

MANCHESTER REGIONAL HIGH SCHOOL

CISCO NETWORKING ACADEMY 2

REVISED
2015

Manchester Regional High School Board of Education

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COURSE DESCRIPTION:

Cisco Networking Academy Discovery Part I covers semesters 3 and 4 of the CCNA Discovery curricula, including basic routing and switching in an enterprise business (configuring and troubleshooting switches, VLANs, WAN Links, and routing protocols- all utilizing the OSI model of network communications) and designing computer networks (gathering customer requirements, using those requirements to build custom networks catering to specific needs, implementing IP and resource-sharing in said networks, and upgrading Cisco IOS software in Cisco devices).

At the end of the two-year track, students should have necessary skills for acquiring two Cisco industry certifications, CCENT (Cisco Certified Entry Networking Technician) and CCNA (Cisco Certified Network Associate) – professional-level certifications held by workplace networking engineers. These courses create an authentic workplace experience for motivated student technicians.

COURSE DATA:

Length of Course:	Full Year
Credits:	5
Periods Per Week:	5
Classification:	Elective
Prerequisite:	Successful completion of Cisco Networking Academy 1

EVALUATION:

The purposes of evaluation are to provide information about student progress and to determine if students have learned the subject matter, which has been taught. Teachers will evaluate student progress by utilizing standardized tests, teacher-made quizzes and tests, oral questioning, class participation, homework, special projects, special exams, and other school records.

EVALUATION CRITERIA:

Evaluation will be based on the following weighted components:

Formal tests	50%
Participation	20%
Labs	30%

Grading structure: Benchmark for mastery of course content is 65%; content mastery for students with IEPs may be less than the Board of Education approved minimum for regular

education students.

A. COURSE TITLE: Cisco Networking Academy 2

B. COURSE PROFICIENCIES:

After completing a course in Cisco Networking Academy 2, the student should be able to:

1. Understand the OSI Model.
2. Understand LANs.
3. Understand the Basics of TCP/IP Addressing.
4. Understand the Host Layers (the Upper 4 Layers of the OSI Model).
5. Understand Basic Information about Routers and their Use in Networks.
6. Understand WANs.
7. Understand the Basics of Router's Command Line Interface.
8. Demonstrate How to Log into the Router.
9. Demonstrate How to Enter Router Modes.
10. Demonstrate Ability to Discern Different Router Modes and Commands.
11. Understand Router Components.
12. Understand Router Show Commands.
13. Understand Router's Network Neighbors.
14. Understand Basic Network Testing Commands.
15. Demonstrate Competence with the Basic Show Commands.
16. Demonstrate Competence with the CDP-Related Commands.
17. Demonstrate Remote Router Access Using Telnet.
18. Demonstrate Network Connectivity Using Ping.
19. Demonstrate Network Troubleshooting Using Trace IP.
20. Demonstrate Interface Status Using Show Interface.
21. Demonstrate Facility with a Range of Show and Testing Commands.
22. Understand the Router Boot Sequence and Setup Mode.
23. Demonstrate Ability to Configure a Router from Setup Mode.
24. Demonstrate Ability to Configure a Router from Setup Mode- Challenge Lab.
25. Understand Where Router Configuration Files are Located.
26. Understand Router Configuration.
27. Demonstrate Basic Router Configuration Skills.
28. Demonstrate Router Interface Configuration
29. Demonstrate a Network Configuration
30. Understand the Basics of iOS Versions.
31. Demonstrate the Ability to Use and interpret the Show Version Command.
32. Demonstrate the Ability to Load IOS Images.
33. Demonstrate Loading IOS Image from a TFTP Server.
34. Demonstrate Loading a New IOS Image.
35. Demonstrate the Ability to Fully Configure a Router from the CLI, for a Router which Has Had Start-up Config Erased.
36. Understand the Basics of Layer 4.
37. Understand Some Important Layer 3 Concepts.

38. Discuss the TCP/IP Protocol Suite.
39. Demonstrate Ability to Use the Show ARP Command.
40. Demonstrate Ability to Gather and Use ARP Table Information.
41. Demonstrate Ability to Remotely Troubleshoot a Router.
42. Understand IP Addressing and Subnetting.
43. Understand the Role of DNS in Router Configurations.
44. Demonstrate the Ability to Assign New Subnet Numbers to the Semester 2 Topology.
45. Demonstrate the Ability to Assigned Subnet Numbers to a Real Network.
46. Understand the Basics of Routing.
47. Understand Why Routing Protocols are Necessary.
48. Understand the Basics of Distance-Vector Routing.
49. Understand the Basics of Link-State Routing.
50. Understand the Context of Different Routing Protocols.
51. Understand Static Routing and Default Routes.
52. Understand Interior and Exterior Routing Protocols.
53. Understand RIP.
54. Understand IGRP.
55. Demonstrate the Ability to Set Up Static Routes.
56. Demonstrate the Ability to Run RIP on a Network.
57. Demonstrate the Ability to Compare and Contrast Static and Dynamic Routes.
58. Demonstrate the Existence of a Routing Loop.
59. Demonstrate Techniques to Prevent Routing Loops.
60. Demonstrate the Ability to troubleshoot the 5-Router Network.

