

Legend for “Guide to The Content Standards For California Public Schools (Academic Crosswalk)”

Parenthetical notation preceding the content standard item refers to the grade level for the standard.  
i.e. (8) refers to grade 8, (9-10) refers to grades 9 & 10.

Example: (8)W2.1 refers to the Eighth Grade Writing Standard Item 2.1

**English-Language Arts:**

R Reading  
W Writing  
WOC Written & Oral Conventions  
LS Listening & Speaking

**Science:**

PH Physics  
CH Chemistry  
B/LS Biology/Life Science  
ES Earth Science  
I&E Investigation & Experimentation

**Mathematics:**

NS Number Sense  
AF Algebra & Functions  
SDP Statistics, Data Analysis & Probability  
MR Mathematical Reasoning  
MG Measurement & Geometry  
AI Algebra I  
G Geometry  
AII Algebra II  
P&S Probability & Statistics  
APP&S Advanced Placement Probability & Statistics  
C Calculus

**History-Social Science:**

WH World History, Culture and Geography  
USH United States History and Geography  
AD American Democracy  
ECON Economics

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## INFORMATION TECHNOLOGY INDUSTRY SECTOR

**I. Information Technology:** Students will understand information technology concepts necessary to function in a rapidly changing technological, global society. They will demonstrate competency by appropriately using a variety of resources to develop, access, modify, and provide information effectively.

### Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
I.a Accessibility – identify and develop systems that allow access to all users, including those with cultural, physical and cognitive differences.	<b>(9-10)W1.3-1.6;</b> (9-10)W2.6			
I.b Business and Technology Ethics – define, explain, and demonstrate proper business and technology ethics, including management of intellectual property and copyright laws	(9-10)R2.6; <b>(9-10)R1.5;</b> (9-10)R2.3e; <b>(9-10)R2.4;</b> (11-12)R3.5c; (11-12)R3.7c		(9-12)I&E1 g, m	(10)WH10.8.5; (11)USH11.3; (11)USH11.8.7; (11)USH11.9.3; (11)USH11.11.4; (12)AD12.2; (12)AD12.3; (12)AD12.5, 6; (12)AD12.10
I.c Computer and Communications Systems – use operating systems, hardware and peripherals, integrating communication tools and appropriate resources, to share, store, and manage information	(9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (9-10)W2.6; (11-12)W1.8; (11-12)W2.6; (11-12)LS2.4		(9-12)I&E1 a	

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Link to Content Standards for California Public Schools

<b>Benchmarks</b>	<b>English Standards</b>	<b>Math Standards</b>	<b>Science Standards</b>	<b>Social Science/ History Standards</b>
I.d Computer Applications – identify, select, and use a variety of business and industry standard applications software; discuss emerging technology trends	<b>(8)R2.1;</b> (9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (9-10)W2.6; (11-12)W1.8; (11-12)W2.6; (11-12)LS2.4	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.3, 3.5;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a	
I.e Knowledge Management and Business Processes – use technology and electronic media to identify, analyze, design, and create processes to manage workflow, communicate a collective understanding, and provide feedback for operational management	<b>(8)R2.1;</b> (9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (9-10)W2.6; (11-12)W1.8; (11-12)W2.6; (11-12)LS2.4	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.3, 3.5;</b> <b>(7)NS1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.2;</b> <b>(7)AF4.2;</b> <b>(7)MG1.3;</b> <b>(7)SDP1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a,	
I.f Personal Security - identify and understand procedures for keeping personal information secure to ensure safety	<b>(9-10)W1.3-1.6;</b> (9-10)W2.6			

