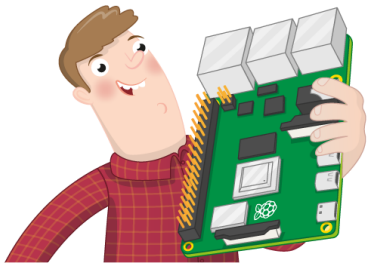
Projects

Setting up your Raspberry Pi

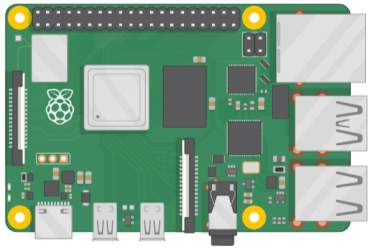
How to set up and start your Raspberry Pi for the first time



Step 1 Introduction

Here you'll learn about your Raspberry Pi, what things you need to use it, and how to set it up.

We also have a three-week online course available **on the FutureLearn platform** (http://rpf.io/rpi-fl), and a **Raspberry Pi forum** (https://www.raspberrypi.org/forums), including the **Beginners** (https://www.raspberrypi.org/forums/viewforum.php?f=91) section, if you want to ask questions and get support from the Raspberry Pi community.



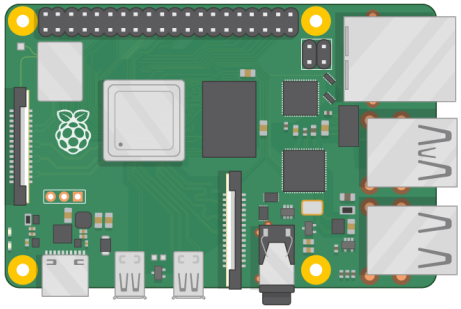
If you need to print this project, please use the **printer-friendly version** (https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up/print).

Step 2 What you will need

Which Raspberry Pi?

There are several **models of Raspberry Pi** (https://www.raspberrypi.org/products/), and for most people Raspberry Pi 4 Model B is the one to choose. Raspberry Pi 4 Model B is the newest, fastest, and easiest to use.

Raspberry Pi 4 comes with 2GB, 4GB, or 8GB of RAM. For most educational purposes and hobbyist projects, and for use as a desktop computer, 2GB is enough.

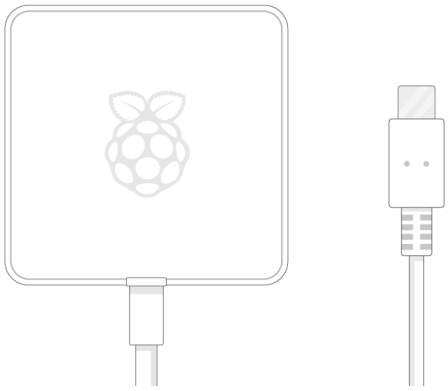


Raspberry Pi Zero, Raspberry Pi Zero W, and Raspberry Pi Zero WH are smaller and require less power, so they're useful for portable projects such as robots. It's generally easier to start a project with Raspberry Pi 4, and to move to Raspberry Pi Zero when you have a working prototype that a smaller Raspberry Pi would be useful for.

If you want to buy a Raspberry Pi, head to **rpf.io/products** (https://rpf.io/products).

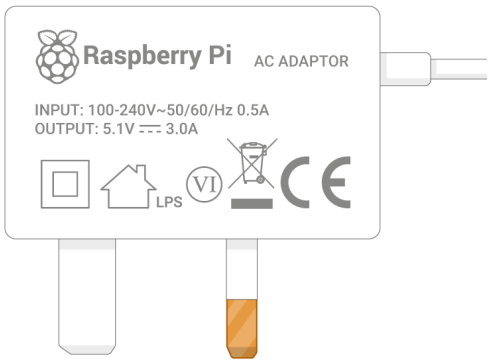
A power supply

To connect to a power socket, all Raspberry Pi models have a USB port (the same found on many mobile phones): either USB-C for Raspberry Pi 4, or micro USB for Raspberry Pi 3, 2, and 1.