STUDENT OUTCOMES

The student will be able to:

Unit1: Semester 1 Review-3 Weeks

- 1.1. Understand the OSI Model.
- 1.2. Understand LANs.
- 1.3. Understand the Basics of TCP/IP Addressing.
- 1.4. Understand the Host Layers (the Upper 4 Layers of the OSI Model).

STANDARDS:

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT II: Routers- 3 Weeks

- 2.1. Understand Basic Information about Routers and their Use in Networks.
- 2.2. Understand WANs.

STANDARDS:

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT III: Using the Router-- 3 Weeks

- 3.1. Understand the Basics of Router's Command Line Interface.
- 3.2. Demonstrate How to Log into the Router.
- 3.3. Demonstrate How to Enter Router Modes.
- 3.4. Demonstrate Ability to Discern Different Router Modes and Commands.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT IV: Router Components- 3 Weeks

- 4.1. Understand Router Components.
- 4.2. Understand Router Show Commands.
- 4.3. Understand Router's Network Neighbors.
- 4.4. Understand Basic Network Testing Commands.
- 4.5. Demonstrate Competence with the Basic Show Commands.
- 4.6. Demonstrate Competence with the CDP-Related Commands.
- 4.7. Demonstrate Remote Router Access Using Telnet.
- 4.8. Demonstrate Network Connectivity Using Ping.
- 4.9. Demonstrate Network Troubleshooting Using Trace Route.
- 4.10. Demonstrate Interface Status Using Show Interface.
- 4.11. Demonstrate Facility with a Range of Show and Testing Commands.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT V: Router Startup and Setup- 3 Weeks

- 5.1. Understand the Router Boot Sequence and Setup Mode.
- 5.2. Demonstrate Ability to Configure a Router from Setup Mode.
- 5.3. Demonstrate Ability to Configure a Router from Setup Mode- Challenge Lab.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT VI: Router Configuration- 3 Weeks

- 6.1. Understand Where Router Configuration Files are Located.
- 6.2. Understand Router Configuration.
- 6.3. Demonstrate Basic Router Configuration Skills.
- 6.4. Demonstrate Router Interface Configuration
- 6.5. Demonstrate a Network Configuration

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT VII: iOS- 3 Weeks

- 7.1. Understand the Basics of iOS Versions.
- 7.2. Demonstrate the Ability to Use and interpret the Show Version Command.
- 7.3. Demonstrate the Ability to Load iOS Images.
- 7.4. Demonstrate Loading iOS Image from a TFTP Server.
- 7.5. Demonstrate Loading a New iOS Image.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT VIII: Individual Router Configuration Practice- 3 Weeks

- 8.1. Demonstrate the Ability to Fully Configure a Router from the CLI, for a Router Which Has Had Start-up Config Erased.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT IX: TCP/IP- 3 Weeks

- 9.1. Understand the Basics of Layer 4.
- 9.2. Understand Important Layer 3 Concepts.
- 9.3. Discuss the TCP/IP Protocol Suite.
- 9.4. Demonstrate Ability to Use the Show ARP Command.
- 9.5. Demonstrate Ability to Gather and Use ARP Table Information.
- 9.6. Demonstrate Ability to Remotely Troubleshoot a Router.

STANDARDS:

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT X: IP Addressing- 3 Weeks

101. Understand IP Addressing and Subnetting.
102. Understand the Role of DNS in Router Configurations.
103. Demonstrate the Ability to Assign New Subnet Numbers to the Semester 2 Topology.
104. Demonstrate the Ability to Assigned Subnet Numbers to a Real Network.

STANDARDS:

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT XI: Routing- 3 Weeks

- 11.1. Understand the Basics of Routing.
- 11.2. Understand Why Routing Protocols are Necessary.
- 11.3. Understand the Basics of Distance-Vector Routing.
- 11.4. Understand the Basics of Link-State Routing.
- 11.5. Understand the Context of Different Routing Protocols.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT XII: Routing Protocols- 3 Weeks

- 12.1. Understand Static Routing and Default Routes.
- 12.2. Understand Interior and Exterior Routing Protocols.
- 12.3. Understand RIP.
- 12.4. Understand IGRP.
- 12.5. Demonstrate the Ability to Set Up Static Routes.
- 12.6. Demonstrate the Ability to Run RIP on a Network.
- 12.7. Demonstrate the Ability to Compare and Contrast Static and Dynamic Routes.
- 12.8. Demonstrate the Existence of a Routing Loop.
- 12.9. Demonstrate Techniques to Prevent Routing Loops.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

UNIT XIII: Network Troubleshooting- 4 Weeks

- 13.1. Demonstrate the Ability to troubleshoot the 5-Router Network.

STANDARDS:

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

References for Cisco Networking Academy 2

Cisco Networking academy Website (also student text, workbook, and labs)
<http://Cisco.netacad.net>

