Orange Public Schools

Curriculum Guide

Cisco I

Grades 10-12

Cisco I Teacher

Ederson Jean

Revisions edited 2019-2020 by Jahmel K. Drakeford

ORANGE TOWNSHIP BOARD OF EDUCATION

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The Orange Board of Education

Vision and Mission Statement

Vision

"The Orange Public School District commits to provide a safe and caring environment where each student is expected to grow and succeed. We pledge to prepare all students with equitable opportunities for college and career readiness, leading to lifelong learning and responsible citizenship in a competitive global community."

Mission

The Orange Public School District in collaboration with all stakeholders is responsible for promoting the academic, social, emotional and personal success of all students. With a commitment to academic excellence, the district provides teachers, families, and administrators the tools needed for all students to reach their full potential. The district serves all students in our schools, acknowledging their unique backgrounds, cultural perspectives and learning styles. The district recognizes that curiosity, discipline, integrity, responsibility and respect are necessary for success. The Orange Public School District cultivates a community of 21st century learners where students take ownership of the learning process, achieve high standards of excellence, and focus on academics.

Content Area:	Cisco: Cisco I	Grade(s)	10-12
Unit Plan Title:	**Introduction to Networks**		

Career Ready Practices

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Overview/Rationale

I. OVERVIEW

This unit introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of the course, students

Standard(s) NJSLS

9.3 Career and Technical Education Standards

- 9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals.
- 9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- 9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information.
- 9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems.
- 9.3.IT.13 Compare key functions and applications of software and determine maintenance strategies for computer systems.
- 9.3.IT-SUP.1 Provide technology support to maintain service.
- 9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- 9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- 9.3.IT-PRG.1 Analyze customer software needs and requirements.
- 9.3.IT-PRG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- 9.3.IT-PRG.3 Analyze system and software requirements to ensure maximum operating efficiency.
- 9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications.

Technology Standard(s)

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
- 8.1.2.A.2 Create a document using a word processing application.

Interdisciplinary Standard(s)

RST WHST

- CCSS.ELA-LITERACY.W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.
- CCSS.ELA-LITERACY.W.K.3 Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.
- CCSS.ELA-LITERACY.W.1.1 Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.

	• CCSS.ELA-LITERACY.W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. • WHST.11-12.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. • WHST.11-12.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. • WHST.11-12.10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
Essential Question(s)	
• What are the IT industry certifications? • Why is it important to know the different names and functions of the components inside a personal computer? • How will these skills benefit me in future**?** • What is the purpose of safe working conditions and procedures? • How will knowing safe work procedures benefit me in the future? • What are the tools and software necessary for proper use with personal computer components and what is their purpose? • What are the steps to successfully assembling a desktop computer? • Why are these skills important to know? • How will these skills benefit me in future? • What is the purpose of preventive maintenance? • Why is it important to work in a step by step of the troubleshooting process? • How will these skills benefit me in future?	
Enduring Understandings	

- Explain how multiple networks are used in everyday life.
- Explain how topologies and devices are connected in a small to medium-sized business network.
- Explain the basic characteristics of a network that supports communication in a small to medium-sized business.
- Explain trends in networking that will affect the use of networks in small to medium-sized businesses.
- Explain the features and functions of the Cisco IOS Software.
- Configure initial settings on a network device using the Cisco IOS Software.
- Explain how rules facilitate communication.
- Explain how devices on a LAN access resources in a small to medium-sized business network.
- Explain how physical layer protocols and services support communications across data networks.
- Build a simple network using the appropriate media.
- Explain the role of the data link layer in supporting communications across data networks.
- Compare media access control techniques and logical topologies used in networks.
- Explain the operation of Ethernet.
- Explain how the address resolution protocol enables communication on a network.
- Configure a router with basic configurations.
- Explain how network layer protocols and services support communications across data networks.
- Explain how routers enable end-to-end connectivity in a small to medium-sized business network
- Explain the use of IPv4 addresses to provide connectivity in small to medium-sized business networks.
- Configure IPv6 addresses to provide connectivity in small to medium-sized business networks.
- Implement an IPv4 addressing scheme to enable end-to-end connectivity in a small to medium-sized business network.
- Compare the operations of transport layer protocols in supporting end-to-end communication.
- Explain the operation of the application layer in providing support to end-user applications.
- Explain how well-known TCP/IP application layer protocols operate.

In this unit plan, the following 21st Century themes and skills are addressed.

