

East Penn School District  
Secondary Curriculum

A Planned Course Statement  
for

**6<sup>th</sup> Grade Technology Education**

Course # 6RT

Grade(s) 6

Department: Technology Education

Length of Period (mins.) 40

Total Clock Hours: 30

Periods per Cycle: 6

Length of Course (yrs.) 0.25

Type of Offering:  required  elective

Credit: \_\_\_\_\_

Adopted: 4/23/07

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## Description of Course

**Course Title:** 6<sup>th</sup> Grade Technology Education: Biotechnology

**Description:** This course comprises two sections of the 6<sup>th</sup> grade Technology Education curriculum. During the first half of the course, students will focus on alternatives to traditional technologies for energy and power, as well as alternatives to traditional technological methods of food growth. Along with the other portion of the class, which focuses on design elements within technology, the objective of this course is to introduce students to the basic foundations of technology in our society, as well as current trends towards more environmentally responsible technological developments.

The second half of the sixth grade course is designed to teach students the aspects of design and drawing through the use of the computer and Computer Aided Design/Drafting (CADD) software. Students will learn the processes and procedures necessary to effectively use the computerized drafting tools to provide representative drawings of basic design concepts. Isometric drawings as well as orthographic projections will be emphasized, and students will be required to show proficiency based on industrial standards for engineering graphics. A culminating activity will involve learning principals of aerodynamics and drawing various airfoil designs using the CADD program for a flying compressed air model rocket. Upon completion of construction, the students will fly the rocket to test it.

### Goals:

- Develop and improve upon the skills of problem solving and critical thinking
- Acquire knowledge through a variety of hands-on activities and experiences
- Use an assortment of up-to-date technologies to assist in the learning process.
- Reinforce mathematics and science through an interdisciplinary approach to overlapping topics

### Requirements:

Students are required to complete a number of different writing activities describing their in-class project's steps, materials, requirements and goals ("the problem statement"). Test and/or quizzes and in-class lab work is included throughout the course.

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#### Key to Levels of Achievement (Listed with each learning objective)

Awareness (A):	Students are introduced to concepts, forms, and patterns.
Learning (L):	Students are involved in a sequence of steps and practice activities, which involved further development and allow evaluation of process.
Understanding (U):	Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level.
Reinforcement (R):	Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication.

**Course Objectives –**

<b>Unit</b>	<b>Num</b>	<b>Objective</b>	<b>Level</b>	<b>Content</b>	<b>Evaluation</b>	<b>Standard</b>
<b>I. Introduction to Technology Education</b>	1	Students will be introduced to the definition of technology and the three areas into which it can be divided.		<ul style="list-style-type: none"> <li>Understand that technology is the application of knowledge, and the use of resources to meet human needs/wants and to solve problems.</li> <li>Understand that technology is divided into three major areas.</li> <li>Understand basic elements of each sub-area.</li> </ul>	<ul style="list-style-type: none"> <li>Classroom discussion</li> <li>Group Activity</li> <li>Quiz</li> </ul>	3.8.7A-C
<b>II. Introduction to Measurement</b>	2	Students will be introduced to concepts of measurement, both linear and volume.		<ul style="list-style-type: none"> <li>Understand that there are multiple measuring methods.</li> <li>Select appropriate measuring method.</li> <li>Compute the volume/area/etc of an object mathematically</li> </ul>	<ul style="list-style-type: none"> <li>Group Activity</li> <li>Homework Assignments</li> <li>Quiz</li> <li>Classroom Activities</li> </ul>	3.7.7B
<b>III. Mechanical Drawing</b>	3	Students will identify and produce isometric and orthographic drawings and shapes.		<ul style="list-style-type: none"> <li>Understand that three-dimensional objects can be represented on a two-dimensional surface.</li> <li>Create isometric and orthographic drawing by hand.,</li> <li>Select appropriate materials and instruments for mechanical drawings.</li> <li>Utilize mechanical drawing instruments.</li> </ul>	<ul style="list-style-type: none"> <li>Produce portfolio of drawings</li> <li>Observation of drawing techniques</li> <li>Submission of drawings for grade</li> </ul>	3.7.7B
<b>IV. Biotechnology</b>	4	Students will identify the historical origins of biotechnology	A	<ul style="list-style-type: none"> <li>Identify the concepts of Biotechnology and Hydroponics</li> <li>Identify the earliest historical examples of hydroponics worldwide</li> <li>Identify the earliest use of hydroponics in the United States</li> <li>.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.7A
	5	Students will identify current trends towards hydroponics as an alternative technology	L	<ul style="list-style-type: none"> <li>Describe how biotechnology has affected current society</li> <li>Identify and describe the benefits and detriments of technology in agriculture</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.8.7A
	6	Students will identify appropriate	L	<ul style="list-style-type: none"> <li>Identify the different materials</li> </ul>	<ul style="list-style-type: none"> <li>Project: Hydroponics Lab</li> </ul>	3.8.7A-B

