Skills and Pathways

Computing in Today's World

Sampler

Mc Graw Hill

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Skills and Pathways:
Computing in Today's World

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Contents

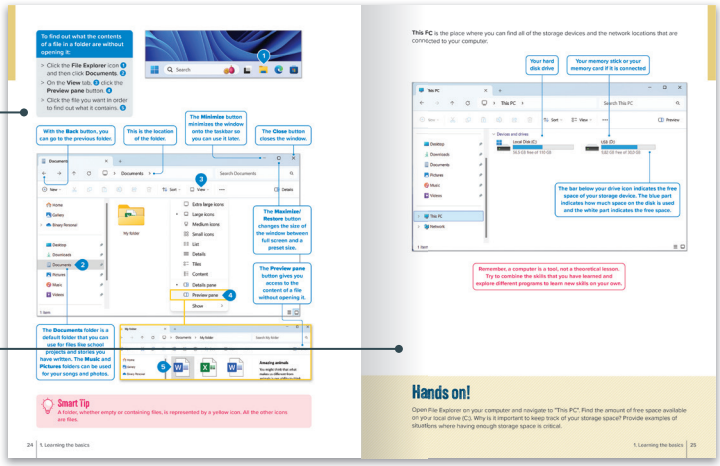
Key Features

> An innovative approach to building digital competencies, developed by expert educators.

> Curriculum aligns with the latest industry standards, preparing students for certifications and future careers.

> Well-defined learning goals and hands-on, applicable digital skills.

Each unit offers straightforward explanations and contemporary examples, making technology concepts accessible and relevant.



Every unit includes a variety of tasks and activities designed to help students build essential digital competencies.

Projects and exercises throughout the course reinforce students' understanding and practical application of digital skills in real-world scenarios.

Students learn about platform diversity expanding their digital toolkit and adaptability.

Each unit organizes key terms that are crucial for digital literacy, equipping students for today's technology-driven workplace.

UNIT 3

3 Communicating online

Communication is one of the most important ways we use the Internet to connect with others, whether for school, work, or staying in touch with friends. This unit covers, how computer networks work, how devices communicate, and how to use different online tools like blogs and instant messaging apps to share ideas safely and responsibly.

Learning Objectives

In this unit, you will:

> identify what a computer network is and how it works.

> identify the differences between LANs and WANs.

> describe how devices communicate over a network using protocols.

> identify the different types of network topologies and how they affect communication.

> evaluate network efficiency based on speed and technology.

> use the Internet safely, understanding privacy, personal data, and network security.

> identify the key concepts of digital citizenship, including netiquette and respecting intellectual property.

> create and share posts on social media and blogs responsibly.

> use an instant messaging application to communicate over the Internet

> prevent and respond to cyberbullying.

Tools

> Blogger

> Facebook

> X platform

> WhatsApp

LESSON 1

Networking basics

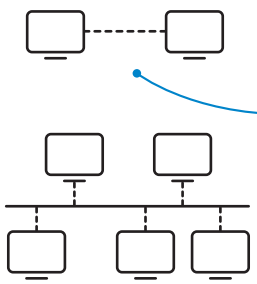
What is a network?

It's time to discuss what a network is and learn about the different types of networks according to topology or geographical restrictions.

A **computer network** (also simply called a network) is a group of two or more computers and other devices (like printers, mobile phones, and tablets) that are linked through cables, fiber channels, or wireless technologies (infrared, radio waves, satellites, etc.). The computers and hardware devices that are connected in a network are called "nodes". Network nodes communicate with each other in order to exchange data, files, and messages and also to share devices.

Network topologies

The way in which computers are interconnected is called **network topology**. The most commonly used topologies are **point-to-point** and **bus topology**.



Point-to-point: This is the simplest topology there is and consists of a permanent link between two nodes. Conventional analog telephony uses point-to-point topology. This means that a point-to-point circuit can be set up dynamically (for as long as is needed) and when it is no longer used, it can be dropped.

Bus topology: Each node is connected to a single cable.

Network categories

Networks are also split into categories, concerning the geographical distance between the connected devices. To be specific, there are **Local Area Networks** (**LANs**) and **Wide Area Networks** (**WANs**).

A LAN interconnects computers that are in a small area, such as a home, an office, etc.

A WAN covers a broader area that may exceed a country's border. For example, the Internet is a type of WAN.

The fully-connected mesh topology, in which each node is physically connected to every other node, is used for small networks, as it is too expensive and complex for bigger networks.

