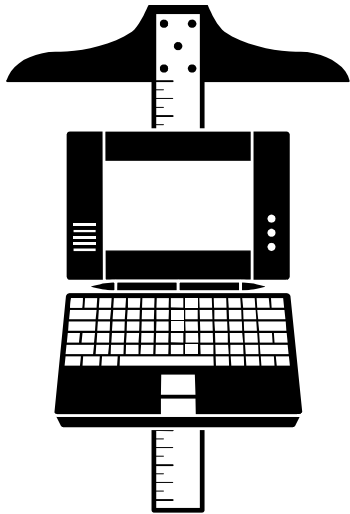


The Technology Education Binder



THE TECHNOLOGY EDUCATION BINDER

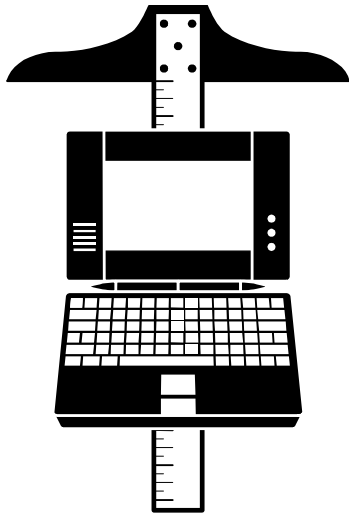
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Curriculum Guide

Exploratory Technology 6



Exploratory Technology 6

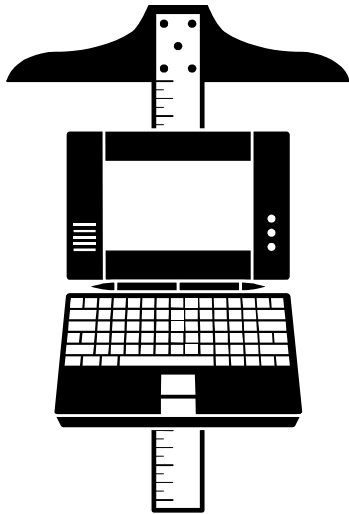
Content Outline

Topic	Competency	Suggested Time Frame
I. TECHNOLOGY FOUNDATIONS	DTE8481.001,	1 week/
A. Definition of Technology	DTE8481.002,	Ongoing
B. Technology Systems	DTE8481.004,	
C. Systems Model	DTE8481.009,	
D. Systems Resources	DTE8481.010	
E. Safe Use of Resources		
F. Leadership and Teams		
II. DESIGNING AND PROBLEM SOLVING	DTE8481.003,	2 weeks/
A. Measurement	DTE8481.005,	Ongoing
B. Problem Solving	DTE8481.006,	
C. Design Process	DTE8481.007,	
D. Materials	DTE8481.008,	
E. Modeling	DTE8481.014,	
	DTE8481.017	
III. TECHNOLOGIES	DTE8481.015,	5 weeks
A. Agriculture and Biotechnology	DTE8481.018	
B. Energy and Power		
C. Construction		
D. Communication		
E. Manufacturing		
F. Transportation		
IV. TECHNOLOGY IMPACTS	DTE8481.016	1 week/
A. Past and Present		Ongoing
B. Future		

Curriculum Guide

Inventions and Innovations

(7-8)



Inventions and Innovations (7-8)