Passaic County Manchester Regional High School District

Unit Planner

Course: Cisco Systems Semester 2
Topic: Review

Theme: Semester 1 Review
Title: Review

Quarter: 1 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.2.12.C.1,
 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
<p>1: Review</p> <p>Select Objective</p> <p>1.1. Understand the OSI Model.</p> <p>1.2. Understand LANs.</p> <p>1.3. Understand the Basics of TCP/IP Addressing.</p> <p>1.4. Understand the Host Layers (the Upper 4 Layers of the OSIModel).</p>	<p>Outline of Chapter 1: Review</p> <p>Select Content Page: Understand the OSI Model</p> <p>Provide an overview of encapsulation.</p> <p>Describe three needs that drive enterprise network improvements.</p> <p>Describe several reasons for using a layered network model.</p> <p>Describe the functions of each layer of the OSI model.</p> <p>Describe Peer-to-Peer communication.</p> <p>Describe how encapsulation requires a lower layer</p>	<p>Identify each of the seven layers, in order, of the OSI Network model</p> <p>Describe network structure by other relationship to networks and to how they are internally configured.</p> <p>Describe the proper network layout in general terms as to the location within the network of the equipment.</p> <p>Identify routers, switches and hubs</p> <p>Explain the importance of a router in a network</p>	<p>practice quizzes</p> <p>online exams</p> <p>class participation</p> <p>student journal</p> <p>hands on</p> <p>performance</p>	<p>Demonstration</p> <p>Discussion</p> <p>Q&A</p> <p>Review materials on Cisco Networking Academy On-line</p> <p>Web Search</p> <p>Student Log/Notebook</p>	<p>*computer lab S-3</p> <p>*Cisco curriculum</p> <p>*lecture</p> <p>*individual instruction</p> <p>*cooperative learning</p>

Unit Planner

	<p>to provide a service to the layer immediately above it. Describe the five steps of data encapsulation. Understand LANs Provide an overview of the media layers (the lowest three layers) of the OSI model. Describe LANs and the devices which comprise them. Describe three common LAN technologies. Describe the physical layer of three varieties of Ethernet. Explain that routers have Ethernet interfaces with addresses. Describe how Ethernet devices transmit. Describe how</p>				
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Unit Planner

	<p>Ethernet devices broadcast.</p> <p>Describe how CSMA/CD operates.</p> <p>Describe physical (MAC) and logical (IP) addressing.</p> <p>Describe some details of MAC addressing.</p> <p>Describe how a host can find a MAC address of another host.</p> <p>Understand the Basics of TCP/IP Addressing</p> <p>Describe the basics of TCP/IP addressing.</p> <p>Explain the basics of subnetworks.</p> <p>Explain how a router views subnetworks.</p> <p>Explain an example of Class C subnetting.</p> <p>Perform Class B subnetwork planning.</p> <p>Perform Class C</p>				
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Unit Planner

	<p>subnetwork planning. Understand the Host Layers (the Upper 4 Layers of the OSI Model)</p> <p>Provide an overview of the host layers.</p> <p>Describe in detail the application layer.</p> <p>Describe in detail the presentation layer.</p> <p>Describe in detail the session layer.</p> <p>Provide an overview of the transport layer.</p> <p>Describe the segmentation of upper layer applications.</p> <p>Describe how TCP establishes a connection.</p> <p>Describe how TCP sends data with flow control.</p> <p>Describe how TCP achieves reliability with</p>				
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Unit Planner

	<p>windowing. Describe a TCP acknowledgment technique. Describe how the transport layer relates to the application layer.</p>
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Unit Planner

Course: Cisco Systems Semester 2
Topic: Routers

Theme: Layer 3 Concepts
Title: Using the Router

Quarter: 1
Time: 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
3: Using the Router	Outline of Chapter 3: Using the Router	Identify each of the seven layers, in order, of the OSI Network model	practice quizzes online exams class participation	Demonstration Discussion Q&A	*computer lab S-3 *Cisco curriculum *lecture *individual instruction *cooperative learning
Select Objective	Select Content Page: Understand the Basics of Router's Command Line Interface.	Describe network structure by relationship to other networks and to how they are internally configured.	student journal hands on performance	Review materials on Cisco Networking Academy On-line	
3.1.	Summarize the basic features of a router.				
Understand the Basics of Router's Command Line Interface.	Compare and contrast user and privileged modes. Describe the Cisco IOS command line interface (CLI). Describe the user-mode command list.	Describe the proper network layout in general terms as to the location within the network of the equipment.		Web Search Student Log/Notebook	
3.2.					
Demonstrate How to Log into the Router.					
3.3.					
Demonstrate How to Enter Router Modes.	Describe the privileged-mode command list. Describe the router's help functions.	Identify routers, switches and hubs			
3.4.					
Demonstrate Ability to Discern Different Router Modes and	Describe how to	Explain the importance of a router in a network configuration.			

Unit Planner

Commands.	use the IOS editing commands. Describe how to review the IOS command history. Demonstrate How to Log into the Router Perform the Overview Lab. Demonstrate How to Enter Router Modes Perform the Router User Interface Simulation Perform the Router User Interface lab. Demonstrate Ability to Discern Different Router Modes and Commands Perform the Router User Interface Challenge Simulation. Perform the Router User Interface Challenge Lab.				
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Passaic County Manchester Regional High School District

Unit Planner

Course: Cisco 2
Topic: Router Components

Theme: Layer 3
Title: Router Components

Quarter: 1-2 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
 8.2.12.C.5, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
4: Router Components	Outline of Chapter 4: Router Components	Identify each of the seven layers, in order, of the OSI Network model	*practice quizzes *online exams	Demonstration Discussion	*computer lab S-3 *Cisco curriculum *lecture
Select Objective	Select Content Page: Understand Router Components	Describe network structure by relationship to other	*class participation *student journal	Q&A	*individual instruction *cooperative learning
4.1. Understand role of router and test	Summarize the networks and to how they are commands.	*hands on performance internally configured.	Review materials on Router show Cisco Networking Components. Academy On-line		
4.2. Understand external Router Show Commands.	Describe five router configuration sources. Describe all of a router's internal configuration components.	Describe the proper network layout in general terms as to the location within the network of the equipment.		Web Search Student Log/Notebook	
4.3. Understand Router's Network Neighbors.	Describe six uses of RAM for working storage in the router.	Identify routers, switches and hubs			
4.4. Understand Basic Understand Router Network	Describe six router modes. Show Commands	Explain the importance of a router in a network			