History

Sir Tim Berners-Lee is a British computer scientist and the inventor of the www. On December 25, 1990, with the help of Robert Cailliau, he implemented the first successful communication between an HTTP client and a server.

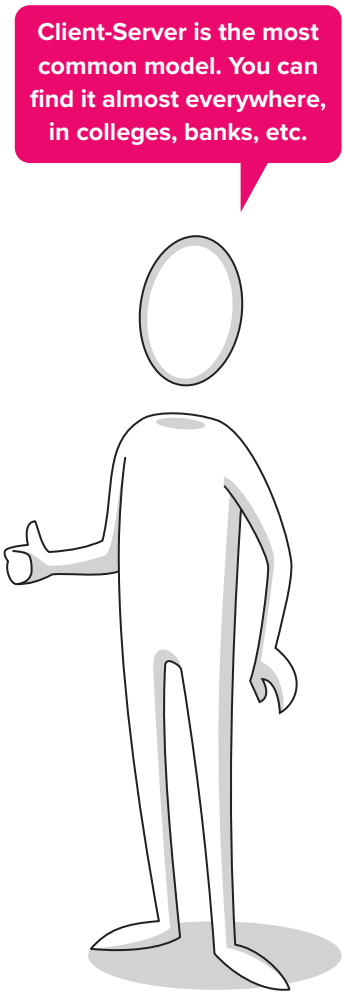
The client-server model

A network consists of two or more interconnected computers.

As a network gets bigger, it supports more tasks and the workload increases. In order to partition the tasks and the workload, each computer in a network must have a specific role.

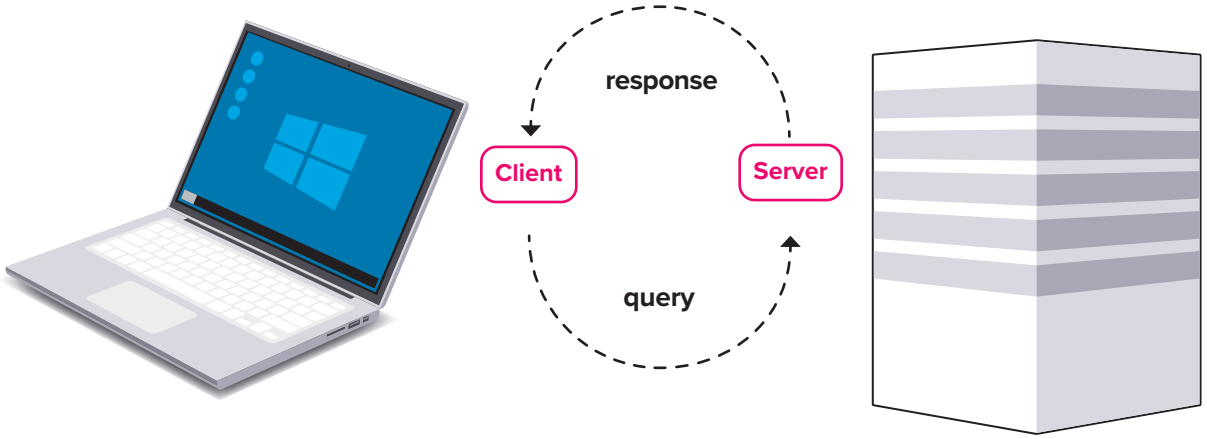
The **Client-Server model** works as a distributed application, where some computers operate as servers and others as clients. Think of a shop, where there are assistants and customers. The customers have requests that the assistants must satisfy. Exactly the same happens in the client-server model: The servers must serve the requests of the clients.

Services such as email and web access are built on the client-server model. When you are using the Internet, your computer uses a web browser to send a request to a web server, which in turn must respond with the correct data.



Information exchange

Computers in a network must communicate with each other in order to exchange messages and information. Communication between computers is quite different from that between humans. Computers "talk" with each other by using different "languages", called communication protocols.



Digital units

The basic **digital unit** is called a bit. A bit can take the value of 1 or 0. These two values are called binary digits and can have various meanings. The most famous meaning is that of activation states (on/off).

There are also other units of information that are defined as multiples of bits. The most common is the byte, which is 8 bits.