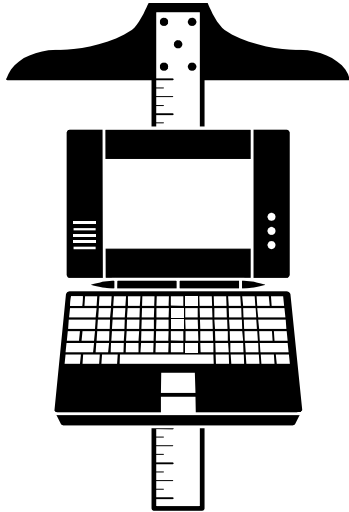
Content Outline

Topic	Competency	Suggested Time Frame
I. TECHNOLOGY FOUNDATIONS	DTE8464.001,	1 week/
A. Definition of Technology	DTE8464.002,	Ongoing
B. Technology Systems	DTE8464.004,	
C. Safe Use of Resources and Equipment	DTE84864.012	
D. Leadership and Teams		
II. TECHNOLOGY DEVELOPMENT	DTE8464.001,	6 weeks/
A. Characteristics and Scope of Technology	DTE8464.003,	Ongoing
B. Core Concepts	DTE8464.005,	
C. Influence on History	DTE8464.006,	
D. Role of Society in Development and Use	DTE8464.007,	
E. Social, Cultural, and Economic Effects	DTE8464.008,	
F. Environmental Effects	DTE8464.009,	
G. Relationships Among Technologies	DTE8464.010,	
	DTE8464.011	
III. DESIGNING AND INNOVATION	DTE8464.005,	5 weeks/
A. Attributes of Design	DTE8464.006,	Ongoing
B. Engineering Design	DTE8464.008,	
C. Role of Problem Solving with Research and Development (R&D), Experimentation, and Troubleshooting	DTE8464.009,	
	DTE8464.011,	
	DTE8464.016	
D. Modeling and Prototyping		
E. Assessing Product Impacts		
IV. ENTERPRISE AND INNOVATION	DTE8464.013,	6 weeks
A. Enterprise Start-Up	DTE8464.014,	
B. Product Development	DTE8464.015,	
C. Production	DTE8464.021,	
D. Quality	DTE8464.022,	
E. Packaging	DTE8464.023,	
F. Advertising	DTE8464.024,	
G. Marketing	DTE8464.025,	
	DTE8464.026,	
	DTE8464.027	

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Technological Systems

(7-8)



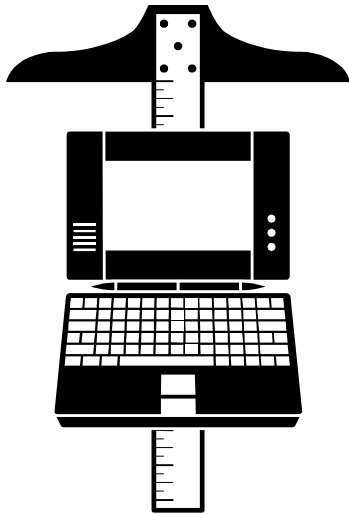
Technological Systems (7-8)

Content Outline

Topic	Competency	Suggested Time Frame
I. TECHNOLOGY FOUNDATIONS	DTE8463.001,	1 week/
A. Definition of Technology	DTE8463.002,	Ongoing
B. Technology Systems	DTE8463.003,	
C. Subsystems	DTE8463.005,	
D. Systems Model	DTE8463.007,	
E. Resources	DTE8463.008,	
F. System Impacts	DTE8463.011	
G. Safe Use of Resources and Equipment		
H. Leadership and Teams		
II. DESIGNING AND PROBLEM SOLVING	DTE8463.004,	2 weeks/
A. Design Process	DTE8463.006,	Ongoing
B. Problem Solving	DTE8463.009,	
C. Modeling	DTE8463.010	
D. Computer Analysis		
III. TECHNOLOGIES	DTE8463.012,	14 weeks
A. Information and Communication	DTE8463.013,	
B. Manufacturing	DTE8463.014,	
C. Construction	DTE8463.015,	
D. Transportation	DTE8463.016,	
E. Energy and Power	DTE8463.017,	
F. Agriculture and Biotechnology	DTE8463.018	
G. Medical		
IV. TECHNOLOGY IMPACTS	DTE8463.021	1 week/
A. Individuals		Ongoing
B. Society		
C. Environment		