Unit Planner

<p>Testing Commands.</p> <p>4.5. Demonstrate Competence with the Basic Show Commands.</p> <p>4.6. Demonstrate Competence with the CDP-Related Commands.</p> <p>4.7. Demonstrate Remote Router Access Using Telnet.</p> <p>4.8. Demonstrate Network Connectivity</p>	<p>Describe at least seven router status commands. Explain the show running-config and show startup-config commands. Explain the show interfaces serial command. Explain the show version command. Explain the show protocols command. Understand Router's Network Neighbors Cisco Discovery Protocol (CDP). Summarize the information that is exchanged as part of CDP. Explain an example of CDP configuration. Explain the show cdp entry command.</p>				
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Unit Planner

<p>Using Ping.</p> <p>4.9. Demonstrate Network Troubleshooting Using Trace IP.</p> <p>4.10. Demonstrate Interface Status Using Show Interface.</p> <p>4.11. Demonstrate Facility with a Range of Show and Testing Commands.</p>	<p>Explain the showcdp neighbors command.</p> <p>Explain basic telnet operations. Understand Basic Network Testing Commands</p> <p>Describe a basic network testing process which uses the OSI model.</p> <p>Describe network testing at the application layer using telnet.</p> <p>Describe network testing at the network layer using the ping command.</p> <p>Describe network testing at the network layer with the trace command.</p> <p>Describe network testing at the network layer with the show ip route command.</p> <p>Describe tests to</p>				
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Unit Planner

	<p>see if a link is operational. Describe how to interpret the show interfaces serial command. Describe the use of the show interfaces and clear counters commands Describe how to check real-time traffic with debug. Describe four ways to log error messages and debug output. Demonstrate Competence with the Basic Show Commands Perform the Show Commands simulation. Perform the Show Commands lab. Demonstrate Competence with</p>				
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Unit Planner

	<p>the CDP-Related Commands Perform the CDP Neighbors Command simulation. Perform the CDP Neighbors Command lab. Demonstrate Remote Router Access Using Telnet Perform the Remote Access To Other Routers simulation. Perform the Remote Access To Other Routers lab. Demonstrate Network Connectivity Using Ping Perform the ICMP Ping Command simulation. Perform the ICMP Ping Command lab. Demonstrate Network</p>				
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Unit Planner

	<p>Troubleshooting Using Trace IP Perform the Trace IP Command simulation. Perform the Trace IP Command lab. Demonstrate Interface Status Using Show Interface Perform the Show Interface and Clear Counters Command simulation. Perform the Show Interface and Clear Counters Command lab. Demonstrate Facility with a Range of Show and Testing Commands Perform Troubleshooting Tools Challenge Simulation. Perform Troubleshooting</p>				
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Unit Planner

Course: Cisco Systems Semester 2
Topic: Router Setup

Theme: Router Start-up
Title: Router Startup and Setup

Quarter: 2 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
 8.2.12.C.5, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
5: Router Startup and Setup	5: Router Startup and Setup	Identify each of the seven layers, in order, of the OSI Network model	practice quizzes online exams	Demonstration Discussion	*computer lab S-3 *Cisco curriculum *lecture
Select Objective	Select Objective	Describe network structure by relationship to other networks and to how they are internally configured.	class participation student journal	Q&A	*individual instruction *cooperative learning
5.1. Understand the Router Boot Sequence and Setup Mode.	5.1. Understand the Router Boot Sequence and Setup Mode.		hands on performance	Review materials on Cisco Networking Academy On-line Web Search	
5.2. Demonstrate Ability to Configure a Router from Setup Mode.	5.2. Demonstrate Ability to Configure a Router from Setup Mode.	Describe the proper network layout in general terms as to the location within the network of the equipment.		Student Log/Notebook	
5.3. Demonstrate Ability to Configure a Router from Setup Mode - Challenge Lab	5.3. Demonstrate Ability to Configure a Router from Setup Mode - Challenge Lab	Identify routers, switches and hubs Explain the importance of a router in a network configuration			

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Unit Planner

Course: Cisco Systems Semester 2
Topic: Router Configuration

Theme: Layer 3
Title: Router Configuration

Quarter: 2 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3,
 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4,
 8.2.12.C.4, 8.2.12.C.5, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
6: Router Configuration	Outline of Chapter 6: Router Configuration	Identify each of the seven layers, in order, of the OSI Network model	practice quizzes online exams	Demonstration	*computer lab S-3 *Cisco curriculum
Select Objective	Select Content Page: Understand Where Router Configuration	Describe network structure by relationship to networks and to how they are internally configured.	class participation student journal	Discussion	*lecture *individual instruction
6.1. Understand Where Router Configuration Files are Located.	Files are Located Summarize the kinds of information that are dealt with by the router. List five types of information that the router configuration file contains.	Describe the proper network layout in general terms as to the location within the network of the equipment.	hands on perform	Q&A Review materials on Configuration . copy running-	*cooperative learning of the
6.2. Understand Router Configuration.	work with Release 11.x configuration files. Describe how to work with pre-Release 11.0 configuration files.	Identify routers, switches and hubs			
6.3. Demonstrate Basic Router Configuration Skills.		figuration			
6.4. Demonstrate Router Interface	files. Describe the use	Explain the importance of a router in a network			