- 1 Byte: 8 bits
- 1 KB: 1,024 Bytes = 8,192 bits
- 1 MB: 1,024 KB = 8,388,608 bits
- 1 GB: 1,024 MB = 8,589,934,592 bits
- 1 TB: 1,024 GB = 8,796,093,022,208 bits

As in other measurements, binary units also use prefixes:

- 1 b: 1 bit
- 1 Kb: 1,024 bits = 8,192 bits
- 1 Mb: 1,024 Kb = 1,048,576 bits
- 1 Gb: 1,024 Mb = 1,073,741,824 bits
- 1 Tb: 1,024 Gb = 1,099,511,627,776 bits

Communication protocol

A **communication protocol** is a system of digital message formats and rules for exchanging these messages. A protocol defines the way that the messages should be formed.

In today's world, computer communication is based on the exchange of information packets. The information to be communicated is broken into small chunks that are labeled to indicate the sender and the receiver. It is like the traditional mail system with postcards. Packets have a maximum length and are forwarded from one computer to another in order to reach their destination. If a packet is lost, then it has to be resent. When the receiver receives a packet, it must send an acknowledgment to the sender in order to inform it that the packet was successfully received. This way, unnecessary retransmissions are limited.

Packets must have a certain structure.

1. The Header. It contains bits that indicate the sender and the receiver, as well as the communication protocol and the packet's number.
2. The information data, which is called the Payload.
3. A couple of bits that tell the receiver that it has reached the end of the packet, called the Trailer.

A packet's structure is explained below.

Packet's structure		
Header	**Payload**	**Trailer**
> Sender's address > Receiver's address > Protocol > Packet number	> Information data	> Data to show the end of packet

Network speed

As technology evolves, users' requirements also grow. The most common requirement is speed. In computer networks, speed has to do with how fast data is transmitted. In a network, speed is calculated in binary units per second. For example, 1 bit per second is written as 1 bps or 1 bit/s and means that the transmission of 1 bit takes 1 second. Many technologies have been developed to increase transmission speed, in both wireless and wired networks.

Asymmetric Digital Subscriber Line (ADSL)

At the moment, **ADSL** is the most widely used technology that enables fast data transmission over telephone lines. ADSL allows more data to be sent over existing telephone lines compared to traditional modem lines. ADSL supports data rates from 1.5 up to 24 Mbit/s when receiving data (downstream) and from 0.5 to 3.5 Mbit/s when sending data (upstream).

Very high bit-rate Digital Subscriber Line (VDSL)

VDSL is the next-generation DSL technology, providing faster data transmission rates than ADSL. VDSL supports super-accelerated data rates of 300 Mbps downstream and 100 Mbps upstream for short distances.

3rd generation (3G), 4th generation (4G), and 5th generation (5G) networks

3G networks provide fast mobile wireless telephony and Internet access. **4G** is the successor of 3G networks. Today, 4G Long-Term Evolution (LTE) offers up to 1,000 Mbit/s for receiving data and 500 Mbit/s for sending data. 5G is the latest standard for wireless networks designed to reach up to 20 Gbit/s. **5G** can support up to a million devices per square kilometer, a capacity that enables new services.

Optical fiber

An **optical fiber** is a flexible, transparent fiber made of silicon or plastic, slightly thicker than a human hair. Data is encoded in pulses of light and optical fibers permit the exchange of these light signals over longer distances and at higher data rates than other forms of communication.

Smart Tip

The Integrated Services Digital Network (ISDN) supports the digital transmission of voice, video, and data. The Public Switched Telephone Network (PSTN) allows any telephone in the world to communicate with any other. The PSTN transmits data at a rate of 64 Kbit/s. Both of these technologies are slowly becoming obsolete.