You need a power supply that provides:

- At least 3.0 amps for Raspberry Pi 4

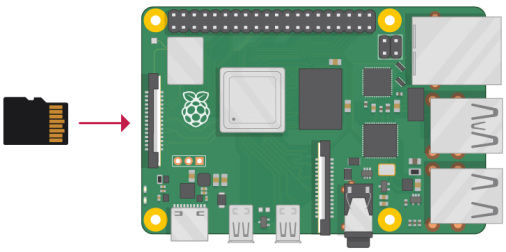


- At least 2.5 amps for Raspberry Pi 3

We recommend using **our official USB-C Power Supply** (https://www.raspberrypi.org/products/type-c-power-supply/) for Raspberry Pi 4, or **our official Universal Power Supply** (https://www.raspberrypi.org/products/raspberry-pi-universal-power-supply/) for Raspberry Pi 3, 2, or 1.

A microSD card

Your Raspberry Pi needs an SD card to store all its files and the Raspberry Pi OS operating system.



You need a microSD card with a capacity of **at least 8GB**.

Many sellers supply SD cards for Raspberry Pi that are already set up with Raspberry Pi OS and ready to go.

A keyboard and a mouse

To start using your Raspberry Pi, you need a USB keyboard and a USB mouse.

Once you've set up your Raspberry Pi, you can use a Bluetooth keyboard and mouse, but you'll need a USB keyboard and mouse for the first setup.

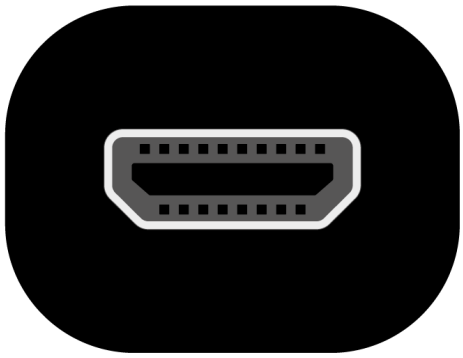
A TV or computer screen

To view the Raspberry Pi OS desktop environment, you need a screen, and a cable to link the screen and your Raspberry Pi. The screen can be a TV or a computer monitor. If the screen has built-in speakers, Raspberry Pi is able to use these to play sound.

HDMI

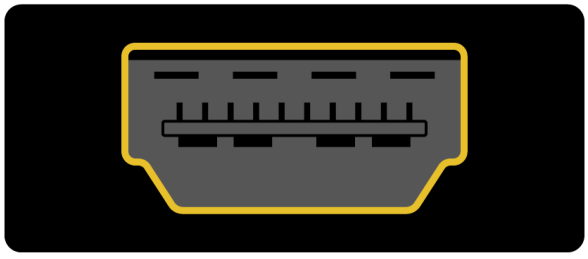
Your Raspberry Pi has an HDMI output port that is compatible with the HDMI port of most modern TVs and computer monitors. Many computer monitors may also have DVI or VGA ports.

Raspberry Pi 4 has two micro HDMI ports, allowing you to connect two separate monitors.



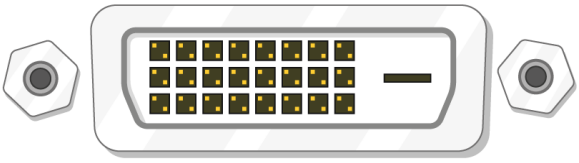
You need either a micro HDMI to HDMI cable, or a standard HDMI to HDMI cable plus a micro HDMI to HDMI adapter, to connect Raspberry Pi 4 to a screen.

Raspberry Pi 1, 2, and 3 have a single full-size HDMI port, so you can connect them to a screen using a standard HDMI to HDMI cable.



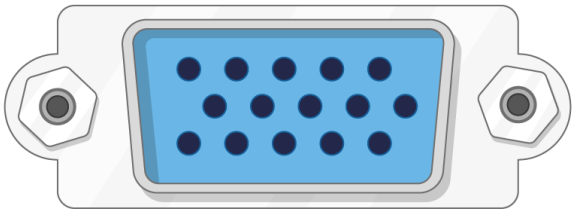
DVI

If your screen has a DVI port, you can connect your Raspberry Pi to it using an HDMI to DVI cable.