Check all that apply. 21st Century Themes			Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill. 21st Century Skills	
	X	Global Awareness	E, A	Creativity and Innovation
	X	Environmental Literacy	E, T, A	Critical Thinking and Problem Solving
		Health Literacy	E, A	Communication
		Civic Literacy	E, T, A	Collaboration
	X	Financial, Economic, Business, and Entrepreneurial Literacy		

Student Learning Targets/Objectives

Students will ….

- Explain network technologies.
- Explain how devices access local and remote network resources.
- Implement basic network connectivity between devices.
- Design an IP addressing scheme to provide network connectivity for a small to medium-sized business network.
- Describe router hardware.
- Explain how switching operates in a small to medium-sized business network.
- Configure monitoring tools available for small to medium-sized business networks.
- Configure initial settings on a network device.

Assessments

• Pre and Formative: Daily —do now/warm-up responses. Ability to demonstrate proficiency in key unit concepts in class discussions. Student Portfolio of key work products. Shared responses to Essential Questions. Interim quizzes. Written and reading-based homework.
• Summative: End of unit written exam
• Authentic: Hands-on Lab:
  ○ Computer Disassembly Hands-on Lab: Install the Power Supply
  ○ Optional Virtual Desktop Activity
  ○ Hands-on Lab: Install the Motherboard
  ○ Optional Virtual Desktop Activity
  ○ Optional Virtual Desktop Activity
  ○ Hands-on Lab: Install the Drives
  ○ Optional Virtual Desktop Activity
  ○ Hands-on Lab: Install Adapter Cards
  ○ Optional Virtual Desktop Activity
  ○ Hands-on Lab: Install Internal Cables
  ○ Optional Virtual Desktop Activity
  ○ Hands-on Lab: Complete the Computer Assembly
  ○ Optional Virtual Desktop Activity
  ○ Hands-on Lab: Boot the Computer

Teaching and Learning Actions	
Instructional Strategies	Academic vocabulary and language; Accountable talk; Adapting to learning styles/multiple intelligences; Analysis of student work; Cues, questions, activating prior knowledge; Current events; Direct instruction; Discovery/Inquiry-based learning; Document-based questions; Effective questioning; Field experience, field trip, or field study; Flexible/strategic grouping; Formative assessment process; Guest speakers; Hands-on learning; Identifying similarities and differences; Integration of content areas; Lecture; Learning centers; Mastery learning; Modeling; Music and songs; Nonlinguistic representations; Note booking/journaling; Peer teaching/collaboration; Project-based learning; Realia; Reinforcing effort and providing recognition; Role play/simulations/drama; Student goal setting; Student self-assessment; Summarizing and note taking; Targeted feedback; Word wall

MTSS	Special education students:: -Adhere to all modifications and health concerns stated in each IEP. -Give students a MENU options, allowing students to pick assignments from different levels based on difficulty. -Use the NEWSELA software, which can revise the reading Lexile level to meet students at current reading level. -Accommodating Instructional Strategies Reading Aloud, Graphic Organizers, Reading Study Guides, one-on-one instruction, class website (Google Classroom), Handouts, Definition List, Syllabus, Large Print, Outlines -Utilize Snap-n-Read and Co-Writer English Language Learners (ELL) students: -Use the Britannica launch pack software; give students the option to change the language of the article to the student's native language for most articles. - Snap and Read Google extension addition. Will read to the student in the language selected. -Vocabulary Spelling City word banks - Use visuals whenever possible to support classroom instruction and classroom activities. -Teacher modeling and written instructions for every assignment At risk of failure students: -Give students a MENU options allowing students to pick activities based on interest that address the objectives and standards of the unit. -Modified Instructional Strategies, Reading alouds, Graphic Organizers, Reading Study Guides, small learning group instruction, class website (Google Classroom), Syllabus, inclusion of more visuals and Films, Field Trips, Google Expeditions, Peer Support, one on one instruction -Constant parental contact along with mandatory tutoring appointments. - Academic Contracts Gifted and talented students: -Modified instructional strategies Socratic Seminar, Group Discussion, Think-Pair-Share, Individual Assignments graded on a more rigorous rubric, Multimedia Projects, working with more primary source documents and completing Case Studies. -Student led classroom instruction also Project Based Learning.