Curriculum Guide

Technology Foundations



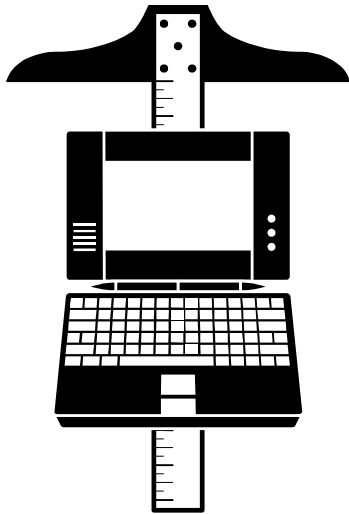
Technology Foundations Content Outline

Topic	Competency	Suggested Time Frame
I. INTRODUCTION TO TECHNOLOGY A. TechnologiesñHistory and Future B. Product, Tool, and Safety C. Production and Product Development	1, 2, 4, 5, 23	17 block/ 34 single periods/ Ongoing
II. ENERGY AND COMPUTER POWER A. Development of the Computer B. Careers in the Computer Industry C. EnergyñFrom the Arm to the Atom D. Energy and Nature	10, 11, 12, 13, 16, 22	7 blocks/ 14 single periods
III. COMMUNICATION AND DRAFTING A. Communication B. CommunicationñPeople and Machines C. DrawingñFreehand to the Computer	26, 28, 32	12 blocks/ 24 single periods/ Ongoing
IV. PRINTING AND PHOTOGRAPHY A. Printing Processes B. PrintingñThe Project C. Photographyís History D. PhotosñBlack and White	18, 24, 28, 32, 37	12 blocks/ 24 single periods/ Ongoing
V. ELECTRICITY AND MANUFACTURING A. ElectricityñAspects and Sources B. Communication via Electricity C. ManufacturingñEvolution and Production D. Manufacture: Design, Test, Produce	6, 7, 8, 14, 15, 20, 30	11 blocks/ 22 single periods/ Ongoing
VI. A ROOF OVER YOUR HEAD A. History of the Dwelling B. Elements of Construction C. Materials of Construction D. Building	19, 21, 29	12 blocks/ 24 single periods/ Ongoing

Topic	Competency	Suggested Time Frame
VII. TRANSPORTATIONñON THE MOVE A. History of Transportation B. Power Sources C. Transportation Vehicles	1, 2, 9, 31, 33, 34, 35	9 blocks/ 18 single periods/ Ongoing
VIII. TECHNOLOGY FOR THE HUMAN BODY A. AgricultureñBack/To the Future B. Healthcare Technology C. The FutureñBiotechnology	3, 17, 25, 36	7 blocks/ 14 single periods/ Ongoing
IX. WRAPPING UP/THE FUTURE A. Technologies for Tomorrow B. Your Place in Technologies Future C. Solving the Problem	27, 36	3 blocks/ 6 single periods

Curriculum Guide

*Basic Technical Drawing
and Design/CAD*



Basic Technical Drawing and Design/CAD

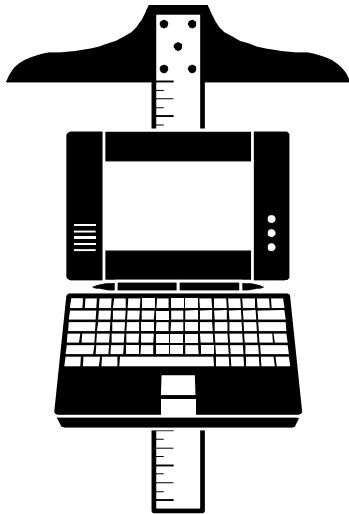
Content Outline

Topic	Competency	Suggested Time Frame
I. DRAFTING MEDIA, PROCESSES, AND SKILLS	DTE8435.001-	20 block/
A. Definition	.005	40 single periods
B. 21st Century Drafting	DTE8435.010	Ongoing
C. Technical Sketches	DTE8435.014	
D. Measurement	DTE8435.019	
E. Leadership and Teams	DTE8435.024	
F. Career Qualifications		
G. Materials and Media		
II. DRAFTING FOUNDATIONS	DTE8435.006	30 blocks/
A. Standards of Drafting and Design	DTE8435.009	60 single periods
B. Lettering	DTE8435.011	Ongoing
C. Dimensioning	DTE8435.012	
D. Safe Use and Maintenance of Equipment and Materials	DTE8435.013	
E. Revise Drawings	DTE8435.016	
F. Geometry for Technical Drawing	DTE8435.017	
G. Orthographic Sketching	DTE8435.017	
H. Orthographic Projection	DTE8435.018	
	DTE8435.020	
III. DRAFTING ILLUSTRATION	DTE8435.007	40 blocks/
A. CAD	DTE8435.008	80 single periods
B. Pictorial Drawings	DTE8435.015	Ongoing
C. Sectional Views and Conventions	DTE8435.021	
D. Auxiliary Views	DTE8435.022	
E. Surface Developments	DTE8435.023	
F. Resources		