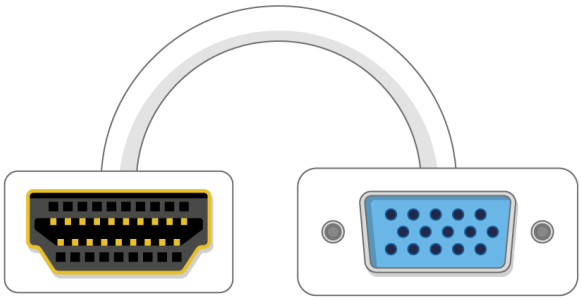


VGA

Some screens only have a VGA port.



To connect your Raspberry Pi to such a screen, you can use an HDMI to VGA adapter.



Optional extras

A case

You may want to put your Raspberry Pi in a case. This is not essential, but it will provide protection for your Raspberry Pi. If you'd like, you can use the official case for **Raspberry Pi 4** (https://www.raspberrypi.org/products/raspberry-pi-4-case/) or **Raspberry Pi Zero or Raspberry Pi Zero W** (https://www.raspberrypi.org/products/raspberry-pi-zero-case/).

Headphones or speakers

The large Raspberry Pi models (but not Raspberry Pi Zero or Raspberry Pi Zero W) have a standard audio port like the one on a smartphone or MP3 player. If you want to, you can connect your headphones or speakers so that your Raspberry Pi can play sound. If the screen you're connecting your Raspberry Pi to has built-in speakers, Raspberry Pi can play sound through these.

An Ethernet cable

The large Raspberry Pi models (but not Raspberry Pi Zero or Raspberry Pi Zero W) have a standard Ethernet port to connect them to the internet; to connect Raspberry Pi Zero to the internet, you need a USB to Ethernet adapter.

Raspberry Pi 4, Raspberry Pi 3, and Raspberry Pi Zero W can also be wirelessly connected to the internet.

Step 3 Set up your SD card

If you have an SD card that doesn't have the Raspberry Pi OS operating system on it yet, or if you want to reset your Raspberry Pi, you can easily install Raspberry Pi OS yourself. To do so, you need a computer that has an SD card port — most laptop and desktop computers have one.

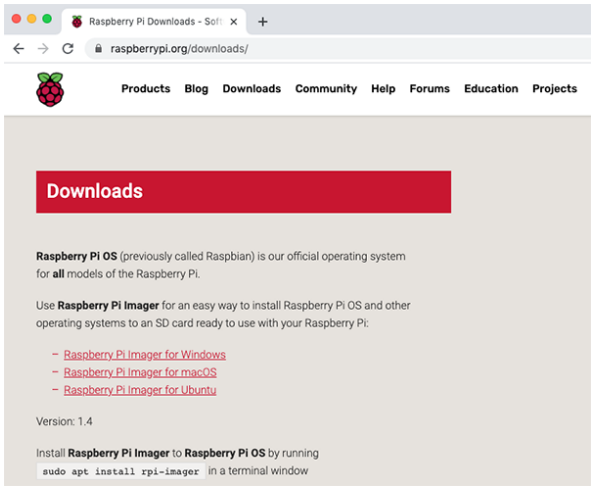
The Raspberry Pi OS operating system via the Raspberry Pi Imager

Using the Raspberry Pi Imager is the easiest way to install Raspberry Pi OS on your SD card.