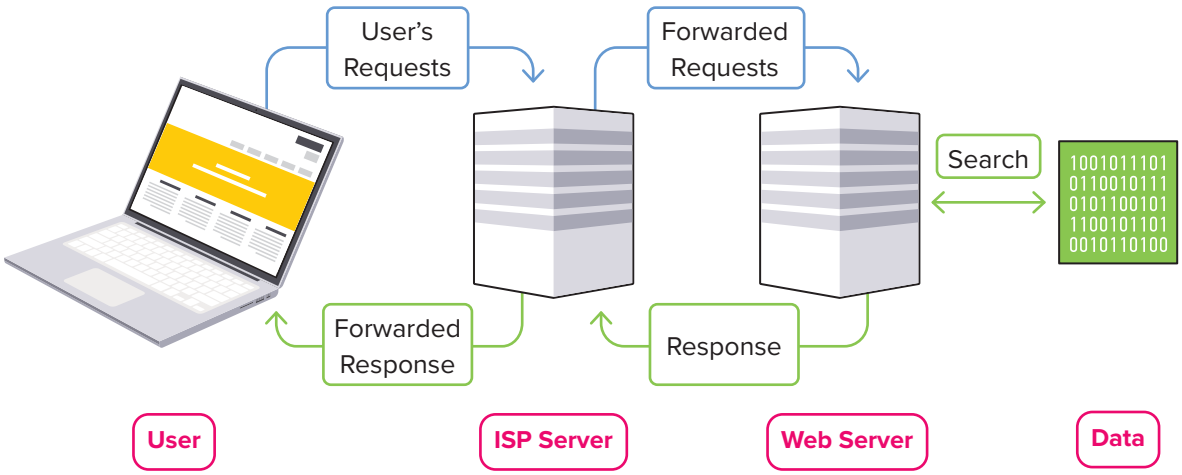
How the Internet works

The Internet transfers information around the world in seconds. When you connect your computer to the Internet, you are connecting to a special type of server that is provided by your **Internet Service Provider** (ISP). The ISP server provides a link between your computer and the outside world, the Internet. When you want to view web pages or check your email, your computer sends requests to the ISP server, which in turn connects to other Internet servers, forwarding the requests. This kind of Internet server is called a **web server**.

In the past, when information needed to be collected, individuals had to go to a public library and spend time searching. In today's world, the Internet serves as the largest source of information, accessible from home, office, or anywhere else through laptops and smartphones.

Check out what happens when you want to explore a web page from your browser:

1. You type an address into the browser's address bar.
2. Your browser sends a request to your ISP server asking for the page.
3. Your ISP server looks in a huge database of Internet (IP) addresses, called "Domain Name Service" or DNS to find the web server that hosts the website you want, then sends a request for the page to this web server.
4. The web server sends the requested page to your ISP server.



Hands on!

What are the main types of network topologies, and how do they differ in terms of structure and communication efficiency? Provide examples of scenarios where each topology might be most effectively utilized.

LESSON 2

What is a blog?

In this section, we will explore **blogs**—what they are, how they are used, and the essential guidelines to follow when writing one.

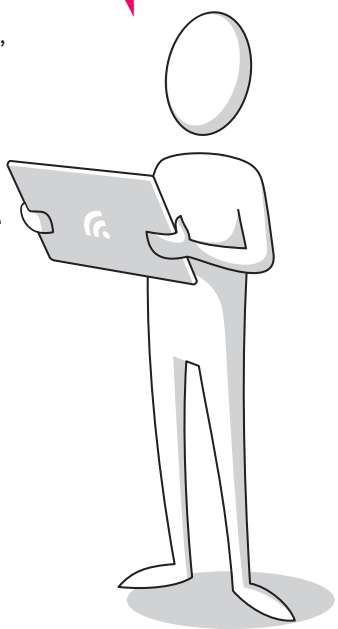
A blog is a website that consists of entries that are called "posts". The **posts** are typically displayed in chronological order with the most recent post at the top of the main page and the older posts toward the bottom and on other web pages.

A blog is usually written by one person and is updated frequently. It is often written on a particular topic. Blogging has as many applications and varieties as you can imagine, from photography to recipes, personal thoughts, and hobbies. Through blogs, people can learn lots of things, share ideas, make friends, and even do business with people with similar interests from around the world.

There are unwritten rules of the "blogosphere" that every blogger should follow. These rules concern the way you should write, as well as the way you should behave when you want to use other sources and other people's words in your texts.

1. When you write a blog, you should be clear so that the reader can understand the point of your article. Images, examples, bullets, and highlighted text always make the article easier and more pleasant to read.
2. Keep your text short; otherwise, it is likely that the readers will become bored.
3. Always read your text before you publish it in order to make corrections, if needed.
4. If you use borrowed materials in your blog (text, quotes, etc.), you should always cite your sources. To avoid plagiarism, you must attribute any quotations to their original source. If you refer to another article or blog, you should make a reference to it by providing the original author's name, the site where it was originally published, and a link back to that site.
5. Using a few words or a phrase and citing your source is generally acceptable under copyright laws. But, if you plan to copy more than a few words or phrases, it is better to ask the original author for permission to republish their text on your blog. Getting permission also applies to the use of photos and images on your blog.
6. Learn about the "fair use" or "fair dealing" exceptions to copyright law in the country in which you live. These will help you understand what you may not do with copyrighted material, especially in cases when you don't have the permission to use the copyrighted material.
7. The content of your blog is available for the world. Just as a reporter's words or a person's spoken words may be considered offensive, so may the words you use in your blog. Avoid legal trouble by writing with a global audience in mind. You never know who might read your blog. Always write about appropriate subjects.