Curriculum Guide

Engineering Drawing

Design/CAD



Engineering Drawing/Design/CAD Content Outline

Topic	Competency	Suggested Time Frame
I. ENGINEERING/CAREERS	DTE8436.001-	5 block/
A. Definition of Engineering	.003	10 single periods
B. Design Process	DTE8436.005	Ongoing
C. Careers		
D. Research		
II. PROCESSES AND COMPOSITION IN ENGINEERING	DTE8436.006-	25 blocks/
A. Resources	.008	50 single periods
B. Measurement	DTE8436.010	Ongoing
C. Sketching	DTE8436.012	
D. Dimensioning	DTE8436.014	
E. Geometry for Technical Drawing		
F. Developments		
III. DRAFTING REPRESENTATIONS	DTE8436.004	60 blocks/
A. Thread Representations	DTE8436.009	120 single periods
B. Assembly Drawings	DTE8436.011	Ongoing
C. Working Drawings	DTE8436.013	
D. Solid Modeling	DTE8436.015	
E. Drafting Applications		
F. Leadership/Team Application		



**The York County School Division
Curriculum Guide**

Subject: Introduction to Engineering

TECHNOLOGY EDUCATION

8490 Introduction to Engineering



Introduction to Engineering Content Outline

Competency	Topic	
Implementing Virginia's CTE Course Requirements		Suggested Timeframe
8490.001-021	Demonstrate <u>Virginia's Workplace Readiness Skills</u> in course activities.	Ongoing
8490.022-028	Apply <u>Virginia's All Aspects of Industry</u> elements in course activities.	
8490.033	Identify <u>Internet safety</u> issues and procedures for complying with acceptable use standards.	
<u>Participating in the Student Organization</u>		Suggested Timeframe
8490.030	Identify the purposes and goals of the student organization.	Ongoing
8490.031	Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.	
8490.032	Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.	
<u>Relating Objectives of the Course to Standards in Technological World</u>		Suggested Timeframe
8490.034	Describe the effects of the explosion in scientific knowledge on the development of technology.	3 blocks / 6 single periods
8490.035	Explain the pressing need for more engineers and technicians in the future.	
8490.036	Explain the purpose and functions of the technological team.	
8490.037	Participate in group work and personnel system to manage class and laboratory activities.	
8490.038	Apply safety rules to laboratory activities.	

<u>Investigating the Engineering Profession and Related Careers</u>		Suggested Timeframe
8490.039	Summarize the characteristics of professional engineers.	3 blocks / 6 single periods
8490.040	Describe the principal fields for specialization in engineering.	
8490.041	Describe procedures for becoming a registered engineer.	
8490.042	Describe education needed for specialty fields in engineering and technology.	
8490.043	Identify benefits of study of the humanities and social sciences.	
8490.044	Demonstrate a professional attitude toward classroom and laboratory activities.	
8490.045	Describe the management responsibilities of engineers.	
<u>Applying Engineering Graphics, Computer Software, and Measurement Instruments</u>		Suggested Timeframe
8490.046	Distinguish among various measurement systems and their base units.	30 blocks / 60 single periods
8490.047	Write a mathematical equation that is constant in units of measurement.	
8490.048	Interpret drawings, using various systems of measurement.	
8490.049	Use the precision measuring tools and instruments to lay out, measure, and inspect parts or products.	
8490.050	Solve problems involving measurement of quantities of materials, using SI Units and U.S. Customary Units.	
8490.051	Use engineering design graphics and descriptive geometry in the solution of design problems.	
8490.052	Sketch objects to show orthographic and pictorial views.	
8490.053	Use basic technical drawing instruments to draw orthographic and isometric projections.	
8490.054	Use appropriate methods to solve and report solutions of repetitive mathematical data, empirical equations, mechanisms, computations, and observations of physical test data.	
8490.055	Use graphical vector analysis in the design process.	
8490.056	Build models that illustrate principal classes of physical models.	
8490.057	Use computer-aided manufacturing (CAM) software to simulate a manufacturing problem.	
8490.058	Program computer-aided machines and numerical controls.	

