Lesson 5: Wired and Wireless Transmission Media

In this lesson, students will learn about wired and wireless transmission media in computer networks. They will understand the differences between wired and wireless networks, and explore the attributes of fiber optic and copper cables used in wired networks. The lesson will also cover Bluetooth as a mode of wireless connection and discuss the advantages and disadvantages of wireless networks compared to wired networks. Students will engage in various activities, including a bell-ringer activity, guided practice, independent practice using Packet Tracer software, and an exit ticket to assess their understanding. The lesson aligns with Common Core Standards and aims to develop students' technical vocabulary, critical thinking skills, and networking knowledge.

## **Objectives:**

By the end of this lesson, students will be able to:

1. Define a wired and a wireless network.

2. Define transmission media.

3. Describe the attributes of fiber optic and copper cables used in wired networks.

4. Describe Bluetooth as a mode of connection.

5. Discuss the advantages and disadvantages of wireless networks compared to wired networks.

## **Materials:**

- Whiteboard or blackboard

- Markers or chalk

- Handouts with advantages and disadvantages of wired and wireless networks

- Computers with internet access for each student (optional)

- Packet Tracer software (optional)

## **Bell-Ringer Activity (5 minutes):**

1. Display the following question on the board: "What is the difference between a wired and a wireless network?"

2. Give students 2 minutes to write down their answers individually.

3. After 2 minutes, ask a few students to share their answers with the class.

## **Introduction (10 minutes):**

1. Begin by explaining the concept of transmission media.

2. Define transmission media as the physical means through which data is transmitted from one device to another in a network.

3. Explain that there are two main types of transmission media: wired and wireless.

4. Briefly discuss the differences between wired and wireless networks, emphasizing the use of physical cables in wired networks and the absence of cables in wireless networks.

5. Mention that in this lesson, we will explore the attributes of different types of transmission media and discuss the advantages and disadvantages of wired and wireless networks.

## **Direct Instruction (20 minutes):**

1. Start by discussing wired networks:

- Explain that in wired networks, data is transmitted through physical cables.

- Discuss the attributes of fiber optic cables, such as high bandwidth, immunity to electromagnetic interference, and long-distance transmission capabilities.

- Discuss the attributes of copper cables, such as lower cost, flexibility, and compatibility with existing infrastructure.

2. Move on to wireless networks:

- Explain that in wireless networks, data is transmitted through electromagnetic waves without the need for physical cables.

- Discuss Bluetooth as a mode of wireless connection, highlighting its short-range capabilities and common use in connecting devices like smartphones, headphones, and speakers.

- Discuss the advantages of wireless networks, such as mobility, flexibility, and easy installation.

- Discuss the disadvantages of wireless networks, such as limited range, susceptibility to interference, and potential security risks.

## **Guided Practice (25 minutes):**

1. Distribute handouts with advantages and disadvantages of wired and wireless networks.

2. Divide the class into pairs or small groups.

3. Instruct students to read the advantages and disadvantages listed on the handout.

4. Provide six scenarios where students need to select the most appropriate transmission media (wired or wireless) based on the given advantages and disadvantages.

5. Allow students to discuss and make their selections within their groups.

6. After 10 minutes, ask each group to share their selections and reasoning with the class.

7. Facilitate a class discussion to compare and evaluate the different choices made by the groups.

## **Independent Practice (25 minutes):**

1. Introduce students to Packet Tracer, a network training tool used in industry and universities.

2. Explain that Packet Tracer allows users to simulate and build networks.

3. If computers with internet access and Packet Tracer software are available, instruct students to open the software and explore the pre-built networks.

4. If computers are not available, provide a demonstration of Packet Tracer on a projector or whiteboard.

5. Assign a task for students to add devices and connections to a pre-built network in Packet Tracer.

6. Encourage students to experiment and develop essential networking skills while completing the task.

7. Circulate the classroom to provide assistance and guidance as needed.

## **Exit Ticket (5 minutes):**

1. Distribute exit tickets to each student.

2. Ask students to write down one advantage and one disadvantage of wired networks compared to wireless networks.

3. Collect the exit tickets before the end of the class.

## **Closure (5 minutes):**

1. Review the main points discussed in the lesson: wired and wireless networks, transmission media, attributes of fiber optic and copper cables, Bluetooth as a mode of connection, and advantages and disadvantages of wireless networks compared to wired networks.

2. Emphasize the importance of understanding different types of transmission media in the context of networking.

3. Encourage students to continue exploring and developing their networking skills using tools like Packet Tracer.

4. Thank the students for their participation and dismiss the class.

**Common Core Standards:**

- CCSS.ELA-LITERACY.RST.9-10.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.

- CCSS.ELA-LITERACY.RST.9-10.7 - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.