

How to Get Started

We often get asked this same question: **How do we start?**

Since this Lab has designed to be used by beginners (as well as more advanced users), we have created this document to provide a quick jump-start guide.

If you are brand new to the Cisco world, then the best way to start would be with file: **CH1 Router Configuration Basics.PPT**
(e-Lectures\Cisco CCNA Lectures\Module 0 - Router Configuration**CH1 Router Configuration Basics.PPT**)

In this document you'll find answers to very basic questions such as: **What are the main Router components?** Or the explanation of the output of very basic commands such as: **SH VERSION:**

```
RouterB#show version
Cisco Internetwork Operating System Software
IOS (tm) 1600 Software (C1600-NSY-L), Version 11.1(7)AA, EARLY DEPLOYMENT
RELEASE
E SOFTWARE (fc2)
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Thu 24-Oct-96 05:24 by kuong
Image text-base: 0x080202B8, data-base: 0x02005000
ROM: System Bootstrap, Version 11.1(10)AA, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc
1)
ROM: 1600 Software (C1600-BOOT-R), Version 11.1(10)AA, EARLY DEPLOYMENT
RELEASE
SOFTWARE (fc1)
RouterB uptime is 9 minutes

System restarted by power-on
System image file is "flash:c1600-nsy-l.111-7.AA", booted via flash
cisco 1600 (68360) processor (revision C) with 3584K/512K bytes of memory.
Processor board ID 06042129
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
1 Ethernet/IEEE 802.3 interface.
1 Serial network interface.
1 Serial(sync/async) network interface.
On-board Switched 56K Line Interface.
System/IO memory with parity disabled
8K bytes of non-volatile configuration memory.
--More--
Along with the IOS, routers contain the following components:
```

Figure 1-8 Output from show version command

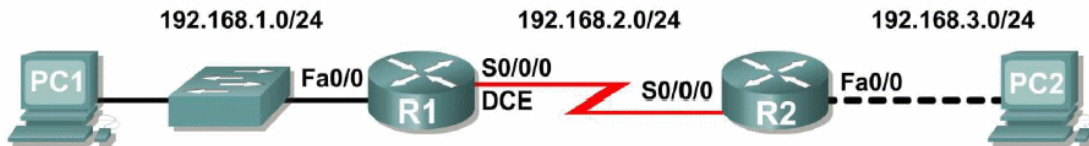
Most of the commands analyzed in this document **can be reviewed with a single Router** (such as the 2500 or the 2600's). So you should not need to make any connections, other than your PC to the console port of the Router!

If you already have some more knowledge, the you may go straight to the Exploration Books folder: **e-Books\1-4-CCNA Exploration Books**. Here you'll find file: **e-Books\1-4-CCNA Exploration Books\CCNA Exploration Labs.PDF**

For the exercises in this document you would need to connect the Routers in the manner given in the respective diagrams. Let's look at this example:

Lab 1.5.1: Cabling a Network and Basic Router Configuration

Topology Diagram



Lab 1.5.1 (first exercise) is a very simple but useful exercise. This exercise requires the use of 2 PC's. PC2 should actually be connected to a Switch and the Switch connected to the Router (R2). You can either use two different Switches or the same Switch using **different VLAN's**. For instance:

VLAN1: Subnet 192.168.1.0/24

VLAN3: Subnet 192.168.3.0/24

If you are not familiar with VLAN's then just use two different Switches until you get more familiar with VLAN's. If you don't have two PC's available, then you can simply define a **Loopback Interface** (Virtual Interface) in Router R2:

config t

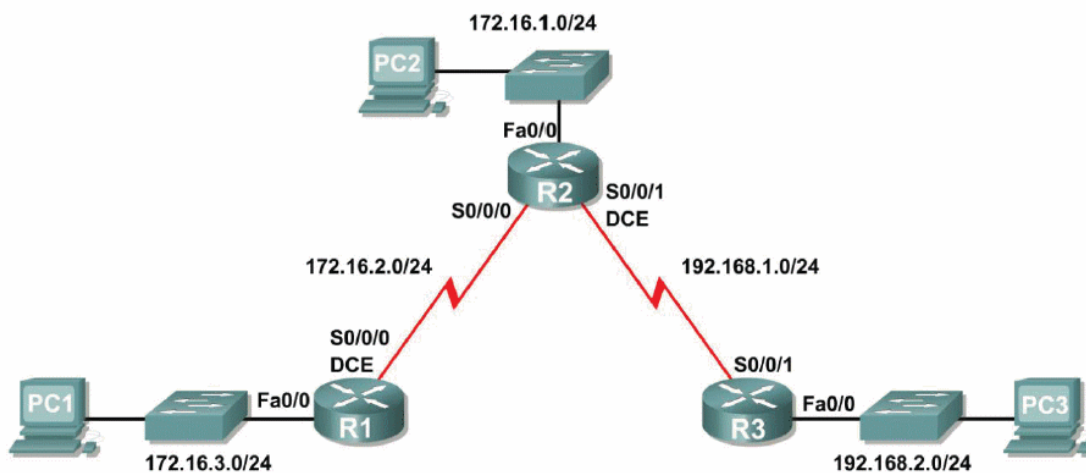
```
interface loopback0
```

```
ip address 192.168.3.1 255.255.255.0
```

That should be enough if all you want to accomplish is reachability to that IP address. This PDF file has many other useful exercises. Let's look at **Lab 2.8.1:**

Lab 2.8.1: Basic Static Route Configuration

Topology Diagram



The main objective of this exercise is to get familiar with **Static Routing**. You should master Static Routing before you deal with more advanced topics such as **Dynamic Routing Protocols** (like RIP, IGRP, EIGRP, OSP & BGP).

To do this Lab you can use the 2600's as Router R1 & R3 and use the 2500 as R2. But since the 2500 is shipped pre-configured as a Frame Relay Switch, **you may disable Frame Relay** from global configuration mode and from interface mode. You can do so with the following commands:

```
conf t
  no frame-relay switching

interface Serial0
  no encapsulation

interface Serial1
  no encapsulation
```

The “**no frame-relay switching**” command disables the Frame Relay function from the Switch, while the “**no encapsulation**” command erases the Frame Relay configuration from the interface.

This doesn't mean that the interface will have no encapsulation. **Some form of Layer 2 encapsulation is always needed!** What this command does is to restore the **default encapsulation; that is, HDLC!**

You can reconfigure the entire Router as a Frame Relay Switch at any time by loading the config given in file: **Frame Relay Switch\Frame-Relay-2-Ports-Config.TXT**

Please keep in mind that **erasing the Frame Relay configuration is not strictly necessary!** It could be helpful only to avoid any possible confusions. But a Router can perfectly perform a dual function. That is, act as a **Layer 3 device** (Router) and as a **Layer 2 device**, in this case a Frame Relay Switch! Both functions can coexist in the same device.

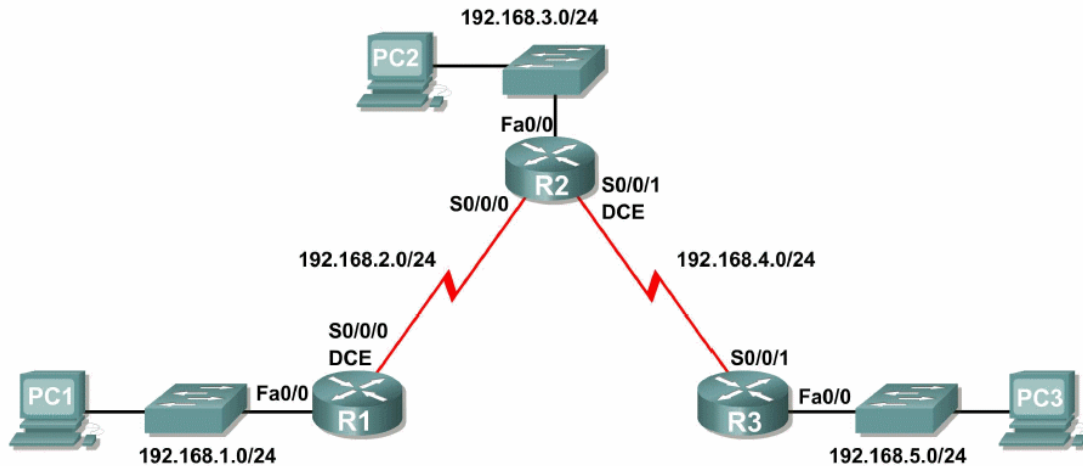
One more note about Diagram 2.8.1. Although it shows 3 Switches, in practice **you don't really need 3 different physical Switches, because you can always configure different VLAN's** in a single Switch. A VLAN would act like a totally separate Switch; that is, like a separate “**Collision Domain**”.