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
I.g Project Management – prioritize activities and manage the details including project scope and scale, timelines, and budgets for the life cycle of the system in a team environment	(9-10)R2.3; (9-10)R2.6	<b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.5;</b> <b>(7)NS1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.2;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.4, 3.1, 3.3</b>		
I.h System Models – identify and compare systems models and data elements and structures	<b>(9-10)W1.3-1.6;</b> (9-10)W2.6			
I.i System Security– illustrate and implement security plans and procedures for information systems	<b>(9-10)R2.1-2.4;</b> (9-10)R2.6 (9-10)W2.6; (11-12)W1.6-1.8	<b>(6)SDP2.5;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 c	
I.j Systems Analysis and Design–analyze information systems and develop efficient and effective solutions	<b>(8)R2.1;</b> <b>(9-10)R2.1-2.4;</b> (9-10)R2.6; (9-10)W2.6; (11-12)W1.6-1.8	<b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.3, 3.5;</b> <b>(7)NS1.3; (7)NS1.6;</b> <b>(7)SDP1.1-1.3;</b> <b>(7)MR1.1;</b> <b>(7)MR3.1, 3.3;</b> <b>AI-10.0; AI-13.0;</b> <b>AI-15.0</b>	(9-12)I&E1 a, b, c, d, j	
I.k Technical Resources– locate, organize and utilize appropriate resources necessary to implement and support systems and/or solve problems	<b>(8)R2.1;</b> <b>(9-10)R2.1-2.4;</b> (9-10)R2.6; (9-10)W2.6; (11-12)W1.6-1.8	<b>(7)MR1.1;</b> <b>(7)MR3.1, 3.3</b>	(9-12)I&E1 a, b, c, d, j	

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## INFORMATION TECHNOLOGY INDUSTRY SECTOR

**II. Information Support and Services:** Students will understand how to analyze the need for, plan, manage, and support the use of business systems to accomplish business goals and objectives. They will demonstrate competency by successfully participating in a system development project that improves the productivity of an organization.

### Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
II.a Change Management—analyze the potential impact of a system on the people in the organization through the systems life cycle and develop appropriate plans addressing impact on resources	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> P&S4.0-8.0	(9-12)I&E1 c, d, j, m	
II.b Deployment Planning—identify steps for systems implementation and resources needed including technical support and ongoing active learning and training programs	<b>(9-10)W1.1, 1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.8; (11-12)R2.3; (11-12)W1.3, 1.6-1.8	<b>(7)MR1.1;</b> <b>(7)MR2.1, 3.1, 3.3</b>	(9-12)I&E1 a	

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Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
II.c Needs Analysis– describe a business problem, examine functional requirements, and prepare a cost-benefit analysis	<b>(9-10)W1.3-1.9;</b> <b>(9-10)W2.3;</b> (9-10)LS2.5-2.6; (11-12)W1.1, 1.3, 1.6-1.8	<b>(6)SDP1.1, 2.5;</b> <b>(7)NS1.1-1.3, 1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-5.0; AI-8.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-17.0; P&S4.0-8.0; APP&S14.0; C11.0	(9-12)I&E1a, d, e, j	
II.d Resource Management – explain how to qualify, recruit and manage both internal and external resources needed when developing, deploying, and supporting systems in an organization	<b>(9-10)W1.3-1.9;</b> <b>(9-10)W2.3;</b> (9-10)LS2.5-2.6; (11-12)W1.1, 1.3, 1.6-1.8	<b>(7)MR3.3</b>	(9-12)I&E1a, d, e, j	
II.e Risk Analysis–identify and analyze organizational, technical, and financial risks associated with the implementation and use of a system	<b>(9-10)W1.3-1.8;</b> <b>(9-10)W2.3;</b> (9-10)LS2.6; (11-12)R2.3; (11-12)W1.3, 1.6-1.8	<b>(6)SDP1.1; (6)SDP2.5;</b> <b>(7)NS1.1-1.3, 1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5, 4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 2.1, 3.1, 3.3;</b> AI-13.0; <b>AI-15.0;</b> P&S4.0-8.0	(9-12)I&E1a, d, j	

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Link to Content Standards for California Public Schools

