

Saving Peter's Packets

Networking & Positive Uses of Computers

Lessons for Middle School Students

Lesson 2: The Great Router Design Race

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Teacher Summary

In Lesson 2, students review what they learned in Lesson 1 (servers, packets, student needs in Haiti, India, and Zimbabwe) and go on to learn about why routers are important to the Internet. They'll tackle problems encountered when routers are not working as they should, when there's congestion on the Internet, and when Internet paths are not functioning as they should. Working together they'll complete a design that shows how a router works. At the conclusion of the lesson, your students will decide which of your class teams is the winner of the Great Router Design Race.

You should be able to complete this lesson in two 50-minute periods. If you decide to do some of the extras or to look into the resource links, you'll need to schedule additional time to cover the material.

Objectives

- To increase understanding of how the Internet can be used to help people around the world.
- To help students gain knowledge of what routers do and why they are important to Internet traffic.
- To help students understand that problems online may be caused by too much traffic along certain paths on the Internet, routers that are not functioning correctly, and complications resulting from broken lines, server malfunctions, and other related difficulties. To encourage students to think creatively as they work together to solve a problem.
- To make learning about how technologies work easy to understand and fun.

ISTE NETS: Standards for Students*

Standard 1: Basic operations and concepts:

- Students demonstrate a sound understanding of the nature and operation of technology systems.

Standard 2: Social, ethical and human issues:

- Students understand the ethical, cultural, and societal issues related to technology.

Standard 3: Technology productivity tools:

- Students use technology tools to enhance learning, increase productivity, and promote creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

Standard 5: Technology research tools

- Students use technology to locate, evaluate, and collect information from a variety of sources.
- Students use technology tools to access data and report results.

*International Society for Technology in Education National Education Technology Standards for Students

Preparations for the lesson

As in Lesson 1, parts of the lesson can be completed without high speed Internet access, but to play the Peter Packet game online, students will need to use computers that have high-speed connections. If you do not want students to go online, the game can be downloaded to individual computers. (To download the game, go to the [Peter Packet site http://www.cisco.com/warp/public/779/edu/peterpacket2/deliverables/funland_play.htm](http://www.cisco.com/warp/public/779/edu/peterpacket2/deliverables/funland_play.htm) and select "Download Game." Once the game is on your computer, click "index.html" to play.)

Because you will be dividing your class into student teams, you'll need one computer for each team.

If you haven't tried the router portion of the game, do this before the lesson so that you will be familiar with the content covered. You might also want to review the background information we've provided.

Lesson Directions:

1. Review with your students where they are in the game, and discuss the next step on their journey to help students in Haiti, India, and Zimbabwe.
2. Divide the class into teams of approximately 3-5 students, instructing each group to work together on the new assignment. Students who worked individually on the Mission Haiti Server Assignment should be assigned to teams taking on The Great Router Race: Haiti; students who worked individually on the Mission India Server Assignment should be on teams taking on The Great Router Race: India; and students who worked individually on the Server Assignment Mission Zimbabwe should be on teams taking on The Great Router Race: Zimbabwe.
3. Send each team to their [Mission Assignments](#) <Instructors>Lessons>Router Lesson>Router Missions> and give them time to complete the missions. Remind students to keep their Mission Journal up to date.
4. When the missions are complete bring the class together for The Great Router Design Race. Let each team explain how its router works and why it should win the race. Have members of the class vote on which router design they think would not only be fast but includes a design that easily explains how routers work.
5. With great fanfare award winning team members [The Peter Packet Prize for Rambunctious Routing](#) <Instructors>Lessons>Packet Unit>Router Lesson>routingaward.pdf>. (Certificate is available for downloading.)

Additional Activities

In each of our other Peter Packet Lessons, we offer a number of supplemental activities to enhance learning for your students. If you are interested in learning about additional activities, check the other lessons in the Peter Packet Package.

The Board Game

Have students design a board game based upon the idea of how servers and routers work.

Who Are They?

Ask your students to tell you what kind of personality or characteristics they think a person who would design computer hardware would have?" See if they envision themselves doing some of these things? See if they envision girls being important in this field? Discuss the opportunities for those who take up careers like these.

The Day Routers Went on Strike

Have your students write a science fiction essay titled, "The Day Routers Went on Strike." Encourage them to think their own day through in order to consider problems that would be faced if no routers in the world were functioning. They can make it a serious or humorous essay. If you have students who like to draw cartoons, have them draw their way through the day.

Router Graphics

The digital cartoon drawing of the router in the game is included in the Peter Packet Graphics Package. Design a poster featuring a slogan for this character along with the graphic of the character.

Additional Resources

Some sites you or your students may want to visit:

How Routers Work

<<http://computer.howstuffworks.com/router.htm>>

An introduction to routers.

Internet Traffic Report

<<http://www.internettrafficreport.com/main.htm>>

<<http://www.internettrafficreport.com/faq.htm>>

Information about traffic on the Internet.

Jelly Beans and the Internet

<http://www.tinhat.com/internet_basics/how_the_internet_works.html>

Unusual guide to how the Internet works.

Mapping the Internet

<<http://computer.howstuffworks.com/internet-infrastructure.htm>>

An excellent diagram featuring routers and servers.

What About the New Cisco Router?

<<http://hs.houstonisd.org/DavisHS/webpages/Clubs/Cisco/router.htm>>

Students install routers in their school.