<u>Citing the Contribution of Engineering in History</u>		Suggested Timeframe
8490.059	Explore the history of engineering.	3 blocks / 6 single periods
8490.060	Conduct research on an engineering achievement.	
8490.061	Deliver a short oral briefing to explain a technical device or engineering achievement.	
<u>Working with the Fundamentals of Problem Solving</u>		Suggested Timeframe
8490.062	Apply steps in the problem-solving method or process.	13 blocks / 26 single periods
8490.063	Function as an engineer or technologist in problem-solving activities.	
8490.064	Apply mathematical formulas to problems and activities.	
8490.065	Perform keyboard functions on a scientific, hand-held calculator.	
8490.066	Use appropriate computer application programs to solve problems.	
<u>Analyzing the Science and Properties of Materials</u>		Suggested Timeframe
8490.067	Describe the physical and chemical properties of engineering materials in terms of their internal structure.	10 blocks / 20 single periods
8490.068	Use tools and laboratory apparatus and equipment to determine the properties of materials.	
8490.069	Conduct laboratory tests and report results in written test report.	
8490.070	List causes of failure in materials and identify procedures used to prevent such failures.	
8490.071	Explain the concept of supply and demand as it relates to materials in short supply.	
8490.072	Experiment with processes used with metal, wood, polymer, ceramic, and composite materials and adhesives.	
<u>Working with Different Processors to Solve Problems</u>		Suggested Timeframe
8490.073	Apply different materials to solve an assigned problem to redesign or test a device.	10 blocks / 20 single periods
8490.074	Use mathematical symbols to express a relationship between two or more variables.	

<u>Communicating Technical Information</u>		Suggested Timeframe
8490.075	Explain the importance of communication between engineers and their clients.	3 blocks / 6 single periods
8490.076	Write a proposal for an engineering project.	
8490.077	Write a technical report for an engineering activity.	
<u>Using the Design Process to Improve a Device or System</u>		Suggested Timeframe
8490.078	Select a problem or project for improvement.	10 blocks / 20 single periods
8490.079	Use the steps in the design process to improve a product.	
<u>Gathering Information about Problems and Solutions</u>		Suggested Timeframe
8490.080	Identify references found in a technical library.	2 blocks / 4 single periods
8490.081	Identify publications used by engineers and the source of each.	
8490.082	List and define the six legal categories of patents.	
8490.083	Explain how patents are obtained.	
8490.084	Describe how patents protect the inventor.	
<u>Managing the Team Concept of Engineering Design</u>		Suggested Timeframe
8490.085	Explain the importance of teamwork in problem solving.	3 blocks / 6 single periods
8490.086	Describe the use of a feasibility study.	
8490.087	List and define the essential steps in the preliminary design phase.	
8490.088	List and define the essential steps in the detailed design phase.	



Introduction to Engineering Content Outline

Competency	Topic	
Implementing Virginia's CTE Course Requirements		Suggested Timeframe
8490.001-021	Demonstrate Virginia's Workplace Readiness Skills I n course activities. http://www.opp-inc.org/workplace_readiness_skills_project	Ongoing
8490.022-029	Apply Virginia's All Aspects of Industry elements in course activities. http://www.cteresource.org/featured/aai.html	
8490.033	Identify Internet safety issues and procedures for complying with acceptable use standards.	
<u>Participating in the Student Organization</u>		Suggested Timeframe
8490.030	Identify the purposes and goals of the student organization.	Ongoing
8490.031	Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.	
8490.032	Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.	
<u>Relating Objectives of the Course to Standards in Technological World</u>		Suggested Timeframe
8490.034	Describe the effects of the explosion in scientific knowledge on the development of technology.	3 blocks / 6 single periods
8490.035	Explain the pressing need for more engineers and technicians in the future.	
8490.036	Explain the purpose and functions of the technological team.	
8490.037	Participate in group work and personnel system to manage class and laboratory activities.	
8490.038	Apply safety rules to laboratory activities.	