<b>Benchmarks</b>	<b>English Standards</b>	<b>Math Standards</b>	<b>Science Standards</b>	<b>Social Science/ History Standards</b>
II.f Systems Management—develop system life-cycle models and plans for the ongoing upgrade, support, and training of users	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(7)NS1.1-1.3;</b> <b>(7)2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MR1.1, 2.1, 3.1, 3.3</b>	(9-12)I&E1a, d, j	
II.g Systems Security—develop a plan and implement policies and procedures to ensure the security and integrity of management systems	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(7)MR3.3</b>	(9-12)I&E1a, d	
II.h Systems Selection—investigate, evaluate, select, and use major types of systems applications and vendors including retail, manufacturing, and service management	<b>(9-10)R2.1;</b> <b>(9-10)R2.4-2.6;</b> <b>(9-10)W1.3-1.8;</b> (9-10)LS1.1; (11-12)W1.6-1.8	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 2.1, 3.1, 3.3</b>	(9-12)I&E1a, d, g, j	
II.i Training—design information and instruction for users to ensure efficient, productive systems operation	<b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8; (11-12)W2.6	<b>(7)MR1.1, 2.1, 3.1, 3.3</b>	(9-12)I&E1a, d	

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## INFORMATION TECHNOLOGY INDUSTRY SECTOR

**III. Media Support and Services:** Students will understand media support and services necessary in the operation of a business organization in a global society. They will demonstrate competency by assessing and developing a variety of media-based information resources.

### Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
III.a 3D Animation – use animation paths to define a set of motions using key framing rendered in digital format for final output		(6)MG2.1-2.6		
III.b 3D Modeling – utilize 3D modeling software to simulate three-dimensional objects in a two-dimensional plane		(6)MG2.1-2.6		
III.c Application Software – select and use appropriate software to design and produce professional documents and presentations	(9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (9-10)W2.5; (9-10)W2.6; (11-12)W1.8; (11-12)W2.5; (11-12)W2.6		(9-12)I&E1 a, d	
III.d Broadcast Production – develop a script, design a set and implement crew responsibilities to broadcast a show	<b>(9-10)R2.1;</b> <b>(9-10)WOC1.1-1.5</b>			

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
III.e Design Layout – identify and implement the basic design elements necessary to produce effective print, video, audio and web-based media	(9-10)W1.3; (11-12)W1.8			
III.f Desktop Publishing – create periodicals or one-time publications, which include the knowledge of planning, publication, creation, pagination, negative stripping, plate burning, printing, folding, cutting, and binding	<b>(9-10)W1.3-1.8</b> ; (11-12)W1.8; (9-10)W2.6a-d			
III.g Electronic Information Transfer – send and receive electronic information including all forms of file attachments	(9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (9-10)W2.6; (11-12)W1.8; (11-12)W2.6; (11-12)LS2.4	<b>(7)MR3.3</b>	(9-12)PH1 a	
III.h File Compression – analyze the purpose of the graphical image to determine the appropriate file format and level of compression				

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
III.i Graphic Design – use drawing techniques including orthographic, oblique, isometric projection and perspective drawings to create both vector- and raster-based graphic images				
III.j Peripherals/Hardware Proficiencies – demonstrate knowledge in the use of different types of peripherals and hardware such as scanners, digital cameras, large capacity digital storage devices, large format printers, teleconferencing devices and 3D digitizing hardware				
III.k Records Management – classify, save, retrieve, backup and delete records		<b>(6)SDP2.5;</b> <b>(7)NS1.3;</b> <b>(7)NS1.6;</b> <b>(7)MR1.1, 3.1, 3.3</b>	(9-12)I&E1 a	
III.l Resource Validation – describe the process to validate Internet resources used and demonstrate proper citation	(8)W1.4; <b>(9-10)W1.3-1.8;</b> (9-10)W2.6			

