# Program Information

## Lesson:

### *Fiber Optics Jargon*

## Training:

## Fiber Optics

## Time frame:

### 45-60 minutes

# Instruction Section

## Learning Objectives:

# Correctly utilize specialized fiber optic terms (jargon) as they apply in the field.

# Recognize and apply systems of measurement and their conversions used in fiber optics.

## Assessment Tools/Methods:

# Participants should be assessed based on participation in group discussions and activities.

## Learner Prior Knowledge:

## Prior to class, participants will need to read:

## Reference Guide: Basic Overview (<https://www.thefoa.org/tech/ref/basic/basics.html>)

## Reference Guide: Fiber Optic Standards (<https://www.thefoa.org/tech/ref/basic/standards.html>)

## Reference Guide: Fiber Optic Safety (<https://www.thefoa.org/tech/ref/safety/safe.html>)

## Prior to class, the participants will need to watch:

## [FOA Lecture 1: Fiber Optics & Communications](http://www.youtube.com/watch?v=pIlBlNW7sOo&list=PLC7CC6B17EF009849&index=28&feature=plpp_video)

## [FOA Lecture 2: Safety When Working With Fiber Optics](http://www.youtube.com/watch?v=qhqclWudh7s&list=PLC7CC6B17EF009849&index=27&feature=plpp_video)

## Instructional Activities:

# Discuss the importance of understanding technical language in any field and how it enhances communication and problem-solving skills.

# Activity 1: Jargon Exploration:

# Invite participants to share any fiber optics terms or concepts they are familiar with.

# Encourage discussion on how jargon impacts their work or interests related to fiber optics.

# Facilitate a discussion to review specific terms or concepts that participants found particularly interesting or confusing during their self-guided reading.

# Ask participants to share out jargon terms and their meanings to give an overview of basic fiber optics jargon, such as analog vs. digital signals, core, cladding, etc.

# Keep a running list of the terms they share on a whiteboard or display for use in the next activity.

# Encourage participants to ask questions and seek clarification on any jargon-related topics they wish to explore further.

# Activity 2: Applying Jargon in Scenarios:

# Divide participants into small groups and assign each group a scenario related to fiber optics from the Jargon Scenario Handout.

# Instruct each group to identify and discuss relevant jargon from their self-guided learning that apply to their scenario.

# *Optional* (based on participant background knowledge) Encourage groups to brainstorm basic solutions or recommendations based on their understanding of fiber optics jargon.

# Allow time for groups to share their findings with each other.

# Activity 3: Fiber Optic Measurement Conversion Jargon:

# Explain to participants the importance of understanding how to convert measurements using the metric system and its jargon.

# Provide participants with the Metric Conversion Math Problems handout.

# Have participants work independently or in small groups to complete the problems.

# After participants have concluded their work on the problems, review the answers with the whole group.

# Have participants reflect on what was most challenging and most helpful as they solved the problems.

# Open the floor for participants to ask any remaining questions or seek clarification on specific topics related to fiber optics jargon.

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# Encourage participants to discuss how they plan to apply their understanding of jargon in their work or further learning endeavors.

## Resources:

# Whiteboard, markers or display to record discussion points

# Jargon Scenario Handout

# Metric Conversion Math Problems Handout

# Metric Conversion Math Problems Handout Answer Key for Instructors

# Reflection Section

Ask participants to reflect on the role that jargon plays in the fiber optics field. Why is it crucial to have an understanding of jargon prior to starting in a job?

*This lesson is supplemental to the Fiber Optics lesson within FOA's Fiber U curriculum and not part of the FOA required curriculum to obtain the Certified Premises Cabling Technician certification. If interested in becoming an approved school and/or obtaining a certification, please contact FOA at* [*thefoa.org/contact-foa.html*](https://www.thefoa.org/contact-foa.html)*.*

*Note: AI, specifically ChatGPT 3.5, was used to generate scenarios for this contextualized lesson plan.*

# Jargon Scenario Handout

**Scenario 1: Setting Up a Fiber Optic Network for a Company**

Provide Group A with the scenario: "Your company is upgrading its communication infrastructure and plans to install a fiber optic network to enhance data transmission speed and reliability."

Ask Group A to identify and discuss relevant jargon from their self-guided learning that applies to setting up a fiber optic network, such as:

Optical Fiber Types (e.g., single-mode, multimode)

Cable Construction (e.g., loose-tube, ribbon cable)

Optical Loss and Attenuation

Splicing and Termination (e.g., fusion splice, connector types)

Encourage Group A to brainstorm solutions or recommendations based on their understanding of fiber optics jargon, considering factors like bandwidth requirements, distance, and environmental conditions.

**Scenario 2: Troubleshooting a Fiber Connection Issue**

Provide Group B with the scenario: "A section of your company's fiber optic network is experiencing intermittent connectivity issues, leading to data transmission delays."

