br>marketplace.  | Students make useful products and sell them. Rattle reel project.<br>This project was developed and tested in a fish house for a year.<br>The students then changed the product, mass produced, and sold it<br>as a fundraiser. |
| 11. Students will develop the abilities to apply the design process.  | N   | Identify criteria and constraints and determine how these will affect the design process.  | Students know their constraints and need to take into consideration while designing their Hammer and any other projects the design in class.  |
| 12. Students will develop the abilities to use and maintain technological products and systems.   | Р   | Use computers and calculators to access, retrieve,<br>organize, process, maintain, interpret, and evaluate<br>data and information in order to communicate.  | CNC Machine Tools are used and tested on in class.  |
| 17. Students will develop an<br>understanding of and be able to<br>select and use information and<br>communication technologies.  | Р   | There are many ways to communicate information, such as graphic and electronic means.  | Students are taught to use Blueprints to communicate the language of Drafting from designer to machinist.   |
| 19. Students will develop an<br>understanding of and be able to<br>select and use manufacturing<br>technologies.  | L   | Servicing keeps products in good operating condition.  | Students are required to help Lubricate and service the machine tools.  |