The last four blogging rules are important because bloggers who don't comply may find themselves at the center of negative publicity or worse, in legal trouble.



How to create your own blog with Blogger

Below is a step-by-step guide to creating your own blog through **Blogger**. Blogger is a blog publishing service hosted by Google at **https://www.blogger.com**.

To sign in to Blogger:

> Visit **blogger.com**.

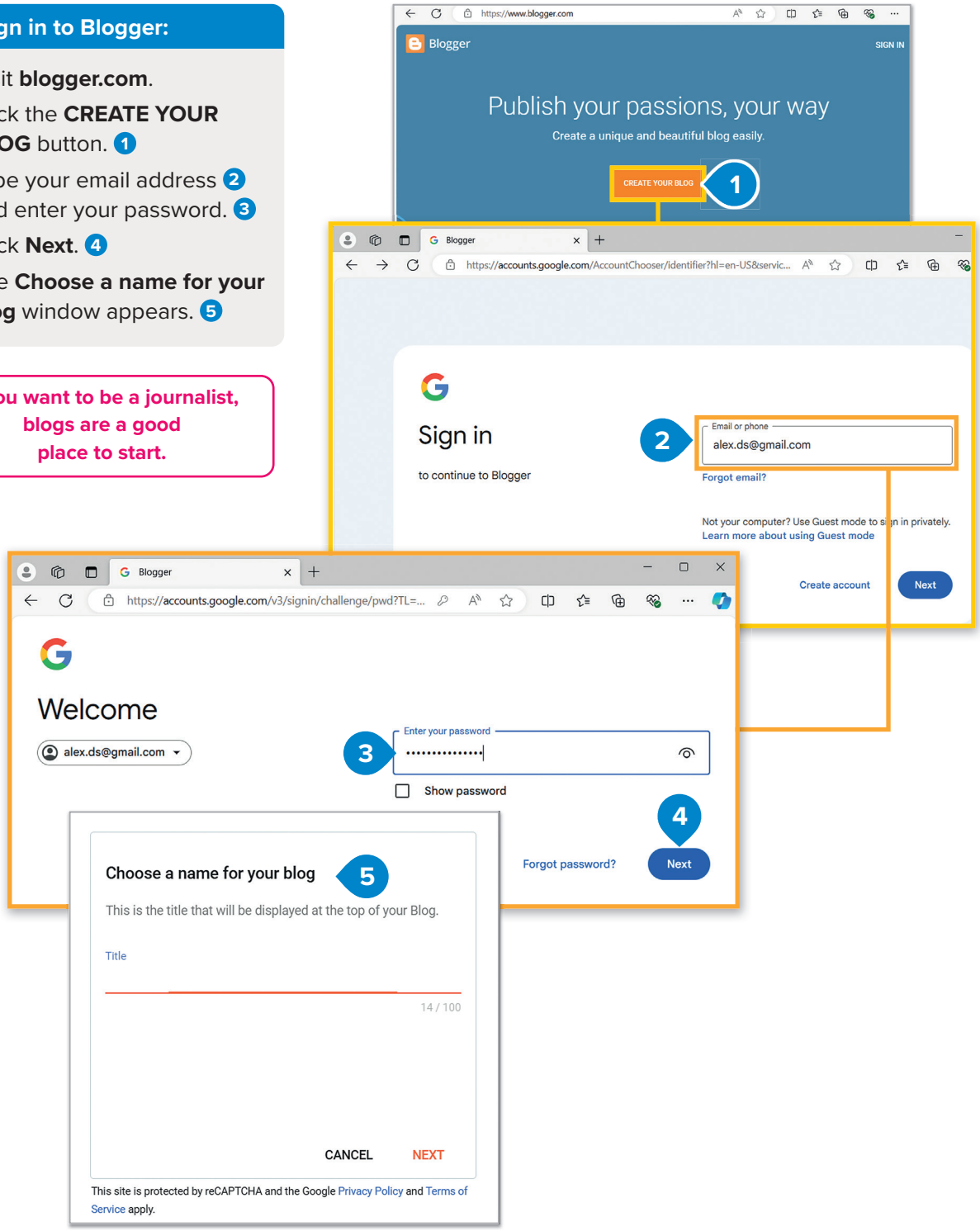
> Click the **CREATE YOUR BLOG** button. 1

> Type your email address 2 and enter your password. 3

> Click **Next**. 4

> The **Choose a name for your blog** window appears. 5

If you want to be a journalist, blogs are a good place to start.