Students with a 504:

Adhere to all modifications and health concerns stated in504 plan. Then assess the academics of the student to implement the necessary modifications as described in this document

Activities D	**Chapter 1** Explore the Network ● 1.0.1.2 Class Activity - Draw Your Concept of the Internet ● 1.1.1.8 Lab - Researching Network Collaboration Tools ● 1.2.4.5 Packet Tracer - Network Representation **Chapter 2** Configure a Network Operating System ● 2.1.4.6 Packet Tracer - Navigating the IOS ● 2.1.4.7 Lab - Establishing a Console Session with Tera Term ● 2.2.3.4 Packet Tracer - Configuring Initial Switch Settings **Chapter 3** Network Protocols and Communications ● 3.2.4.5 Activity - Identify Layers and Functions ● 3.2.4.6 Packet Tracer - Investigating the TCP/IP and OSI Models in Action **Chapter 4** ● 4.1.2.4 Lab - Identifying Network Devices and Cabling ● 4.2.2.7 Lab - Building an Ethernet Crossover Cable ● 4.2.4.4 Packet Tracer – Connecting a Wired and Wireless LAN **Chapter 5** Ethernet ● 5.1.2.8 Lab - Viewing Network Device MAC Addresses ● 5.2.1.7 Lab - Viewing the Switch MAC Address Table ● 5.3.1.3 Packet Tracer – Identify MAC and IP Addresses **Chapter 6** Network Layer ● 6.3.2.6 Activity - The Router Boot Process

- 6.3.2.7 Lab - Exploring Router Physical Characteristics
- 6.5.1.2 Lab - Building a Switch and Router Network

Chapter 7

IP Addressing

- 7.1.2.9 Lab – Converting IPv4 Addresses to Binary
- 7.1.4.9 Lab – Identifying IPv4 Addresses

Chapter 8

Subnetting IP Networks

- 8.1.4.6 Lab - Calculating IPv4 Subnets
- 8.1.4.7 Packet Tracer - Subnetting Scenario

Chapter 9

Transport Layer

- 9.2.1.6 Lab - Using Wireshark to Observe the TCP 3-Way Handshake
- 9.2.1.7 Activity - TCP Connection and Termination Process

Chapter 10

Application Layer

- 10.1.2.5 Lab – Researching Peer-to-Peer File Sharing
- 10.2.1.7 Packet Tracer – Web and Email

Chapter 11

Build a Small Network

- 11.2.2.6 Lab - Researching Network Security Threats
- 11.3.3.3 Packet Tracer - Using show Commands
- 11.4.3.6 Packet Tracer - Troubleshooting Connectivity Issues

Experiences D	Field Trips Guest Speakers Internships Job Shadowing
Resources	
• WWW.Cisco.netacad.net • IT Essentials Course	
Suggested Time Frame:	10 Weeks

D- Indicates differentiation at the Lesson Level.

NJASCD, 12 Centre Drive Monroe Township, NJ 08831 njascd.

Content Area:	Cisco: Cisco I	Grade(s)	10-12
Unit Plan Title:	**Routing and Switching**		

Career Ready Practices

CRP1. Act as a responsible and contributing citizen and employee.
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CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Overview/Rationale

I. OVERVIEW

This unit describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with virtual LANs and interVLAN routing in both IPv4 and IPv6 networks.

Standard(s) NJSLS

9.3 Career and Technical Education Standards

- 9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals.
- 9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
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- 9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems.
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- 9.3.IT-SUP.1 Provide technology support to maintain service.
- 9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- 9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- 9.3.IT-PRG.1 Analyze customer software needs and requirements.
- 9.3.IT-PRG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
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- 9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications.

Technology Standard(s)

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
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Essential Question(s)

- What is the purpose of an operating system?
- Based on a customer's needs, how does one decide on which operating system to use?
- Why is it important to have GUI operating systems?
- What are the procedures for installing an operating system?
- How will these skills benefit me in future?
- What is a computer network?
- What are the benefits of a computer network?
- What are the different types of computer networks?
- What are important networking concepts, standards and technologies
- What are the physical components of a network?

- What are the LAN topologies and architectures?
- What are important maintenance and troubleshooting techniques for a network?
- When is it necessary to upgrade a network?
- Why are these skills important to know?
- How will these skills benefit me in future?

Enduring Understandings

- Implement DHCP on a router.
- Implement network address translation (NAT).
- Implement access control lists (ACLs) to filter traffic.
- Determine how a router will forward traffic based on the contents of a routing table.
- Implement static routing.
- Explain how switching operates in a small to medium-sized business network.
- Configure Ethernet switch ports.
- Implement VLANs.
- Use monitoring tools and network management protocols to troubleshoot data networks.
- Configure monitoring tools available for small to medium-sized business networks.
- Configure initial settings on a network device.

