Fiber Optic Splicing Worksheet

Name:_____

Duplicate this worksheet for each termination type.

The Loss Budget (What loss value should you expect?)

What Students Learn:
What is a Loss Budget and a Power Budget
How to set the reference for loss testing
Differences in measurements by direction and modal distribution

With a given network, it is designed to work on a cable plant with a loss less than the transmitter and receiver can tolerate. This loss is generally calculated at the design phase and is used as a pass/fail criteria after installation when testing.

The loss you measure should be close to what you predict when you do a power budget. The loss is the sum of the loss in the fibers over the length installed, plus the loss of all connectors and splices in the installed cable plant. Below are some tables to help calculate the loss budget.

Cable Plant Passive Component Loss Budget

Step 1. Fiber loss at the operating wavelength

Cable Length (km)				
Fiber Type	Multimode		Singlemode	
Wavelength (nm)	850	1300	1300	1550
Fiber Atten. (dB/km)	3	1	0.5	0.4
Total Fiber Loss				

Step 2. Connector Loss

Typical Connector Loss	0.3 or 0.5 dB
Total # of Connectors	
Total Connector Loss	

Step 3. Splice Loss

	Mech.	Fusion
Typical Splice Loss	0.5 dB	0.05 dB

Total # splices		
Total Splice Loss		

Step 4. Total Cable Plant Attenuation

Total Fiber Loss (dB)	
Total Connector Loss (dB)	
Total Splice Loss (dB)	
Other (dB)	
Total Link Loss (dB)	

Using these guidelines and the worksheets at the end of this section, calculate the loss budget for the following two cable plants:

1) Multimode campus LAN backbone, 1.7 km long, four connector pairs (plus the end connectors) and no splices. Calculate loss at both 850 and 1300 nm.

2) Singlemode network, 17 km long, 6 fusion splices. Calculate loss at both 1300 and 1550nm.

(Hint: don't forget the connectors on each end!)

Power Budget

Fiber Optic networks are designed to operate within certain power levels. If the loss is too high the signal power at the receiver will be too low for proper operation. If the signal power is too strong at the receiver the receiver will saturate**.** This is why you test with a power meter, to ensure the received power is in the correct range.

With the following parameters, how much loss can the network tolerate?

Transmitter Power: -10 dBm
Receiver Power (minimum): - 22 dBm
Power Budget: _____ dB

Would such a network work on either of the cable plants in the exercise?