The York County School Division Curriculum Guide

Subject: Introduction to Engineering

<u>Investigating the Engineering Profession and Related Careers</u>		Suggested Timeframe
8490.039	Summarize the characteristics of professional engineers.	3 blocks / 6 single periods
8490.040	Describe the principal fields for specialization in engineering.	
8490.041	Describe procedures for becoming a registered engineer.	
8490.042	Describe education needed for specialty fields in engineering and technology.	
8490.043	Identify benefits of study of the humanities and social sciences.	
8490.044	Demonstrate a professional attitude toward classroom and laboratory activities.	
8490.045	Describe the management responsibilities of engineers.	
<u>Applying Engineering Graphics, Computer Software, and Measurement Instruments</u>		Suggested Timeframe
8490.046	Distinguish among various measurement systems and their base units.	30 blocks / 60 single periods
8490.047	Write a mathematical equation that is constant in units of measurement.	
8490.048	Interpret drawings, using various systems of measurement.	
8490.049	Use the precision measuring tools and instruments to lay out, measure, and inspect parts or products.	
8490.050	Solve problems involving measurement of quantities of materials, using SI Units and U.S. Customary Units.	
8490.051	Use engineering design graphics and descriptive geometry in the solution of design problems.	
8490.052	Sketch objects to show orthographic and pictorial views.	
8490.053	Use basic technical drawing instruments to draw orthographic and isometric projections.	
8490.054	Use appropriate methods to solve and report solutions of repetitive mathematical data, empirical equations, mechanisms, computations, and observations of physical test data.	
8490.055	Use graphical vector analysis in the design process.	
8490.056	Build models that illustrate principal classes of physical models.	
8490.057	Use computer-aided manufacturing (CAM) software to simulate a manufacturing problem.	
8490.058	Program computer-aided machines and numerical controls.	



The York County School Division Curriculum Guide

Subject: Introduction to Engineering

<u>Citing the Contribution of Engineering in History</u>		Suggested Timeframe
8490.059	Explore the history of engineering.	3 blocks / 6 single periods
8490.060	Conduct research on an engineering achievement.	
8490.061	Deliver a short oral briefing to explain a technical device or engineering achievement.	
<u>Working with the Fundamentals of Problem Solving</u>		Suggested Timeframe
8490.062	Apply steps in the problem-solving method or process.	13 blocks / 26 single periods
8490.063	Function as an engineer or technologist in problem-solving activities.	
8490.064	Apply mathematical formulas to problems and activities.	
8490.065	Perform keyboard functions on a scientific, hand-held calculator.	
8490.066	Use appropriate computer application programs to solve problems.	
<u>Analyzing the Science and Properties of Materials</u>		Suggested Timeframe
8490.067	Describe the physical and chemical properties of engineering materials in terms of their internal structure.	10 blocks / 20 single periods
8490.068	Use tools and laboratory apparatus and equipment to determine the properties of materials.	
8490.069	Conduct laboratory tests and report results in written test report.	
8490.070	List causes of failure in materials and identify procedures used to prevent such failures.	
8490.071	Explain the concept of supply and demand as it relates to materials in short supply.	
8490.072	Experiment with processes used with metal, wood, polymer, ceramic, and composite materials and adhesives.	
<u>Working with Different Processors to Solve Problems</u>		Suggested Timeframe
8490.073	Apply different materials to solve an assigned problem to redesign or test a device.	10 blocks / 20 single periods
8490.074	Use mathematical symbols to express a relationship between two or more variables.	



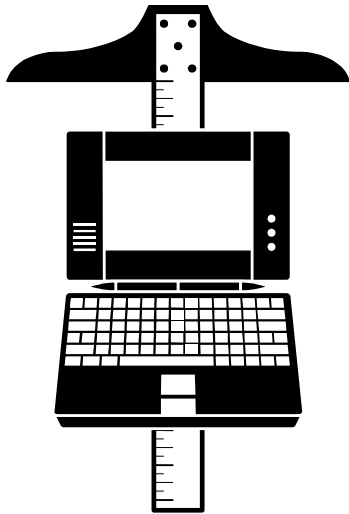
The York County School Division Curriculum Guide