Cisco Networking
Academy On-line Web Search

Student Log/Notebook

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Unit Planner

	<p>config tftp and copy tftp running-config connnands. Describe using NVRAMwith Release 11.x. Describe using NVRAM with Pre- 11.0 IOS software. Understand Router Configuration List the three major router configuration modes and one specific configuration mode. Describe the role of global configuration modes. Describe how to configure routing protocols. Describe the connon interface configuration connnands. Describe the connnands required to fully configure a specific interface. Make a</p>				
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	<p>flowchart showing Release 11.x configuration methods. Make a flowchart showing Pre-Release 11.0 configuration methods. Describe password configuration methods. Describe router identification configuration. Demonstrate Basic Router Configuration Skills Perform the Router Configuration simulation. Perform the Router Configuration lab. Demonstrate Router Interface Configuration Perform the Router Interface Configuration simulation. Perform the</p>				
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Unit Planner

	Router Interface Configuration lab. Demonstrate a Network Configuration Perform the Router Configuration Challenge Simulation. Perform the Router Configuration Challenge Lab.				
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Unit Planner

Course: Cisco Systems Semester 2
Topic: Cisco iOS

Theme: Layer 3
Title: Cisco IOS

Quarter: 2-3 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
 8.2.12.C.5, 8.2.12.E.4
 9.1.3, LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
7: IOS	Outline of Chapter 7: IOS	Identify each of the seven layers, in order, of the OSI Network model	practice quizzes online exams class participation	Demonstration Discussion Q&A	*computer lab S-3 *Cisco curriculum *lecture *individual instruction *cooperative learning
Select Objective	Select Content Page: Understand the Basics of IOS Versions	Describe network structure by relationship to networks and to how they are internally configured.	student journal hands on performance	Review materials on Cisco Networking Academy On-line Web Search Student Log/Notebook	
7.1. Understand the Basics of IOS Versions.	List three places from which routers boot IOS.				
7.2. Demonstrate the Ability to Use and Interpret the Show Version Command.	Describe the process by which a router locates the Cisco IOS software.	Describe the proper network layout in general terms as to the location within the network of the equipment.			
7.3. Demonstrate the Ability to Load IOS Images.	Explain the role of the configuration register values. Describe the show version command.	Identify routers, switches and hubs			
7.4. Demonstrate Loading IOS Image from a	Describe the three router bootstrap options. Describe what	the importance of a			

TFTP Server.

the router must do to
prepare for using

router in a network



Unit Planner

<p>7.5. Demonstrate Loading a New IOS Image.</p>	<p>a TFTP server. Describe the . show flash command. Describe Cisco's IOS naming conventions. Describe the copy flash tftp command. Describe the copy tftp flash command. Describe how to load a software image backup. Demonstrate the Ability to Use and Interpret the Show Version Command Perform the Show Version, Show Flash Boot System and Copy Commands simulation. Perform the Show Version, Show Flash Boot System and Copy Commands lab. Demonstrate the Ability to Load IOS</p>				
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Unit Planner

	<p>Images Perform the Loading IOS Image into Flash simulation. Perform the Loading IOS Image into Flash lab. Demonstrate Loading IOS Image from a TFTP Server Perform the Challenge Lab. Demonstrate Loading a New IOS Image Perform Loading Cisco IOS Release 11.2 Software lab.</p>				
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Passaic County Manchester Regional High School District

Unit Planner

Course: Cisco Systems Semester 2
Topic: Individual Router Configuration

Theme: Layer 3
Title: Router Configuration Practice

Quarter: 3 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
 8.2.12.C.5, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
<p>8: Individual Router Configuration Practice</p> <p>Select Objective</p> <p>8.1. Demonstrate the Ability to Fully Configure a Router from the CLI, for a Router Which Has Had Start-up Config Erased.</p>	<p>Outline of Chapter 8: Individual Router Configuration Practice</p> <p>Select Content Page:</p> <p>Demonstrate the Ability to Fully Configure a Router from the CLI, for a Router Which Has Had Start-up Config Erased</p> <p>Describe the importance of individual router configuration.</p> <p>Make a flowchart showing the router configuration process.</p> <p>Describe and perform the router password recovery procedure on</p>	<p>Identify each of the seven layers, in order, of the OSI Network model</p> <p>Describe network structure by relationship to networks and to how they are internally configured.</p> <p>Describe the proper network layout in general terms as to the location within the network of the equipment.</p> <p>Identify routers, switches and hubs</p> <p>the</p> <p>Explain importance of a router in a network</p>	<p>practice quizzes</p> <p>online exams</p> <p>class participation</p> <p>student journal</p> <p>hands on</p>	<p>Demonstration</p> <p>Discussion</p> <p>Q&A</p> <p>Review materials on Cisco Networking Academy On-line</p> <p>Web Search</p> <p>Student Log/Notebook</p>	<p>*computer lab S-3</p> <p>*Cisco curriculum</p> <p>*lecture</p> <p>*individual instruction</p> <p>*cooperative learning</p>