This Diagram also shows several PC's. But in most cases you can simulate the PC IP addresses by creating Loopback Interfaces in the Router! You can do that when you only want to use these IP's for reachability purposes.

Another very useful exercise that you can do with this Lab is the one described in **Lab 5.6.1:**

Lab 5.6.1: Basic RIP Configuration

Topology Diagram



For this Lab (and for the previous Lab 2.8.1) you would benefit from having an **AUI/RJ45 Transceiver** for the Cisco 2500, so that you can connect a Switch to the 2500's Ethernet Port. **Please check our website for price and availability.**

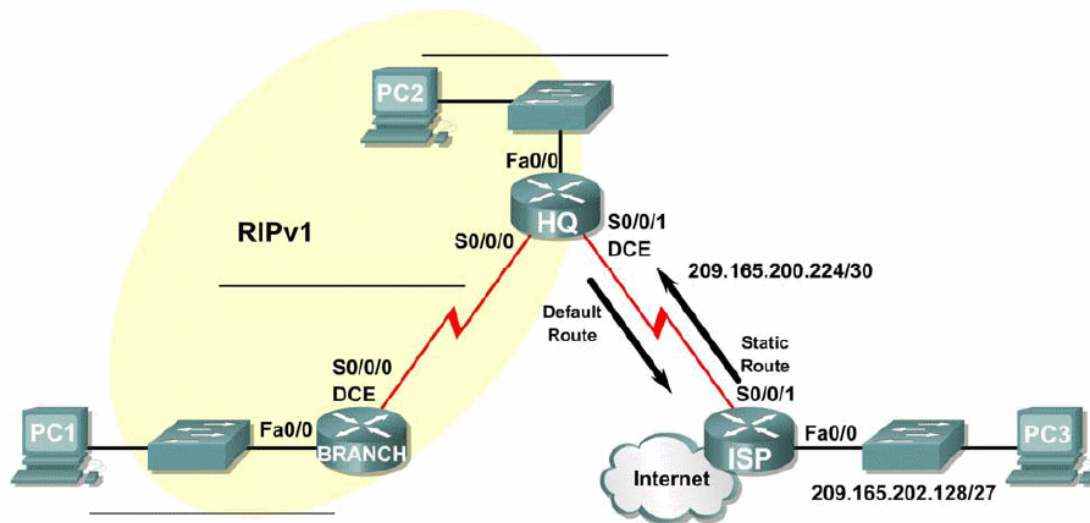
With this setup you can complete the following Lab Scenarios:

- Scenario A: Running RIPv1/2 on Classful Networks
- Scenario B: Running RIPv1/2 with Subnets and Between Classful Networks
- Scenario C: Running RIPv1/2 on a Stub Network.

With a similar setup you can also do **Lab 5.6.2 & Lab 5.6.3** :