Subject: Introduction to Engineering

<u>Communicating Technical Information</u>		Suggested Timeframe
8490.075	Explain the importance of communication between engineers and their clients.	3 blocks / 6 single periods
8490.076	Write a proposal for an engineering project.	
8490.077	Write a technical report for an engineering activity.	
<u>Using the Design Process to Improve a Device or System</u>		Suggested Timeframe
8490.078	Select a problem or project for improvement.	10 blocks / 20 single periods
8490.079	Use the steps in the design process to improve a product.	
<u>Gathering Information about Problems and Solutions</u>		Suggested Timeframe
8490.080	Identify references found in a technical library.	2 blocks / 4 single periods
8490.081	Identify publications used by engineers and the source of each.	
8490.082	List and define the six legal categories of patents.	
8490.083	Explain how patents are obtained.	
8490.084	Describe how patents protect the inventor.	
<u>Managing the Team Concept of Engineering Design</u>		Suggested Timeframe
8490.085	Explain the importance of teamwork in problem solving.	3 blocks / 6 single periods
8490.086	Describe the use of a feasibility study.	
8490.087	List and define the essential steps in the preliminary design phase.	
8490.088	List and define the essential steps in the detailed design phase.	

Curriculum Guide

Principles of Physics I



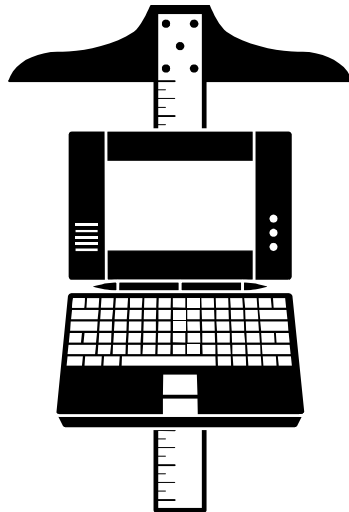
Principles of Physics I

Content Outline

Topic	Competency	Suggested Time Frame
I. NEWTONIAN MOTION	1, 2, 3, 4, 5,	20 block/
A. Linear Motion	6, 9, 12, 13,	40 single periods
B. Rotational Motion	14, 15, 17,	
C. Newton's Laws of Motion	18, 19, 21	
D. Force and Motion		
II. ELECTRICITY	3, 9, 11,	22 blocks/
A. Nature of Electricity/Current	12,13, 14, 15,	44 single periods
B. Voltage	16, 17, 18,	
C. Elements of Circuits	20, 21	
III. FLUIDS	3, 4, 5, 7, 9,	22 blocks/
A. Phases of Matter	10, 11, 12,	44 single periods
B. Flow Rate	13, 14, 15,	
C. Resistance to Flow	16, 17, 18,	
D. Pressure	19, 20	
E. Hydraulics and Applications		
IV. THERMODYNAMICS	3, 4, 5, 6, 9,	10 blocks/
A. Heat vs. Temperature	10, 11, 12,	20 single periods
B. Heat Flow and Specific Heats	13, 14, 15,	
C. Insulation/Resistance	16, 17, 18,	
	19, 20	
V. ENERGY	2, 5, 7, 8, 9,	16 blocks/
A. Conservation	10, 11, 12,	32 single periods
B. Calculation in Systems	13, 14, 15,	
C. Conversion	16, 17, 18,	
D. Converts	19, 20, 21,	
E. Transducers	22, 23, 24,	
F. Power	25, 26, 27,	
	28, 29, 30,	
	31, 32, 33,	
	34, 35, 36,	
	37, 38, 39, 40	

Curriculum Guide

Principles of Physics II



Principles of Physics II

Content Outline

Topic	Competency	Suggested Time Frame
I. MOMENTUM A. Linear B. Curved C. Conservation D. Collisions E. Impulse	1, 2, 3, 4, 5	18 block/ 36 single periods
II. WAVES A. Characteristics/Types B. Reflection C. Diffraction D. Doppler E. Refraction F. Resonance	6, 7, 8, 9, 10	26 blocks/ 52 single periods
III. ENERGY CONVERTERS A. Purpose of converters B. Mechanical to Fluid Converters C. Fluid to Mechanical Conversion D. Electrical to Heat Conversion E. Heat to Electrical Conversion F. Efficiency	11, 12, 13, 14, 15, 16	23 blocks/ 46 single periods
IV. TRANSDUCERS A. Definition/Transducers Versus Converters B. Mechanical to Electrical Transducers C. Fluid to Mechanical/Electrical Transducers D. Electrical to Mechanical and Thermal E. Thermal to Mechanical/Fluid/Electrical	17, 18, 19, 20, 21, 22, 23	23 blocks/ 46 single periods