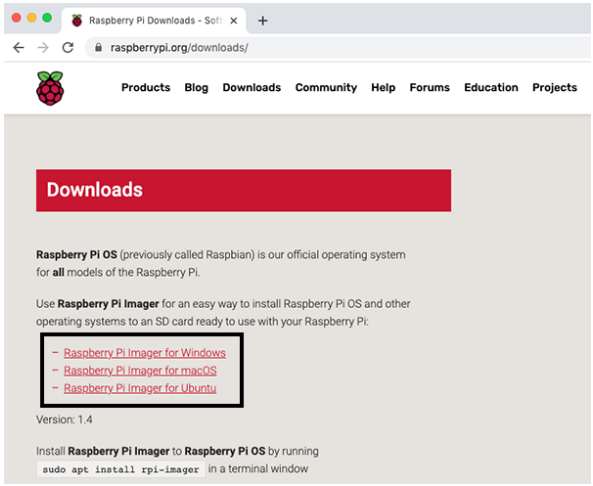
Note: More advanced users looking to install a particular operating system should use this guide to **installing operating system images** (https://www.raspberrypi.org/documentation/installation/installing-images/README.md).

Download and launch the Raspberry Pi Imager

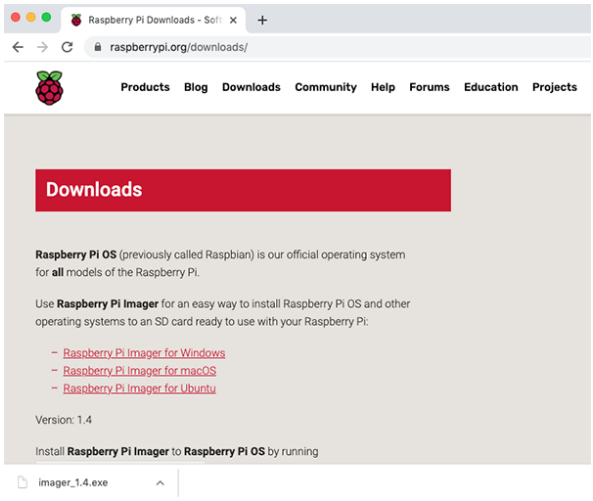
- Visit the **Raspberry Pi downloads page** (https://www.raspberrypi.org/downloads)



- Click on the link for the Raspberry Pi Imager that matches your operating system



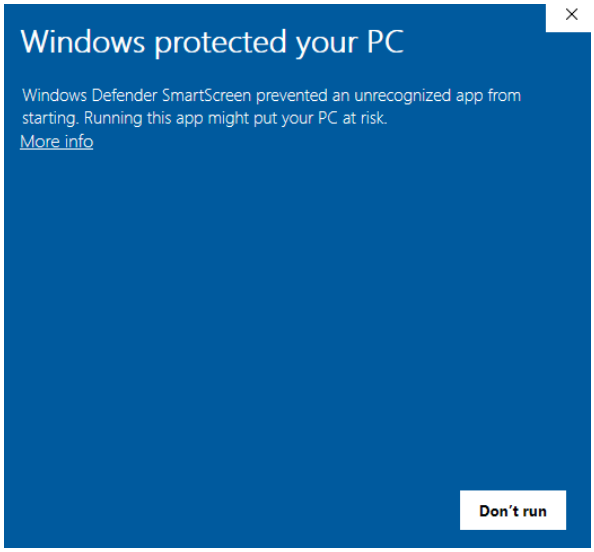
- When the download finishes, click it to launch the installer



Using the Raspberry Pi Imager

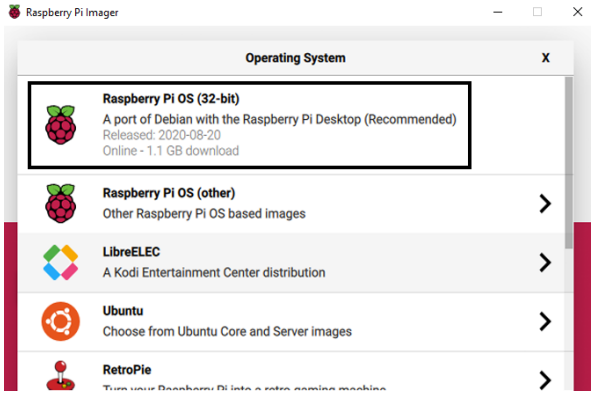
Anything that's stored on the SD card will be overwritten during formatting. If your SD card currently has any files on it, e.g. from an older version of Raspberry Pi OS, you may wish to back up these files first to prevent you from permanently losing them.