Ask Group B to identify and discuss relevant jargon from their self-guided learning that applies to troubleshooting fiber connection issues, such as:

Optical Loss and Attenuation

Signal Speed and Latency

Optical Power Measurement (e.g., optical power meter)

Fiber Splicing and Connectors (e.g., fusion splice, mechanical splice)

Encourage Group B to brainstorm troubleshooting strategies, considering techniques like OTDR testing, inspection of connectors, and assessing signal quality.

**Scenario 3: Upgrading Fiber Optic Equipment for High-Speed Data Transmission**

Provide Group C with the scenario: "Your organization plans to upgrade its fiber optic equipment to support high-speed data transmission for multimedia streaming and real-time communication."

Ask Group C to identify and discuss relevant jargon from their self-guided learning that applies to upgrading fiber optic equipment for high-speed data transmission, such as:

Wavelength Division Multiplexing (WDM)

Bandwidth and Data Rates

Optical Time Domain Reflectometer (OTDR)

Optical Power Budgeting

Encourage Group C to brainstorm recommendations for equipment upgrades and configurations, considering factors like wavelength compatibility, fiber types, and capacity planning.

**Scenario 4: Designing Fiber Optic Infrastructure for a Smart City Project**

Provide Group D with the scenario: "Your city is implementing a smart city project that requires a robust fiber optic infrastructure to support IoT devices, surveillance systems, and real-time data analytics."

Ask Group D to identify and discuss relevant jargon from their self-guided learning that applies to designing fiber optic infrastructure for smart city projects, such as:

Fiber Optic Cable Types (e.g., outdoor cables)

Fiber Plant Installations (e.g., underground, aerial)

Bend Insensitive Fibers

Network Capacity Planning and Scalability

Encourage Group D to brainstorm infrastructure design considerations, considering factors like fiber deployment methods, network resilience, and future expansion needs.

**Scenario 5: Implementing Fiber to the Home (FTTH) for Residential Areas**

Provide Group E with the scenario: "Your telecommunications company is deploying Fiber to the Home (FTTH) services in residential areas to provide high-speed internet, voice, and video services."

Ask Group E to identify and discuss relevant jargon from their self-guided learning that applies to implementing FTTH services, such as:

Single-Mode Fiber vs. Multimode Fiber

Fiber Optic Cable Types for Premises (e.g., distribution cable, breakout cable)

Optical Network Terminal (ONT) and Customer Premises Equipment (CPE)

Installation Techniques (e.g., blowing micro cables into ducts)

Encourage Group E to brainstorm deployment strategies, considering factors like fiber termination options, network architecture, and customer connectivity requirements.

# Metric Conversion Math Problems Handout

Use the conversions below to help you solve the following problems:

Meter: 3.28 feet, 39.37 inches. Fiber optic cable lengths are generally expressed in meters or kilometers.

Millimeter: 1/1000 meter

Kilometer: 1000 meters / 3,281 feet / 0.62 miles

Micron: 1/1,000,000 of a meter

1. A fiber optic cable is laid underground for a distance of 2.5 kilometers. How many meters is this cable in length?
2. A fiber optic cable has a diameter of 125 microns. What is the diameter of the cable in millimeters?
3. A technician needs to connect two buildings using fiber optic cables. If the distance between the buildings is 5,000 meters, how many kilometers of fiber optic cable will be required?
4. A company is installing fiber optic cables in a city. They need to cover a total distance of 15 kilometers. If each cable segment is 500 meters long, how many segments will they need?
5. A fiber optic cable is 2.8 millimeters in diameter. Convert this diameter to microns.
6. A data center requires fiber optic cables with a length of 15,000 meters. How many kilometers of fiber optic cable will they need?
7. A telecommunications company installs a fiber optic cable with a length of 7.5 kilometers. Convert this length to meters.
8. A factory needs to connect two sections using fiber optic cables. The distance between the sections is 3.5 kilometers. How many millimeters is this distance?

# Metric Conversion Math Problems Handout Answer Key for Instructors

1. Answer: 2.5 kilometers = 2.5 \* 1000 meters = 2500 meters
2. Answer: 125 microns = 125/1000 millimeters = 0.125 millimeters
3. Answer: 5,000 meters = 5000/1000 kilometers = 5 kilometers
4. Answer: 15 kilometers = 15 \* 1000 meters = 15000 meters

Number of segments = Total distance / Length of each segment = 15000 meters / 500 meters = 30 segments

1. Answer: 2.8 millimeters = 2.8 \* 1000 microns = 2800 microns
2. Answer: 15,000 meters = 15,000/1000 kilometers = 15 kilometers
3. Answer: 7.5 kilometers = 7.5 \* 1000 meters = 7500 meters
4. Answer: 3.5 kilometers = 3.5 \* 1000 meters = 3500 meters

3500 meters = 3500 \* 1000 millimeters = 3,500,000 millimeters