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<b>Benchmarks</b>	<b>English Standards</b>	<b>Math Standards</b>	<b>Science Standards</b>	<b>Social Science/ History Standards</b>
III.m Target Market – develop media and strategies that target the specific needs and wants of the audience	(8)W2.6; (11-12)W1.1-1.2			
III.n Tool Integration - integrate hardware and software tools, mixing pre-existing and new digital media, for the purpose of producing multimedia presentations and products	(11-12)W1.9			
III.o Video Production/Filmmaking – create a video-based project that includes planning, script writing, storyboarding, filming and editing	(9-10)W2.6a-d; (11-12)W1.1-1.8			
III.p Web Page Design – plan, design and develop effective web page content that is optimized for fast delivery and retrieval	(9-10)W2.6			
III.q Web Page Management – apply knowledge of coded language and standard scripting languages and advance communication protocols to manage/master a web site				

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## INFORMATION TECHNOLOGY INDUSTRY SECTOR

**IV. Network Communications:** Students will understand the concepts, systems, and business models necessary to install, create, and manage diverse types of communication technologies and networking systems. They will demonstrate competency by performing tasks related to the creation, installation, management, and security of a chosen networking system.

### Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
IV.a Business Decisions– analyze the factors affecting the selection of appropriate communications services; for example, cost, ease of use, and timelines	<b>(9-10)R2.1-2.7</b> <b>(9-10)W1.3-1.8;</b> <b>(9-10)W2.3;</b> (9-10)W2.6; (9-10)LS1.2-1.9; (11-12)W1.3, 1.6-1.8; (11-12)LS1.3	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.5;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF3.3;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)SDP1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> AI-13.0; <b>AI-15.0;</b> P&S4.0-8.0	(9-12)I&E1 a, d	(11)USH11.8.7
IV.b Business Models– examine various types of networking models including products and services provided, identification of market spaces, resources needed to create, deliver, and support products and revenue models essential for company growth	<b>(8)R2.1;</b> <b>(9-10)R2.3-2.7;</b> <b>(9-10)W1.3-1.8;</b> <b>(9-10)W2.3;</b> (9-10)W2.6; (9-10)LS1.2-1.3, 1.6-1.8; (11-12)W1.3-1.9; (11-12)LS1.3; (11-12)LS2.4	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.5;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF3.3;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)SDP1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a, d, g	

