



**VIRGINIA BEACH CITY PUBLIC SCHOOLS**  
CHARTING THE COURSE

***Department of Teaching & Learning***  
***Parent/Student Course Information***

***Production Technology Program***  
***Materials Technology I***  
***(TE 8433)***  
***Grades 10 - 12***  
***One-half Credit, One Semester***

*Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.*

**COURSE DESCRIPTION**

The courses in engineering and technology provide opportunities for students to acquire skills and knowledge necessary for technological literacy, entry-level careers and lifelong learning. Students learn Virginia's 21 Workplace Readiness Skills within the content area. Those who are completing a two-year sequence have the opportunity to verify their knowledge of the workplace readiness skills through an industry assessment. Students explore the science of materials and processes as they fabricate usable products and conduct experiments. Learning experiences include analysis, testing and processes of wood, plastic and composite materials. This course is recommended for students interested in technical careers and others wishing to improve their consumer knowledge and technological literacy.

**CERTIFICATION**

None

**STUDENT ORGANIZATION**

Technology Student Association (TSA) is a co-curricular organization for all students enrolled in engineering and technology courses. Students are encouraged to be active members of their youth organization to develop leadership and teamwork skills and to receive recognition for their participation in local, regional, state and national activities.

**PREREQUISITE**

Production or Construction Technology and/or Earth Science.

**OPTIONS FOR NEXT COURSE**

Materials Technology II

**REQUIRED STUDENT TEXTBOOK**

*Industrial Materials*

## COMPETENCIES FOR MATERIALS TECHNOLOGY I

### **Demonstrating Workplace Readiness Skills: Personal Qualities and People Skills**

- 1 Demonstrate positive work ethic.
- 2 Demonstrate integrity.
- 3 Demonstrate teamwork skills.
- 4 Demonstrate self-representation skills.
- 5 Demonstrate diversity awareness.
- 6 Demonstrate conflict-resolution skills.
- 7 Demonstrate creativity and resourcefulness.

### **Demonstrating Workplace Readiness Skills: Professional Knowledge and Skills**

- 8 Demonstrate effective speaking and listening skills.
- 9 Demonstrate effective reading and writing skills.
- 10 Demonstrate critical-thinking and problem-solving skills.
- 11 Demonstrate healthy behaviors and safety skills.
- 12 Demonstrate an understanding of workplace organizations, systems and climates.
- 13 Demonstrate lifelong-learning skills.
- 14 Demonstrate job-acquisition and advancement skills.
- 15 Demonstrate time-, task- and resource-management skills.
- 16 Demonstrate job-specific mathematics skills.
- 17 Demonstrate customer-service skills.

### **Demonstrating Workplace Readiness Skills: Technology Knowledge and Skills**

- 18 Demonstrate proficiency with technologies common to a specific occupation.
- 19 Demonstrate information technology skills.
- 20 Demonstrate an understanding of Internet use and security issues.
- 21 Demonstrate telecommunications skills.

### **Examining All Aspects of an Industry**

- 22 Examine aspects of planning within an industry/organization.
- 23 Examine aspects of management within an industry/organization.
- 24 Examine aspects of financial responsibility within an industry/organization.
- 25 Examine technical and production skills required of workers within an industry/organization.
- 26 Examine principles of technology that underlie an industry/organization.
- 27 Examine labor issues related to an industry/organization.
- 28 Examine community issues related to an industry/organization.
- 29 Examine health, safety and environmental issues related to an industry/organization.

### **Addressing Elements of Student Life**

- 30 Identify the purposes and goals of the student organization.
- 31 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
- 32 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs and projects.
- 33 Identify Internet safety issues and procedures for complying with acceptable use standards.

### **Technology Concepts**

- 34 Use measuring and layout tools.
- 35 List technological developments related to materials and processes technology.
- 36 Explain the origin of various natural and synthetic materials.

- 37 Explain the life cycle of a given product and the materials and processes associated with it.
- 38 Implement a safety plan that includes safety rules and emergency procedures for laboratory work.
- 39 Research careers related to materials and processes.
- 40 Investigate local industry and technical resources related to materials and processes technology.
- 41 Research the responsibilities of the members of a collaborative project team.
- 42 Participate in a collaborative project team.
- 43 Explain the basic structure of atoms and ions.
- 44 Compare the structure of amorphous and crystalline materials.
- 45 Distinguish between materials classified as polymers, ceramics, metals and composites.

### **Describe mechanical properties.**

- 46 Use testing devices to measure mechanical properties of selected materials.
- 47 Compare chemical and physical properties of selected materials.
- 48 Research emerging technologies.

### **Working with Polymers**

- 49 Describe the characteristics and uses of thermoplastics and thermosetting plastics.
- 50 Select appropriate polymer(s) for a product, based on the properties of the material.
- 51 Produce polymer items through use of selected combining techniques.
- 52 Select and use appropriate separating techniques on polymers.
- 53 Select and use appropriate forming techniques on polymers.
- 54 Produce finished surfaces on polymers.
- 55 Apply polymeric materials and processes to a problem, product design or prototype.

### **Working with Metals**

- 56 Describe the basic structure of metals.
- 57 Compare typical properties of selected metals and alloys.
- 58 Select and perform basic metal forming techniques.
- 59 Select and perform metal separation processes.
- 60 Select and perform metal combining techniques.
- 61 Select and perform metal finishing techniques.
- 62 Apply metal materials and processes to a problem, product design or prototype.

### **Working with Woods**

- 63 Describe the nature and structure of wood and forest products.
- 64 Determine the physical, mechanical, and chemical properties of woods.
- 65 Select and use separating techniques on woods.
- 66 Select and use wood combining methods.
- 67 Select and apply wood conditioning materials.
- 68 Apply wood materials and processes to a problem, product design or prototype.

### **Working with Ceramics**

- 69 Explain the origin, types, and uses of ceramics.
- 70 Classify ceramics, based on their properties.
- 71 Produce a ceramic part or item.

### **Working with Composites**

- 72 Identify types and applications of composite materials.
- 73 Produce a composite part or item.
- 74 Exploring Additive and Subtractive Manufacturing
- 75 Identify additive and subtractive manufacturing processes.

- 76 Generate models to be converted into machine-compatible digital files.
- 77 Create a product using additive or subtractive processes.

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To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/ Executive Director of Student Support Services at (757) 263-1980,

2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone 263-1070 (voice); fax 263-1424; 263-1240 (TDD) or email at [Charles.Hurd@vbschools.com](mailto:Charles.Hurd@vbschools.com).

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