**Write a report on how to set up and test a basic network:**

**Components Required for Network Setup:**

Before diving into the configuration process, let’s outline the essential components you’ll need:

* **Modem:** A modem connects your network to the internet via your Internet Service Provider (ISP). It typically has an Ethernet port for the connection.
* **Router:** The router manages the flow of data between devices within your network and between your network and the internet. It usually includes a firewall for security and multiple Ethernet ports for wired connections.
* **Switch (Optional):** A switch is used to expand the number of Ethernet ports available for wired connections. It’s especially useful in larger networks.
* **Access Points (APs) (Optional):** APs are used to extend Wi-Fi coverage in larger spaces. They connect to the router and broadcast Wi-Fi signals.
* **Network Cables:** Ethernet cables are required to connect devices like computers, printers, and switches to the network.
* **Computers and Devices:** The devices you want to connect to the network, including computers, laptops, smartphones, and printers.

**Step-by-Step Network Configuration Guide:**

Now, let’s go through the step-by-step process of setting up a basic LAN using a router. Please note that specific router models may have variations in the configuration process, so consult your router’s manual for detailed instructions.

**Step 1: Hardware Setup**

1. **Connect the Modem:** Plug one end of an Ethernet cable into the modem and the other end into the router’s WAN or Internet port.
2. **Power On:** Connect the router to a power source and turn it on.
3. **Connect Computers:** Use Ethernet cables to connect computers and other devices to the router’s LAN ports. For Wi-Fi, connect to the router’s default Wi-Fi network using the provided credentials (usually found on the router).

**Step 2: Access Router Settings**

1. **Find Router IP:** Open a web browser on a connected computer and enter the router’s IP address. Common router IPs include “192.168.0.1” or “192.168.1.1.” Consult your router’s manual for the specific IP.
2. **Login:** Log in to the router’s administration interface using the default username and password (usually “admin” and “admin” or “admin” and “password”). Change the password for security.

**Step 3: Configure Basic Settings**

1. **WAN Configuration:** Set up the WAN connection type. Most ISPs use DHCP, so select “Obtain an IP address automatically.”
2. **Wi-Fi Setup (if applicable):** Configure Wi-Fi settings, including network name (SSID) and password. Use WPA2 or WPA3 for security.
3. **LAN Configuration:** Ensure the router’s LAN IP address doesn’t conflict with other devices on your network. The default is usually fine.

**Step 4: Security Settings**

1. **Change Default SSID:** Rename your Wi-Fi network to something unique. Avoid using personal information.
2. **Password:** Set a strong Wi-Fi password that combines letters, numbers, and symbols.
3. **Firewall:** Enable the router’s firewall to protect your network from external threats.

**Step 5: Device Configuration**

1. **Static IP Assignments:** For critical devices (e.g., servers or network printers), assign static IP addresses within the router’s DHCP settings to ensure they always have the same IP.
2. **Port Forwarding:** If you want to access specific services or devices remotely (e.g., a security camera), configure port forwarding.
3. **Wi-Fi Channels:** To optimize Wi-Fi performance, choose an optimal Wi-Fi channel that has minimal interference from neighboring networks.

**Step 6: Testing**

1. **Connectivity:** Verify that all connected devices can access the internet and communicate with each other.
2. **Security:** Run a network security scan to check for vulnerabilities and apply recommended updates.