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Unit Planner

	routers. Perform Individual Router Configuration lab.
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Unit Planner

Course: Cisco Systems Semester 2
Topic: TCP/IP

Theme: Layer 3
Title: TCP/IP

Quarter: 3
Time: 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
9: TCP/IP	Outline of Chapter 9: TCP/IP	Identify each of the seven layers, in order, of the OSI model	practice quizzes online exams	Demonstration	*computer lab S-3 *Cisco curriculum *lecture
Objective	Understand the	Network model	class participation	Discussion	*individual instruction
9.1. Understand the Basics of Layer 4.	Basics of Layer 4 List three components of the TCP/IP protocol stack.	Describe network structure by relationship to networks and to how they are internally configured.	other student journal hands on	Q&A Review materials on Cisco Networking Academy On-line	*cooperative learning
9.2. Understand Some Important Layer 3 Concepts.	Describe the importance of the TCP/IP stack. Compare and contrast the TCP/IP protocol stack with the OSI model.	Describe the proper network layout in general terms as to the location within the network of the equipment.		Web Search Student Log/Notebook	
9.3. Discuss the TCP/IP Protocol Suite.	List five application layer protocols.				
9.4. Demonstrate Ability to Use the Show ARP Command.	Compare and contrast TCP and UDP. Describe the	Identify routers, switches and hubs			
	fields in a TCP	conf			
9.5.	segment.	Explain the importance of a router in a network			

Demonstrate Ability

Explain the

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Unit Planner

<p>to Gather and Use ARP Table Information.</p> <p>9.6. Demonstrate Ability to Remotely Troubleshoot a Router.</p>	<p>concept of port numbers.</p> <p>For both TCP and UDP, list three important protocols and their associated port numbers.</p> <p>Diagram the TCP three-way handshake/open connection.</p> <p>Describe the TCP simple acknowledgment.</p> <p>Describe the TCP sliding window.</p> <p>Describe TCP sequence and acknowledgment numbers.</p> <p>Describe a UDP segment format.</p> <p>Understand Some Important Layer 3 Concepts</p> <p>Describe four network layer protocols from the TCP/IP stack.</p> <p>Diagram the IP Datagram.</p> <p>Explain the</p>				
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Unit Planner

	<p>protocol field of the IP datagram.</p> <p>List at least three Internet Control Message Protocol (ICMP) messages.</p> <p>Describe briefly how ICMP testing works.</p> <p>Describe briefly how ICMP ping works.</p> <p>Describe briefly how ARP works.</p> <p>Describe briefly how RARP works.</p> <p>Discuss the TCP/IP Protocol Suite</p> <p>Relate the Internet TCPIIP protocols to the OSI model.</p> <p>Describe mapping and addressing protocols.</p> <p>Describe the SNMP protocol.</p> <p>Describe some of the file transfer protocols.</p> <p>Describe some of the troubleshooting</p>				
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Unit Planner

	<p>protocols. Demonstrate Ability to Use the Show ARP Command Perform the Show ARP and Clear ARP simulation. Perform the Show ARP and Clear ARP lab. Demonstrate Ability to Gather and Use ARP Table Information Perform the ARP Commands Challenge Simulation. Perform the ARP Commands Challenge Lab. Demonstrate Ability to Remotely Troubleshoot a Router Perform the Challenge Lab.</p>				
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Unit Planner

Course: Cisco Systems Semester 2
 Topic: IP Addressing

Theme: Layer 3
 Title: IP Addressing

Quarter: 3 Time: 3 Weeks
 Standards: TECH: 8.1.12.A.3,
 8.2.12.C.1, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
<p>10: IP Addressing</p> <p>Objective</p> <p>10.1. Understand IP Addressing and Subnetting.</p> <p>10.2. Understand the Role of DNS in Router Configurations.</p> <p>10.3. Describe the role of broadcast to Assign New Subnet Numbers to the Semester 2 Topology.</p> <p>10.4. Demonstrate the Ability</p>	<p>Outline of Chapter 10: IP Addressing</p> <p>Understand IP Addressing and Subnetting</p> <p>Describe how IP addressing is important in routing.</p> <p>Describe the purpose of IP addresses.</p> <p>Describe the role of host addresses on a routed network.</p> <p>the location within the network of the equipment.</p> <p>addresses on a routed network.</p> <p>Explain the interface and network assignment of router IP addresses.</p> <p>Understand the Role of DNS in Router</p>	<p>Identify each of the seven layers, in order, of the OSI Network model</p> <p>Describe network structure by relationship to other networks and to how they are internally configured.</p> <p>Describe the proper network layout in general terms as to Ability of</p> <p>Identify routers, switches and hubs the</p> <p>Explain importance of a router in a network</p>	<p>practice quizzes</p> <p>online exams</p> <p>class participation</p> <p>Inanason</p>	<p>Demonstration</p> <p>Discussion</p> <p>Q&A</p> <p>Review materials on Cisco Networking Academy On-line</p> <p>Web Search</p> <p>Student Log/Notebook</p>	<p>*computer lab S-3</p> <p>*Cisco curriculum</p> <p>*lecture</p> <p>*individual instruction</p> <p>*cooperative learning</p>