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Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
IV.c Customer Support—create a plan that includes customer policies and procedures including incident management and escalation; select help desk tools and resources such as incident tracking, knowledge database, and staffing	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a, d	
IV.d Emerging Technology and Trends—discuss emerging products, services, and business models in relation to the creation, setup, and management of networking and telecommunication products and services	<b>(9-10)R2.1;</b> <b>(9-10)R2.5-2.6;</b> <b>(9-10)W1.3-1.8;</b> <b>(9-10)W2.3;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8; (11-12)LS1.1	<b>(7)MR3.3</b>	(9-12)I&E1 a, d	(11)USH11.7.6; (11)USH11.8.7
IV.e Media Types—identify, evaluate, create, and process voice and data transmissions	(9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (11-12)W1.8; (11-12)W2.6	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 3.1, 3.3</b>	(9-12)I&E1 a	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
IV.f Network and Systems Administration—analyze, manage, and maintain various types of electronic networks	<b>(8)R2.1;</b> <b>(9-10)R2.1-2.7</b>	<b>(6)SDP1.1; (6)SDP2.5;</b> <b>(7)NS1.1-1.3; (7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-5.0; AI-10.0;</b> <b>AI-13.0; AI-15.0;</b> <b>P&amp;S4.0-8.0</b>	(9-12)I&E1 a, d	
IV.g Network Communication Applications—describe and illustrate appropriate use of communication services, products, and applications	<b>(8)R2.1;</b> <b>(9-10)R2.1;</b> <b>(9-10)R2.4-2.6;</b> <b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.8; (11-12)W1.3, 1.6-1.8		(9-12)I&E1 a	
IV.h Network Communication Infrastructure—evaluate, select, and configure compatible systems across various platforms and media types	<b>(9-10)R2.1-2.7</b>	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.5;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF3.3;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)SDP1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-5.0; AI-10.0;</b> <b>AI-13.0; AI-15.0;</b> <b>P&amp;S4.0-8.0</b>	(9-12)I&E1 a, d	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
IV.i Resource Management—discuss the effective management of human, financial, and communications resources from the standpoint of both a user and a provider	<b>(8)R2.1;</b> <b>(9-10)R2.1;</b> <b>(9-10)R2.4-2.6;</b> <b>(9-10)W1.3-1.8;</b> <b>(9-10)W2.3;</b> (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8	<b>(7)NS1.1-1.3;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MR1.1, 3.1, 3.3</b>	(9-12)I&E1 a, m	
IV.j Security Monitoring and Investigation—classify appropriate monitoring devices and procedures for quick identification, and prevention of security violations; describe investigative procedures to follow	<b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.8; (11-12)W1.3, 1.6-1.9	<b>(7)NS1.1-1.3;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MR1.1, 3.1, 3.3</b>	(9-12)I&E1 a, d	
IV.k Security Program—develop policies and procedures including user agreements, incident reporting, and recovery for users; design orientation and training programs to educate technicians and end-users	<b>(8)R2.1;</b> <b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8; (11-12)LS2.4	<b>(7)NS1.1-1.3;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MR1.1, 3.1, 3.3</b>	(9-12)I&E1 a, d	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
IV.l Security Risk Assessment—identify potential risks and entrance points including internal and external risks, and select appropriate hardware and software including firewalls, monitoring, and antivirus protection	<b>(9-10)R2.1;</b> <b>(9-10)R2.4-2.6;</b> <b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a, d	
IV.m Standards and Protocol—analyze implications of protocols and international standards and discuss their impact on data transmission	<b>(9-10)R2.5-2.6;</b> <b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.1; (9-10)LS1.1, 1.3-1.8; (11-12)W1.3, 1.6-1.8	<b>(7)NS1.1-1.3;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a, d	
IV.n Topology—diagram physical and logical layouts of network communication systems	<b>(9-10)R2.3-2.6</b> (9-10)LS1.1	<b>(7)MG1.2;</b> <b>(7)MR1.1, 3.1, 3.3;</b> <b>AI-5.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0; G11.0	(9-12)I&E1 a, d	
IV.o Training—provide information and instruction to users that will enable them to utilize network communication systems	<b>(8)R2.1;</b> <b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8; (11-12)W2.6; (11-12)LS2.4	<b>(7)MR1.1, 3.1, 3.3</b>	(9-12)I&E1 m	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
IV.p Troubleshooting– identify problems, develop appropriate methods and tools for resolving problems, and implement solutions	<b>(9-10)W1.3-1.8;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.3, 1.6-1.8	<b>(7)MR1.1;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-5.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0	(9-12)I&E1 a, d	

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## INFORMATION TECHNOLOGY INDUSTRY SECTOR

**V. Programming and Systems Development:** Students will understand systems and programming concepts related to computer-based information systems. They will demonstrate competency by developing successful computer systems and programs.

### Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
V.a Algorithms – design solutions that are correct, reliable, and efficient; compare and contrast various sorting and searching methods	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(6)SDP1.1</b> <b>(6)SDP2.5 3.1, 3.3, 3.5;</b> <b>(7)AF1.3;</b> <b>(7)NS2.2;</b> <b>(7)AF1.1, 1.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)SDP1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0	(9-12)I&E1 a, b, c, d, e, g, j	
V.b Architecture Methods – explain digital logic, machine-level representation of data, memory-system organization, and architectural use of assembly-level programming	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(7)NS1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR3.1, 3.3</b>	(9-12)I&E1 a, b, c, d	
V.c Artificial Intelligence and Robotics – discuss uses and effects of artificial intelligence and robotics	<b>(9-10)W1.3-1.5;</b> <b>(9-10)W2.3;</b> (9-10)LS1.3-1.9	P&S4.0-8.0	(9-12)I&E1 m	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
V.d Data Structures – develop the abstract organization of information and develop programs that perform operations, such as search, insert, or balance, which maintain the properties of the data structure	(9-10)W1.3-1.5; (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	(7)AF1.1, 1.2; (7)MR2.1, 2.4, 3.1, 3.3; <b>AI-5.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0	(9-12)I&E1 a, d, e	
V.e Database – design, modify and use tables to store data; design and develop forms, reports and queries to access information in the database	(9-10)W1.3-1.5; (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	(7)AF1.1, 1.2; (7)MR2.1, 2.4, 3.1, 3.3; <b>AI-5.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0; P&S4.0-8.0	(9-12)I&E1 a, d, e	
V.f Human-Computer Interfaces – use knowledge of people, including cognitive, physical and social characteristics, to design and build effective interactions between humans and computer systems	<b>(8)R2.1;</b> <b>(9-10)R2.1;</b> (9-10)R2.6; (9-10)W1.8; (9-10)W2.3d; (9-10)W2.6; (11-12)W1.8; (11-12)W2.6; (11-12)LS2.4	(7)MR1.1, 3.1, 3.3	(9-12)I&E1 a-g, j, m	
V.g Networking and Communications – install programs that utilize various network and communication protocols		(7)MR1.1, 3.1, 3.3	(9-12)I&E1 a, d	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
V.h Operating Systems – utilize operating systems and associated utilities for file management, backup and recovery, and execution of programs; compare simple and multi-user operating systems		<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3</b>	(9-12)I&E1 a, d	
V.i Program Design – design, code, execute, test and debug well-structured, maintainable programs to meet specifications	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(6)SDP1.1;</b> <b>(6)SDP2.5;</b> <b>(6)SDP3.1, 3.3, 3.5;</b> <b>(7)NS1.1-1.3;</b> <b>(7)NS1.6, 1.7;</b> <b>(7)NS2.1-2.3;</b> <b>(7)AF1.1, 1.2, 1.5;</b> <b>(7)AF4.1, 4.2;</b> <b>(7)MG1.1-1.3;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-5.0; AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0; P&S4.0-8.0	(9-12)I&E1 a, b, c, d, e, j	
V j Program Modification – define and execute ways in which specification changes and technological advances require the modification of programs	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(7)MR1.1, 3.1, 3.3;</b>	(9-12)I&E1 a, b, d, k	

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## Link to Content Standards for California Public Schools

Benchmarks	English Standards	Math Standards	Science Standards	Social Science/ History Standards
V.k Programming Languages – compare programs using control structures, procedures, functions, parameters, variables, error recovery, and recursion	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(7)AF1.1, 1.2;</b> <b>(7)MR1.1;</b> <b>(7)MR2.1, 2.3, 2.4, 3.1, 3.3;</b> <b>AI-5.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0;</b> AI-24.0; AI-25.0; P&S4.0-8.0	(9-12)I&E1 a, b, c, d, e, g, k	
V.l Social Issues – develop systems which support access, privacy and high ethical standards while understanding their impact on individuals and society	<b>(9-10)R1.5;</b> <b>(9-10)W2.3-2.4;</b> (11-12)R2.6; (11-12)R3.5c; (11-12)R3.7c	<b>(7)MR3.3</b>	(9-12)I&E1 m	(10)WH10.8.5; (11)USH11.3; (11)USH11.8.7; (11)USH11.9.3; (11)USH11.11.4; (12)AD12.2; (12)AD12.3; (12)AD12.5; (12)AD12.6; (12)AD12.10
V.m Systems Analysis – demonstrate knowledge of the systems development life cycle and its application to the development of effective information systems	<b>(9-10)W1.3-1.5;</b> (9-10)W2.6; (9-10)LS1.3-1.9; (11-12)W1.6-1.8	<b>(7)AF1.1, 1.2;</b> <b>(7)MR1.1, 1.2;</b> <b>(7)MR2.1, 3.1, 3.3;</b> <b>AI-5.0;</b> <b>AI-10.0;</b> AI-13.0; <b>AI-15.0</b>	(9-12)I&E1 a, b, c, d,	

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