Lab 5.6.2: Challenge RIP Configuration

Topology Diagram

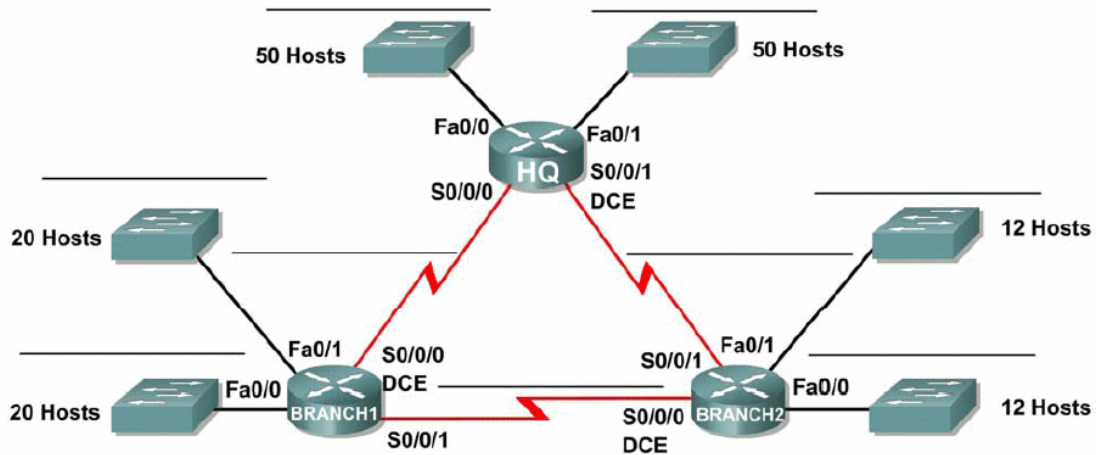


These Labs also deals with RIP, but accomplishes different objectives.

For certain exercises such as the ones shown in **Lab 6.4.1**, you don't really need a "Lab" to complete the given tasks, as they are pure "addressing" exercises

Activity 6.4.1: Basic VLSM Calculation and Addressing Design

Topology Diagram

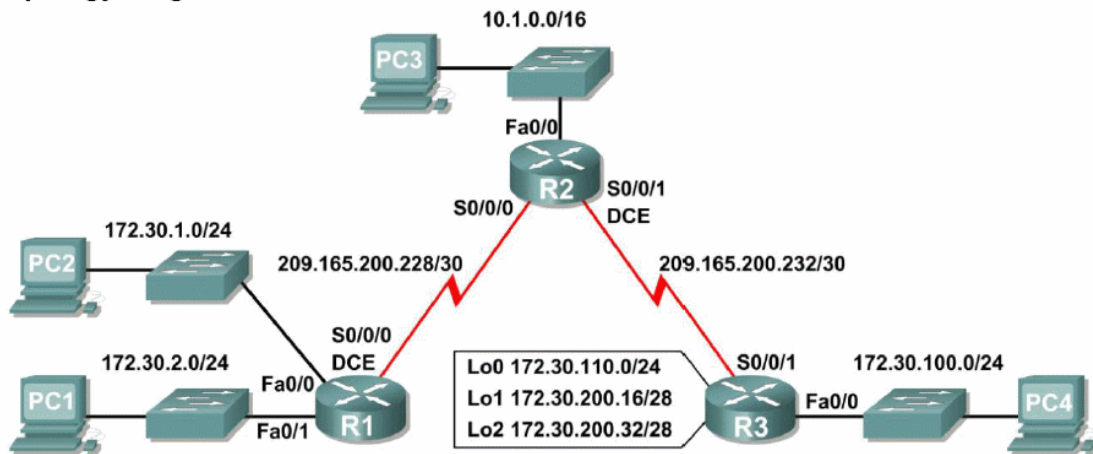


The same is true for Activities **6.4.2**, **6.4.3**, **6.4.4**, **6.4.5**, & **6.4.6**. If you are relatively new to Networking, you should try to do these exercises!

Next you'll find **Lab 7.5.1**:

Lab 7.5.1: RIPv2 Basic Configuration Lab

Topology Diagram



R1 in this diagram shows a pair a Ethernet interfaces. But the 2610's have a single Ethernet interface. Ideally you would need a Router with two Ethernet interfaces, such as the **2611**. You can also install an additional Ethernet Port to a 2610. To do so would need an **NM-1E** Module.

Our website offers options to either upgrade your 2610 to a 2611 or to add an NM-1E module! **Please check our website** (www.ciscoland.net) for the latest prices on all available upgrades.

Both, the 2610 and the 2611 (or a 2610 + NM-1E), come **with Ethernet 10-BaseT** (10 Mbps) interfaces. With most IOS versions, it is not possible to use an Ethernet Interface to create Sub-interfaces and configure them with **encapsulation IEEE 802.1Q** (commonly known as encapsulation dot1Q).

But the most recent IOS versions such **12.3.26 & 12.4.a** do allow an Ethernet interface to **create Sub-interfaces and use encapsulation dot1Q!** However, you would need a Memory upgrade to do so. Normally 2610's are shipped with 32 Mb. RAM & 8 Mb. Flash. But **they can be upgraded to Max. Memory 64 Mb. RAM & 16 Mb. Flash**, which will allow them to load either IOS!