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<p>to Assign Subnet Numbers to a Real Network.</p>	<p>Configurations</p> <p>Describe ip address command.</p> <p>Describe the ip host command.</p> <p>Describe the ip name-server command.</p> <p>Describe how to enable and disable DNS on a router.</p> <p>Explain the results of the show hosts command.</p> <p>List three commands that can be used to verify address configuration.</p> <p>Explain the simple ping command.</p> <p>Explain how to access the extended ping command.</p> <p>Explain the trace command.</p> <p>Demonstrate the Ability to Assign New Subnet Numbers to the</p> <p>Semester 2 Topology</p> <p>Perform the</p>				
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Unit Planner

	<p>Semester 2 Topology Challenge Lab. Demonstrate the Ability to Assign Subnet Numbers to a Real Network Perform the IP Addressing and Subnetworks Challenge Lab.</p>
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Unit Planner

Course: Cisco Systems Semester 2
 Topic: Routing

Theme: Layer 3
 Title: Routing

Quarter: 4 Time: 3 Weeks
 Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
 8.2.12.C.5, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
11: Routing	Outline of Chapter 11: Routing	Identify each of the seven layers, in order, of the OSI Network model	practice quizzes online exams class participation	Demonstration Discussion	*computer lab S-3 *Cisco curriculum *lecture *individual instruction
Objective	Understand the				
11.1. Understand the Basics of Routing.	Basics of Routing Summarize the purposes and attributes of routing protocols.	Describe network structure by other relationship to networks and to how they are internally configured.	stud student journal hands on performan	Q&A Review materials on Cisco Networking Academy On-line	*cooperative learning
11.2. Understand Why Routing Protocols are Necessary.	Explain how path determination is a function of the network layer. Explain how	Describe the proper network layout in		Web Search	
11.3. Understand the Basics of Distance-Vector Routing.	routers route packets from source to destination. Explain that both networks and	general terms as to the location within the network of the equipment.		Student Log/Notebook	
11.4. Understand the Basics of Link-State	individual hosts on a network must have addresses. Explain best path selection and	Identify routers, switches and hubs the Explain importance of a			

Routing. packet switching as the router in a network



Unit Planner

<p>11.5. Understand the Context of Different Routing Protocols.</p>	<p>two basic processes of a router. Compare and contrast routed versus routing protocol. Explain how a packet undergoes multiple encapsulations and de- encapsulations, up to the network layer, as it traverses a network of routers. Explain multiprotocol routing. Understand Why Routing Protocols are Necessary Compare and contrast static versus dynamic routes. Explain one example why a static route would be used. Explain one example of how a default route is used. Explain why dynamic routing is necessary.</p>				
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Unit Planner

	<p>Explain what information is important in dynamic routing.</p> <p>Explain how distances on network paths are determined by various metrics.</p> <p>Describe three classes of routing protocols.</p> <p>Explain the concept of time to convergence.</p> <p>Understand the Basics of Distance-Vector Routing</p> <p>Explain the concept of distance-vector routing.</p> <p>Explain how distance-vector protocols exchange routing tables.</p> <p>Explain how topology changes propagate through the network of routers.</p> <p>Explain the problem of routing loops.</p>				
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loops.

Unit Planner

	<p>Explain the problem of counting to infinity.</p> <p>Explain the solution of defining a maximum.</p> <p>Explain the solution of split horizon.</p> <p>Explain the solution of hold-down timers.</p> <p>Understand the Basics of Link-State Routing</p> <p>Explain the concept of link-state routing.</p> <p>Explain how link-state protocols exchange routing tables.</p> <p>Explain how topology changes propagate through the network of routers.</p> <p>Describe two link-state concerns.</p> <p>Explain a situation where link-state advertisements (LSAs) are</p>				
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	<p>unsynchronized leading to inconsistent path decisions amongst routers. Understand the Context of Different Routing Protocols Compare and contrast distance-vector and link-state routing protocols. Describe hybrid routing protocols. Describe LAN-to-LAN routing. Describe LAN-to-WAN routing. Describe routers as intelligent layer 3 networking devices which perform best path selection and switching of multiple protocols and media.</p>				
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Passaic County Manchester Regional High School District

Unit Planner

Course: Cisco Systems Semester 2

Topic: Routing Protocols

Theme: Layer 3

Title: Routing Protocols

Quarter: 4

Time: 3 Weeks

Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
8.2.12.C.5, 8.2.12.E.4
LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
<p>12: Routing Protocols</p> <p>Objective</p> <p>12.1. Understand Static Routing and Default Routes.</p> <p>12.2. Understand Interior dialog.</p> <p>Exterior Routing Protocols.</p> <p>12.3. Understand RIP.</p> <p>12.4. Understand IGRP.</p> <p>12.5. Demonstrate the Ability to Set Up Static</p>	<p>Outline of Chapter 12: Routing Protocols</p> <p>Understand Static Routing and Default Routes</p> <p>NametwoIP routing protocols.</p> <p>Describe initial router configuration using the system configuration and</p> <p>Describe the initial IP routing table.</p> <p>Describe three ways a router learns about destinations.</p> <p>Describe the ip route command.</p> <p>Describe an example of using the ip route command.</p> <p>Describe the ip default-network</p>	<p>Identify each of the seven layers, in order, of the OSI Network model</p> <p>Describe network structure by relationship to networks and to how they are internally configured.</p> <p>Describe the proper network layout in general terms as to the location within the network of the equipment.</p> <p>Identify routers, switches and hubs</p> <p>Explain the importance of a router in a network</p> <p><u>figuration</u></p>	<p>practice quizzes</p> <p>online exams</p> <p>class participation</p> <p>student journal</p> <p>lu<ttlu on</p>	<p>Demonstration</p> <p>Discussion</p> <p>Q&A</p> <p>Review materials on Cisco Networking Academy On-line</p> <p>Web Search</p> <p>Student Log/Notebook</p>	<p>*computer lab S-3</p> <p>*Cisco curriculum</p> <p>*lecture</p> <p>*individual instruction</p> <p>*cooperative learning</p>