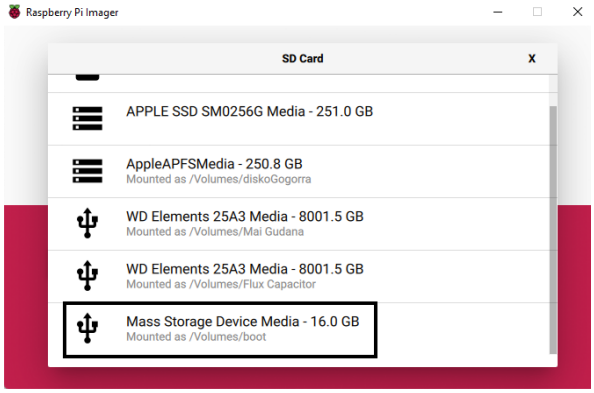
When you launch the installer, your operating system may try to block you from running it. For example, on Windows I receive the following message:



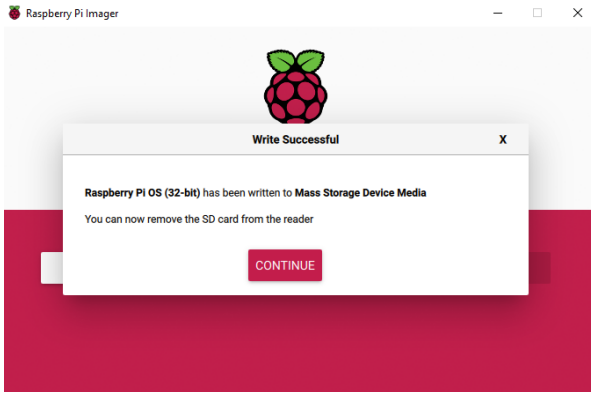
- If this pops up, click on `More info` and then `Run anyway`
- Follow the instructions to install and run the Raspberry Pi Imager
- Insert your SD card into the computer or laptop SD card slot
- In the Raspberry Pi Imager, select the OS that you want to install and the SD card you would like to install it on

Note: You will need to be connected to the internet the first time for the the Raspberry Pi Imager to download the OS that you choose. That OS will then be stored for future offline use. Being online for later uses means that the Raspberry Pi imager will always give you the latest version.



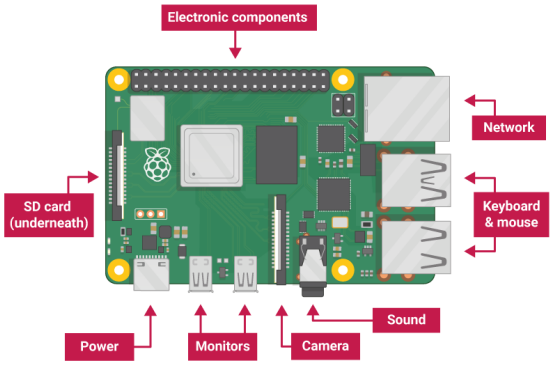


- Then simply click the `WRITE` button
- Wait for the Raspberry Pi Imager to finish writing
- Once you get the following message, you can eject your SD card

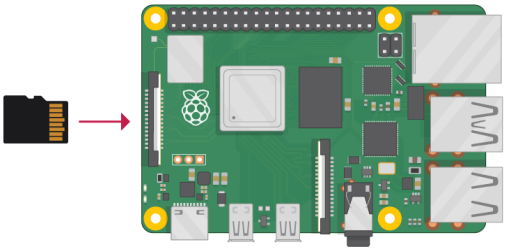


Step 4 Connect your Raspberry Pi

Now get everything connected to your Raspberry Pi. It's important to do this in the right order, so that all your components are safe.