Having the Sub-interface and encapsulation dot1Q functions available is very important because when you create a Sub-interface (or Virtual interface), they behave pretty much like a physical interface! Thus, having many Sub-interfaces is like having many physical interfaces, **which allows you to do very complex exercises!**

Another advantage of the Sub-interfaces and encapsulation dot1Q functions is that they allow the Router to do **VLAN Trunking!** With VLAN Trunking a Router can route the traffic between multiple VLAN's by using a technique known as **"Router-on-a-Stick"**. The CD includes a sample Router-on-a-Stick configuration in file:

e-Lectures\Cisco Routing - Other\Router-on-a-Stick.PDF

But there is another way to have these functions readily available. This is by having Routers with **Fast Ethernet interfaces** instead of simple Ethernet ones.

In order to get a Fast Ethernet interface, you may **upgrade your 2610 Routers to either a 2620, 2650, or to a 2600XM Router** (2610XM, 2620XM, etc.).

A 2620 also supports up to 64 Mb. RAM & 16 Mb. Flash. **A 2650 supports up to 128 Mb. RAM & 32 Mb. Flash**, which means that it may load virtually any of the recent IOS versions, including the **latest IOS up to date, IOS 12.4.25a.**

XM Routers have additional advantages though. In addition to having **Fast Ethernet 100-BaseT** interfaces, these Routers support **up to 256 Mb. in RAM and 48 Mb. In Flash.** While they come standard with 64 RAM/16 Flash, Memory size can be upgraded. Don't forget to check out our website (www.ciscoland.net) for the latest prices on all available upgrades.

Here is a short summary of the **advantages of XM Router vs. 2610, 2620, and even 2650's:**

- **Additional Memory Capacity:** up to 256 Mb. In RAM & 48 Mb. In Flash
- **Ability to load & run ANY existing IOS Image** (for the 2600 family)
(although this also true with 2650's)
- **Can be used with SDM** (Security Device Manager)
(SDM only supports the 2600XM family. It does not support the 2600's series)
- **Can be used to load CME** (Call Express Manager)
(CME is a very important topic in CCNA-Voice and CCVP certifications)

By the way, the accompanying **CD includes a few documents about the SDM Technology.** Among them we have the following documents:

e-Lectures\Cisco SDM Security Device Manager\SDM Overview.PDF
e-Lectures\Cisco SDM SecurityDownloading and Installing SDM.PDF
e-Lectures\Cisco SDM SecurityConfiguring a Router to Run SDM.PDF

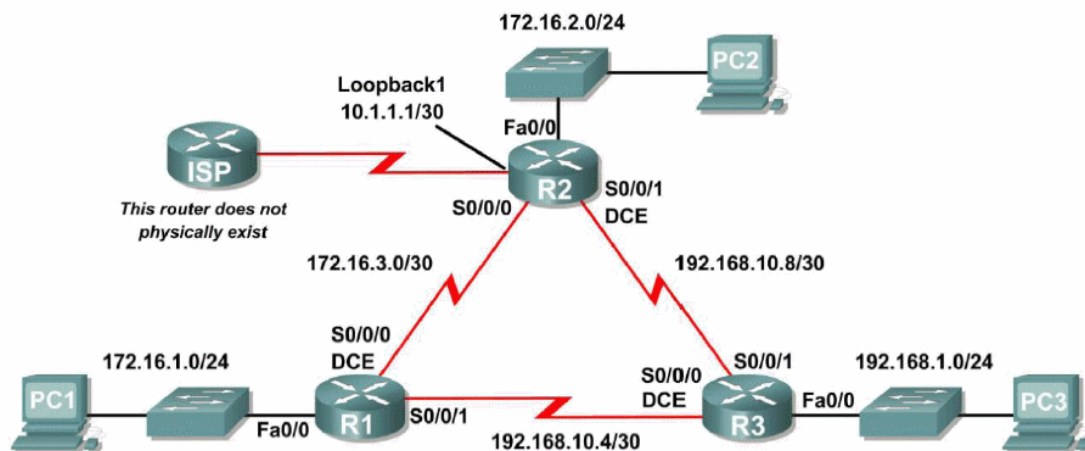
Finally, yet another alternative to either 2600's or 2600XM's Routers is the **1700 platform**; more specifically the **1721 or the 1750 Routers**, which **also come with Fast Ethernet 100-BaseT interfaces**, and **which also support SDM!** Its price range is intermediate between the 2620 and the 2610XM Router. So if you are on a tight budget, you may consider this model.