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<p>Routes.</p> <p>12.6. Demonstrate the Ability to Run RIP on a Network.</p> <p>12.7. Demonstrate the Ability to Compare and Contrast Static and Dynamic Routes.</p> <p>12.8. Demonstrate the Existence of a Routing Loop.</p> <p>12.9. Demonstrate Techniques to Prevent Routing Loops.</p>	<p>command.</p> <p>Describe an example of using the ip default-network command.</p> <p>Understand Interior and Exterior Routing Protocols</p> <p>Define autonomous system.</p> <p>Compare and contrast interior and exterior routing protocols.</p> <p>List four interior IP routing protocols.</p> <p>Describe IP routing configuration tasks.</p> <p>Describe dynamic routing configuration using the router and network commands.</p> <p>Understand RIP</p> <p>Describe four key elements ofRIP.</p> <p>Describe the use of router rip and network commands to enable rip.</p>				
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Unit Planner

	<p>Describe an example of enabling RIP on an IP-addressed network.</p> <p>Describe the monitoring of IP packet flow using the show ip protocol command.</p> <p>Describe the show ip route command.</p> <p>Understand IGRP</p> <p>List four key characteristics of IGRP.</p> <p>Describe the use of router igrp and network commands to enable IGRP.</p> <p>Describe an example of enabling IGRP on an IP-addressed network.</p> <p>Describe the monitoring of IP packet flow using the show ip protocol command.</p> <p>Describe the</p>				
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	<p>show ip interfaces command.</p> <p>Describe the show ip route command.</p> <p>Describe the debug ip rip command.</p> <p>Demonstrate the Ability to Set Up Static Routes</p> <p>Perform the Static Routes simulation.</p> <p>Perform the Static Routes lab.</p> <p>Demonstrate the Ability to Run RIP on a Network</p> <p>Perform the RIP Routing Protocol simulation.</p> <p>Perform the RIP Routing Protocol lab.</p> <p>Demonstrate the Ability to Compare and Contrast Static and Dynamic Routes</p> <p>Perform the Convergence with RIP and Static Routes Challenge</p>				
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	<p>Simulation. Perform the Convergence with RIP and Static Routes Challenge Lab. Demonstrate the Existence of a Routing Loop Perform the Routing Loops Challenge Simulation. Perform the Routing Loops Challenge Lab. Demonstrate Techniques to Prevent Routing Loops Perform Preventing Routing Loops Challenge Simulation. Perform Preventing Routing Loops Challenge Lab.</p>				
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Unit Planner

Course: Cisco Systems Semester 2
Topic: Network Troubleshooting

Theme: Network Troubleshooting
Title: Network Troubleshooting

Quarter: 4 **Time:** 3 Weeks
Standards: TECH: 8.1.12.A.3, 8.1.12.F.1,
 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4,
 8.2.12.C.5, 8.2.12.E.4
 LIT: RST.9-10.7, RST.11-12.2

QUESTIONS	CONTENT	SKILLS & HABITS	ASSESSMENTS	ACTIVITIES	RESOURCES
<p>13: Network Troubleshooting</p> <p>Objective</p> <p>13.1. Demonstrate the Ability to Troubleshoot the 5-Router Network.</p>	<p>Outline of Chapter 113: Network Troubleshooting</p> <p>Demonstrate the Ability to Troubleshoot the 5-Router Network</p> <p>Explain the standard configuration.</p> <p>Describe typical layer 1 errors.</p> <p>Describe typical layer 2 errors.</p> <p>Describe typical layer 3 errors.</p> <p>Describe network troubleshooting strategies.</p> <p>Perform the Troubleshooting lab a 5-router network.</p>	<p>Identify each of the seven layers, in order, of the OSI Network model</p> <p>Demonstrate an understanding of the concept of data transmission between networked devices.</p> <p>Explain the function of hosts and clients</p> <p>Describe network structure by relationship to other networks and to how they are internally configured.</p> <p>Describe the proper network layout in on general terms as to position and connections and within the</p>	<p>*practice quizzes</p> <p>*online exams</p> <p>*class participation</p> <p>*student journal</p> <p>*hands on performance</p>	<p>Demonstration</p> <p>Discussion</p> <p>Q&A</p> <p>Review materials on Cisco Networking Academy On-line</p> <p>Web Search</p> <p>Student Log/Notebook</p>	<p>*computer lab S-3</p> <p>*Cisco curriculum</p> <p>*lecture</p> <p>*individual instruction</p> <p>*cooperative learning</p>

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		<p>network of the equipment.</p> <p>Identify routers, switches and hubs</p> <p>Compare and contrast routers, switches and hubs.</p> <p>Explain the importance of a router in a network configuration.</p>			
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