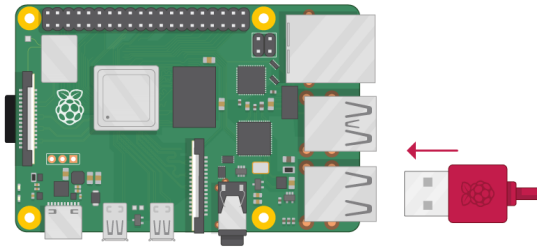


- Insert the SD card you've set up with Raspberry Pi OS into the microSD card slot on the underside of your Raspberry Pi.

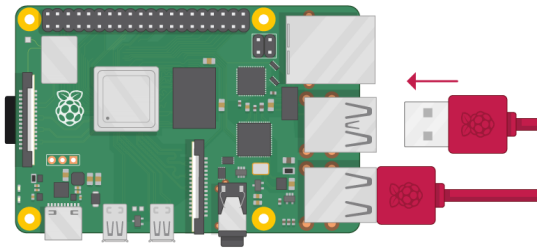


Note: Many microSD cards come inside a larger adapter — you can slide the smaller card out using the lip at the bottom.

- Find the USB connector end of your mouse's cable, and connect the mouse to a USB port on Raspberry Pi (it doesn't matter which port you use).



- Connect the keyboard in the same way.

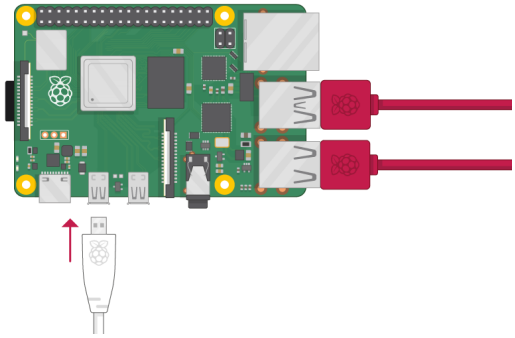


- Make sure your screen is plugged into a wall socket and switched on.
- Look at the HDMI port(s) on your Raspberry Pi — notice that they have a flat side on top.
- Use a cable to connect the screen to Raspberry Pi's HDMI port — use an adapter if necessary.

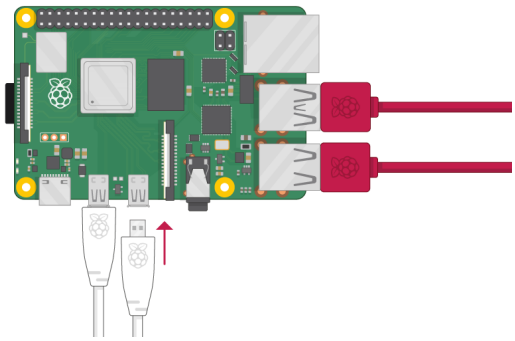
  Raspberry Pi 4

  Connect your screen to the first of Raspberry Pi 4's HDMI ports, labelled **HDMI0**.

  Note: Make sure you have used **HDMI0** (nearest the power in port) rather than **HDMI1**.

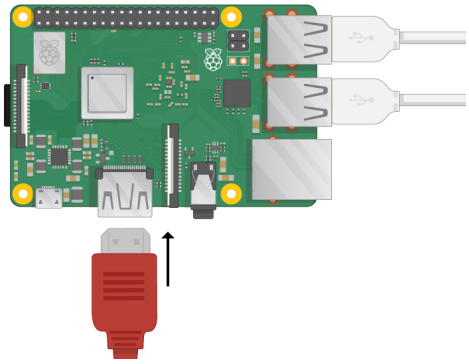


  You can connect an optional second screen in the same way.



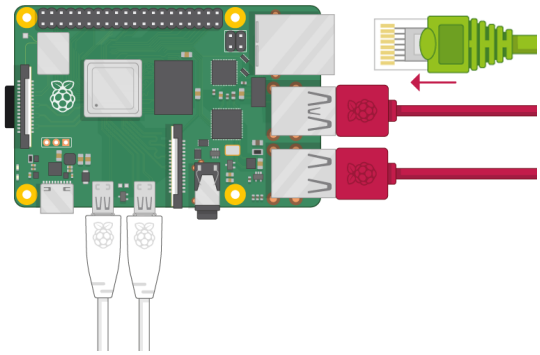
  Raspberry Pi 1, 2, 3

  Connect your screen to the single HDMI port.