Once again, please check our website (www.ciscoland.net) for the latest prices on all available upgrades.

To complete the rest of the Labs given file **CCNA Exploration Labs.PDF**, you would also need a few upgrades. For instance, take a look at **Lab 9.6.1**:

Lab 9.6.1: Basic EIGRP Configuration Lab

Topology Diagram



This exercise requires the use of multiple Serial Ports in each Router. You already have 2 Serial Ports in your 2500, so you would need to **add a second Serial Port in each 2610**. You would need an additional Serial Cable as well.

You could also purchase an **NM-4A/S card** for the 2600 Router (which can be used to do some complex a Hub-and-Spoke Frame Relay exercises) and add only one more Serial Port. This may yield a better price/benefit ratio. **Please ask for price and availability.**

If you want to do more complex exercises such as those involving a **Hub-and-Spoke** configuration (one Hub and at least 2 Spokes), then you need to **upgrade to a 4-Ports Frame Relay Switch configuration.**

You can do so by **upgrading the 2500 Frame Relay Router to a 2520 model**, which comes with **4 Serial Interfaces instead of 2**. This will allow you to create true a **Hub-and-Spoke** configuration scenarios, although you will need a third Router, so that one acts as the Hub, and the other 2 act as the Spokes!

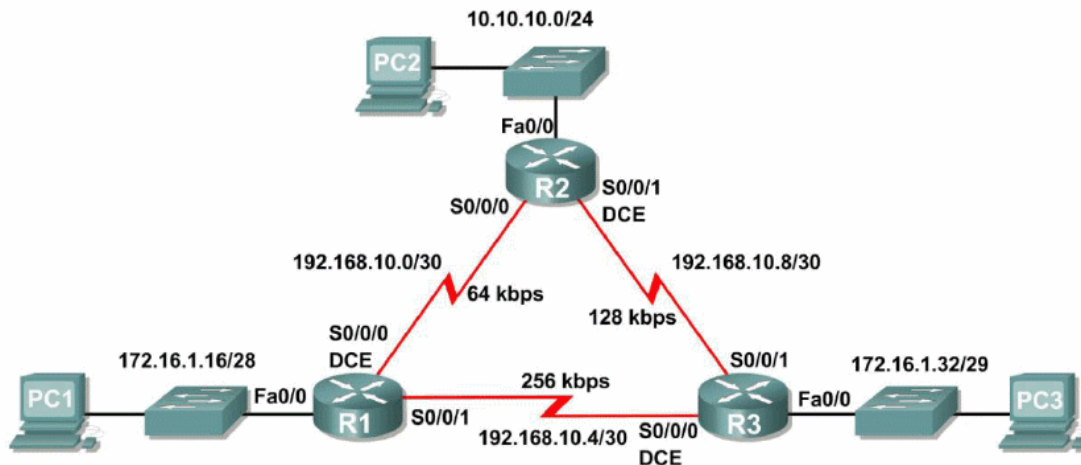
As mentioned above, **another way to implement a 4-Ports Frame Relay Switch**, is by purchasing an **NM-4A/S card** which can be inserted in the 2600's Routers. **But you will have to buy another 2600 Router for the Frame Relay function.** That way, the 2500 may act as the Hub, the pair of standard 2600's will be the Spokes, and the new 2600 with the NM-4A/S card will be the Frame Relay Switch!

Don't forget to check out our website (www.ciscoland.net) for the latest prices on all available upgrades.

Once again, these upgrades will allow you to do most (if not all) the remaining exercises given in file **CCNA Exploration Labs.PDF** such as **Lab 11.6.1:**

Scenario A: Basic OSPF Configuration

Topology Diagram



We really hope this gives you a pretty good idea of how to take advantage of this Lab. The accompanying CD includes more information and additional exercises for more advanced CCNA/CNNP topics such as **Dynamic Routing Protocols** (RIP, IGRP, EIGRP, OSP & BGP, etc.), **Spanning Tree Protocol, Network Security, Wireless Technology, VPN, etc.**

In addition, the **Video CD** includes short but very effective Video Tutorials about many different topics, ranging from very simple ones, to some not so simple! So please make sure you take advantage of these training materials!

Please send us a message if you have any questions. Thank you for choosing our products!!