In this unit plan, the following 21st Century themes and skills are addressed.

Check all that apply. 21st Century Themes			Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill. 21st Century Skills		
	X	Global Awareness		E, A	Creativity and Innovation

X	Environmental Literacy	E, T, A	Critical Thinking and Problem Solving
	Health Literacy	E, A	Communication
	Civic Literacy	E, T, A	Collaboration
X	Financial, Economic, Business, and Entrepreneurial Literacy		

Student Learning Targets/Objectives

Students will ….

- Configure a router to route between multiple directly connected networks.
- Explain how routers use information in data packets to make forwarding decisions in a small to medium sized business network.
- Explain how a router learns about remote networks when operating in a small to medium-sized business network.
- Explain how static routes are implemented in a small to medium-sized business network.
- Configure static routes to enable connectivity in a small to medium-sized business network.
- Troubleshoot static and default route configurations.
- Explain the function of dynamic routing protocols.
- Implement RIPv2.
- Determine the route source, administrative distance, and metric for a given route.
- Explain how switched networks support small to medium-sized businesses.
- Explain how Layer 2 switches forward data in a small to medium-sized LAN.
- Configure basic switch settings to meet network requirements.
- Implement VLANs to segment a small to medium sized business network.
- Configure routing between VLANs in a small to medium-sized business network.
- Configure standard IPv4 ACLs to filter traffic in a small to medium-sized business network.
- Troubleshoot IPv4 ACL issues.
- Implement DHCPv4 to operate across multiple LANs in a small to medium-sized business network.
- Implement DHCPv6 to operate across multiple LANs in a small to medium-sized business network.
- Configure NAT services on the edge router to provide IPv4 address scalability in a small to medium-sized business network.
- Configure NTP and Syslog in a small to medium-sized business network.

- Maintain router and switch configuration and IOS files.

Assessments

- Pre and Formative: Daily —do now/warm-up responses. Ability to demonstrate proficiency in key unit concepts in class discussions. Student Portfolio of key work products. Shared responses to Essential Questions. Interim quizzes. Written and reading-based homework.
- Summative: End of unit written exam
- Authentic: Hands-on Lab:
    - Optional Lab: Install Windows Vista
    - Lab: Create Accounts and Check For Updates in Windows XP
    - Optional Lab: Create Accounts and Check For Updates in Windows Vista
    - Lab: Managing System Files with Built-in Utilities in Windows XP
    - Optional Lab: Managing System Files with Built-in Utilities in Windows Vista
    - Lab: Run Commands in Windows XP
    - Optional Lab: Run Commands in Windows Vista
    - Lab: Managing Administrative Settings and Snap-ins in Windows XP
    - Optional Lab: Managing Administrative Settings and Snap-ins in Windows
    - Vista
    - Lab: Install Third-Party Software in Windows XP
    - Optional Lab: Install Third-Party Software in Windows Vista
    - Lab: Restore Points in Windows XP
    - Lab: Restore Points in Windows Vista
    - Lab: Registry Backup and Recovery in Windows XP
    - Lab: Managing Device Drivers with Device Manager in Windows XP
    - Optional Lab: Managing Device Drivers with Device Manager in Windows Vista

Teaching and Learning Actions

Instructional Strategies	Academic vocabulary and language; Accountable talk; Adapting to learning styles/multiple intelligences; Analysis of student work; Cues, questions, activating prior knowledge; Current events; Direct instruction; Discovery/Inquiry-based learning; Document-based questions; Effective questioning; Field experience, field trip, or field study; Flexible/strategic grouping; Formative assessment process; Guest speakers; Hands-on learning; Identifying similarities and differences; Integration of content areas; Lecture; Learning centers; Mastery learning; Modeling; Music and songs; Nonlinguistic representations; Note booking/journaling; Peer teaching/collaboration; Project-based learning; Realia; Reinforcing effort and providing recognition; Role play/simulations/drama; Student goal setting; Student self-assessment; Summarizing and note taking; Targeted feedback; Word wall

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Suggested Time Frame:	10 Weeks

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Orange Public School's Cisco I's curriculum guide is aligned to Cisco Networking Academy and Cisco Public. All rights are reserved, and ownership of this content belongs to Cisco. Refer to the attached documents from Cisco that breaks down Cisco I's scope and sequence.