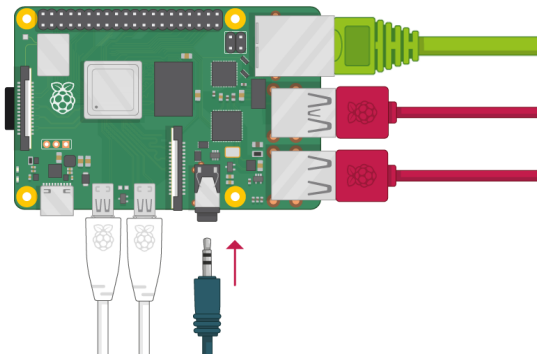


Note: Nothing will display on the screen, because your Raspberry Pi is not running yet.

- If you want to connect your Raspberry Pi to the internet via Ethernet, use an Ethernet cable to connect the Ethernet port on Raspberry Pi to an Ethernet socket on the wall or on your internet router. You don't need to do this if you want to use wireless connectivity, or if you don't want to connect to the internet.



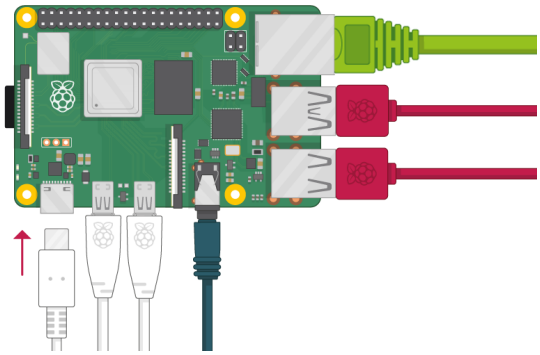
- If the screen you are using has speakers, sound will play through those. Alternatively, connect headphones or speakers to the audio port if you prefer.



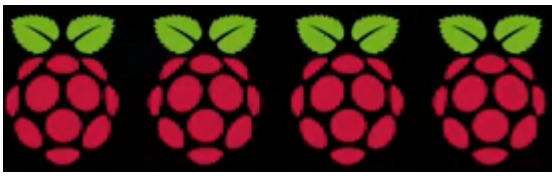
Step 5 Start up your Raspberry Pi

Your Raspberry Pi doesn't have a power switch. As soon as you connect it to a power outlet, it will turn on.

- Plug the power supply into a socket and connect it to your Raspberry Pi's power port.



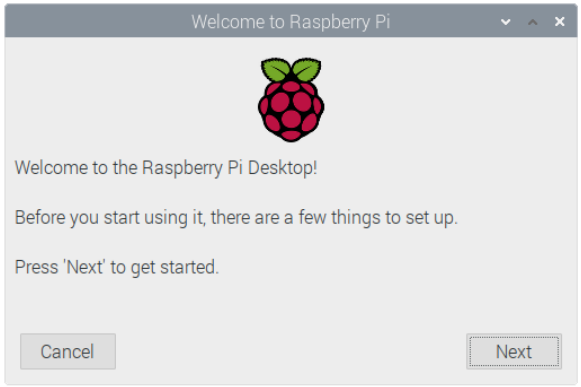
You should see a red LED light up on the Raspberry Pi, which indicates that Raspberry Pi is connected to power. As it starts up (this is also called **booting**), you will see raspberries appear in the top left-hand corner of your screen.



After a few seconds the Raspberry Pi OS desktop will appear.