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		resources and materials needed to solve a problem		needed to create a model hydroponics systems <ul style="list-style-type: none"> <li>Identify the unavoidable restraints to design</li> <li></li> </ul>		
	7	Identify and monitor basic plant production processes	U	<ul style="list-style-type: none"> <li>Monitor and tend to the Hydroponics Lab</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing Project: Hydroponics Lab</li> </ul>	3.6.7A
<b>V. Alternative Energy</b>	8	Define the term “Alternative Energy”	A	<ul style="list-style-type: none"> <li>Identify the social changes that occur due to a technological advance</li> <li>Identify the technological changes that occur due to a change in society</li> <li>Identify the basic concept of ‘alternative energy’</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.7C 3.8.7 A-B
	9	Identify the relationships between energy production technologies, societal expectations and environmental concerns.	L	<ul style="list-style-type: none"> <li>Explain the factors that are/were taken into consideration when developing a specific power technology</li> <li>Identify tradeoffs between production and environmental needs</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.7C
<b>VI. Computer Assisted Design/Drafting</b>	10	The student will be able to identify the various types of drawings used in industry and their importance	A	<ul style="list-style-type: none"> <li>What is a mechanical drawing?</li> <li>How does a mechanical drawing differ from an architectural drawing?</li> <li>Are mechanical drawings a form of communication?</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.4B 3.6.7B
	11	Identify present uses of CADD and compare to drafting and design methodologies of the past	L	<ul style="list-style-type: none"> <li>How did the use of manual drafting and design principles in the past provide design ideas and information?</li> <li>How do we presently use CADD to provide design ideas and information?</li> <li>Compare and contrast past and present methodologies of drawing design ideas and information.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.4B
	12	Identify and explore CADD software and various drafting and	L	<ul style="list-style-type: none"> <li>Identify proper tools to produce drawings of common geometric</li> </ul>	<ul style="list-style-type: none"> <li>Drafting project : Isometric and Orthographic drawings</li> </ul>	3.6.7B 3.8.7A

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		design tools.		<ul style="list-style-type: none"> <li>shapes.</li> <li>Identify and select proper scale for given object/paper size.</li> <li>Metric and English measurement</li> </ul>		3.7.7.B
	13	Identify and produce isometric drawings of shapes	U	<ul style="list-style-type: none"> <li>Perform steps necessary for complete isometric views</li> </ul>	<ul style="list-style-type: none"> <li>Drafting project : Isometric and Orthographic drawings</li> </ul>	3.6.7A
	14	Identify and produce orthographic projection drawings of shapes	U	<ul style="list-style-type: none"> <li>Perform steps necessary for complete orthographic views</li> </ul>	<ul style="list-style-type: none"> <li>Drafting project : Isometric and Orthographic drawings</li> </ul>	3.6.7A
<b>VI. Aerodynamics</b>	15	Identify the various parameters of basic flight	A	<ul style="list-style-type: none"> <li>Explain the scientific concept of free bodies in space.</li> <li>Identify factors affecting free body equilibrium with respect to aircraft flight.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.7C 3.8.7 A-B
	16	Identify the airfoil concept and associated airflow.	L	<ul style="list-style-type: none"> <li>Explain the linkage between airfoil and difference of pressure due to Bernoulli's principle.</li> <li>Explain the concept of force per unit area and wing area with respect to lift.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> <li>Teacher developed concepts quiz</li> </ul>	3.6.7C
	17	Identify the need for dynamic control in three dimensional space	L	<ul style="list-style-type: none"> <li>Explain control surface dynamics and their relationship to fins on a rocket.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> </ul>	3.6.7C
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	18	Identify the concept of aerodynamic drag	L	<ul style="list-style-type: none"> <li>Explain component drag and effects on stability</li> </ul>	<ul style="list-style-type: none"> <li>Teacher evaluation of group participation</li> </ul>	3.6.7C
	19	Relate flight dynamics to rocketry	U	<ul style="list-style-type: none"> <li>Correlate aerodynamic effects of airplanes to rocket surfaces</li> </ul>	<ul style="list-style-type: none"> <li>Model Rocket Project: Design, Build, and Fly a Model Compressed Air Rocket.</li> </ul>	3.6.7C
	20	Design model rocket using CADD software	L	<ul style="list-style-type: none"> <li>Design parameters for compressed air rocket</li> </ul>	<ul style="list-style-type: none"> <li>Teacher developed rubric</li> </ul>	3.6.7B 3.7.7D
	21	Build model rocket	L	<ul style="list-style-type: none"> <li>Select proper materials and utilize proper construction tools, techniques and procedures</li> <li>Observe proper safety procedures.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher developed rubric</li> </ul>	3.6.7C 3.7.7B  3.7.7A
	22	Test fly model rocket	R	<ul style="list-style-type: none"> <li>Launch rocket using compressed air launch mechanism</li> <li>Identify and test various launch</li> </ul>	<ul style="list-style-type: none"> <li>Teacher developed rubric</li> </ul>	3.7.7B  3.6.7C

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				angles and resultant trajectories to determine longest down-range distance and accuracy.		