

Got it!

I'll give you a **very detailed, step-by-step guide** to **Install and Configure Docker and Kubernetes on Windows 11**, including error handling and all commands .

# Install and Configure Docker + Kubernetes on Windows 11

## ⚙️ 1. Install Docker Desktop (includes Kubernetes)

### Step 1: Check system requirements

- Windows 11 Home/Pro
- Enable **WSL2** (Windows Subsystem for Linux version 2)
- Virtualization must be enabled (BIOS setting)

### Step 2: Enable Virtualization in BIOS

If you face errors like:

"WSL2 requires an update to its kernel component"

You must:

- Restart PC → Press BIOS key (F2 / DEL / Esc).
- Find **Virtualization Technology** → **Enable** it.
- Save and Exit.

### Step 3: Enable WSL 2 (if not already enabled)


Open **PowerShell as Admin** and run:

```
dism.exe /online /enable-feature /featurename:Microsoft-Windows-Subsystem-Linux /all /norestart
```

Then enable Virtual Machine Platform:

```
dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart
```

#### Step 4: Install WSL2 Kernel Update (Important)


- Download WSL2 update package:  
 <https://aka.ms/wsl2kernel>
- Install it manually.

#### Step 5: Set WSL 2 as your default version

```
wsl --set-default-version 2
```

This ensures any Linux system you install will be using WSL2.

#### Step 6: Download and Install Docker Desktop

- Official Link:  
 <https://www.docker.com/products/docker-desktop/>
- Install it → during setup, ensure:
- **Use WSL2 backend** is selected.
- Install required WSL Linux Distro if prompted (e.g., Ubuntu).

#### Step 7: Start Docker Desktop

- Open Docker Desktop → wait till the **Docker Engine** is running.

Check in terminal:

```
docker --version
```

Expected output:

```
Docker version 26.x.x, build xxxx
```

Docker installation successful!

## ⚙️ 2. Enable Kubernetes inside Docker Desktop

#### Step 8: Enable Kubernetes

- Open Docker Desktop → Go to **Settings** → **Kubernetes** tab.

- Check **"Enable Kubernetes"**.
- Click **Apply & Restart**.

✂ First time setup takes 5-10 minutes (Kubernetes cluster setup).

## Step 9: Verify Kubernetes Installation

Open **PowerShell** or **CMD**:

```
kubectl version --client --output=yaml
```

```
kubectl cluster-info
```

Output will show something like:

Kubernetes master is running at https://localhost:6443

## ✂ Common Errors & Their Solutions

Error Message	Reason	Solution
Docker Engine not running	Docker not started	Open Docker Desktop manually
WSL2 not installed	Missing Linux Kernel update	Install from <a href="https://aka.ms/wsl2kernel">https://aka.ms/wsl2kernel</a>
Kubernetes stuck starting	Low system resources	Allocate more CPU/Memory under Docker → Settings → Resources
kubectl not recognized	Path variable issue	Restart PC after installing Docker Desktop

## Useful Docker & Kubernetes Commands

### Docker Commands:

docker --version	# Check Docker version
docker run hello-world	# Run test container
docker ps -a	# List all containers
docker stop <container_id>	# Stop container

```
docker rm <container_id>          # Remove container
docker images                      # List docker images
docker rmi <image_id>              # Remove image
```

### Kubernetes Commands:

```
kubectl version --client           # Check kubectl version
kubectl cluster-info               # Show cluster info
kubectl get nodes                  # List all nodes
kubectl get pods                   # List all pods
kubectl get deployments            # List all deployments
kubectl delete pod <pod_name>     # Delete a pod
```

## Sample Test: Run a Hello World app on Kubernetes

```
kubectl create deployment hello-node --image=k8s.gcr.io/echoserver:1.4
kubectl expose deployment hello-node --type=LoadBalancer --port=8080
kubectl get services
```

Access it via:

`http://localhost:<assigned_port>`

## Important Points:

- Docker Desktop now **comes with Kubernetes** built-in. No need for Minikube separately.
- If you want **advanced** multi-node clusters later → install **Kind** or **Minikube** separately.
- Always **update Docker Desktop** regularly.
- Use **WSL2 backend** for best performance.

# QUICK FINAL FLOW

1. Enable Virtualization in BIOS
2. Enable WSL2 (Subsystem + Kernel Update)
3. Install Docker Desktop (Use WSL2 Backend)
4. Start Docker Desktop → Verify `docker --version`
5. Enable Kubernetes from Docker Desktop Settings
6. Verify with `kubectl version` and `cluster-info`
7. Run Hello World containers in Docker and Kubernetes

## You are now ready with:

- Docker working
- Kubernetes Cluster working
- Error handling knowledge
- All important commands

Would you also like me to give:

- A **Mini Project idea** to test your Docker + Kubernetes setup? (like hosting a Flask app?)
- OR a **One Page Cheat Sheet PDF** summarizing all this?

Tell me!

I'll prepare it right away!