Finishing the setup

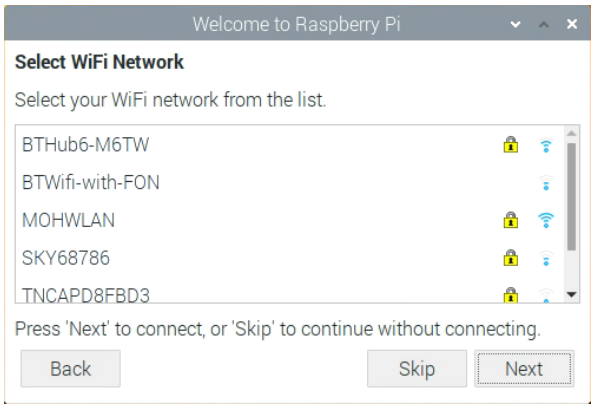
When you start your Raspberry Pi for the first time, the **Welcome to Raspberry Pi** application will pop up and guide you through the initial setup.



- Click on **Next** to start the setup.
- Set your **Country**, **Language**, and **Timezone**, then click on **Next** again.

- Enter a new password for your Raspberry Pi and click on **Next**.

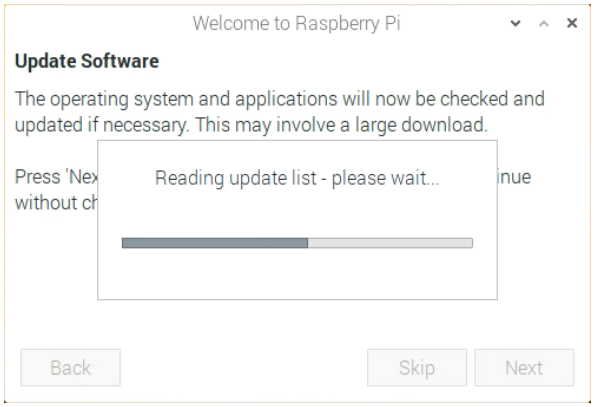
- Connect to your wireless network by selecting its name, entering the password, and clicking on **Next**.



Note: If your model of Raspberry Pi doesn't have wireless connectivity, you won't see this screen.

Note: Wait until the wireless connection icon appears and the correct time is shown before trying to update the software.

- Click on **Next**, and let the wizard check for updates to Raspberry Pi OS and install them (this might take a little while).



- Click on **Restart** to finish the setup.

Note: You will only need to reboot if that's necessary to complete an update.

Step 6 Where to find help

If you're having problems with your Raspberry Pi, there are lots of places you can get help and advice:

- Check out the **help section** (https://www.raspberrypi.org/help/) and the **troubleshooting guide** (https://www.raspberrypi.org/learning/troubleshooting-guide/) on the Raspberry Pi website
- The **Raspberry Pi forum** (https://www.raspberrypi.org/forums), including the **Beginners** (https://www.raspberrypi.org/forums/viewforum.php?f=91) section, is a great place to ask questions and get support from the Raspberry Pi community
- Call out on **Twitter** (https://twitter.com) using the hashtag #rpilearn, or submit a question on the **Raspberry Pi Stack Exchange** (https://raspberrypi.stackexchange.com/)
- You could also attend a free **Raspberry Jam** (https://rpf.io/jam) community event to talk to people about their experiences and get some first-hand help from fellow Raspberry Pi users

Step 7 What next?

Well done! You have just completed the first project in the **Raspberry Pi for beginners** (https://projects.raspberrypi.org/en/pathways/raspberry-pi-beginners) pathway.

Next, try the second project in the pathway, **Using your Raspberry Pi** (https://projects.raspberrypi.org/en/projects/raspberry-pi-using/).

The complete Raspberry Pi for beginners pathway

- **Setting up your Raspberry Pi** (https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up/)
- **Using your Raspberry Pi** (https://projects.raspberrypi.org/en/projects/raspberry-pi-using/)
- **Customise your Raspberry Pi desktop** (https://projects.raspberrypi.org/en/projects/custom-pi-desktop/)
- **Pac-Man treasure hunt on the terminal** (https://projects.raspberrypi.org/en/projects/pacman-terminal)
- **Create a new command on Raspberry Pi** (https://projects.raspberrypi.org/en/projects/raspberry-pi-command/)

Other Raspberry Pi projects on the Raspberry Pi website

Take a look at some of our many other **Raspberry Pi projects** (https://projects.raspberrypi.org/en/projects?hardware%5B%5D=raspberry-pi).