History

Blog is a portmanteau of the words web log. It was coined by Peter Merholz in April or May, 1999.

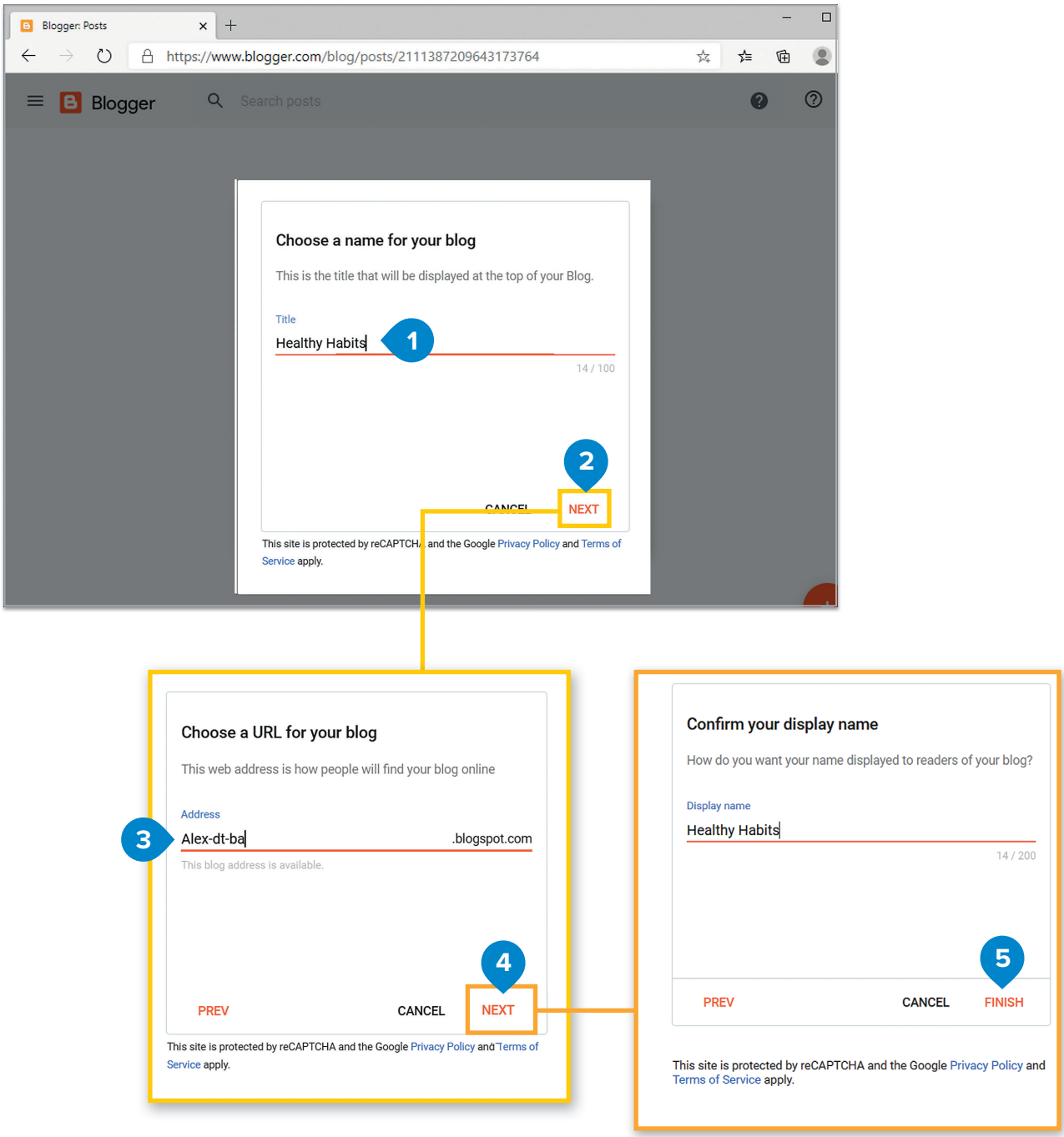
To create a new blog:

> In the **Choose a name for your blog** window, in the **Title** text box, type a name for your blog 1 and click **NEXT**. 2

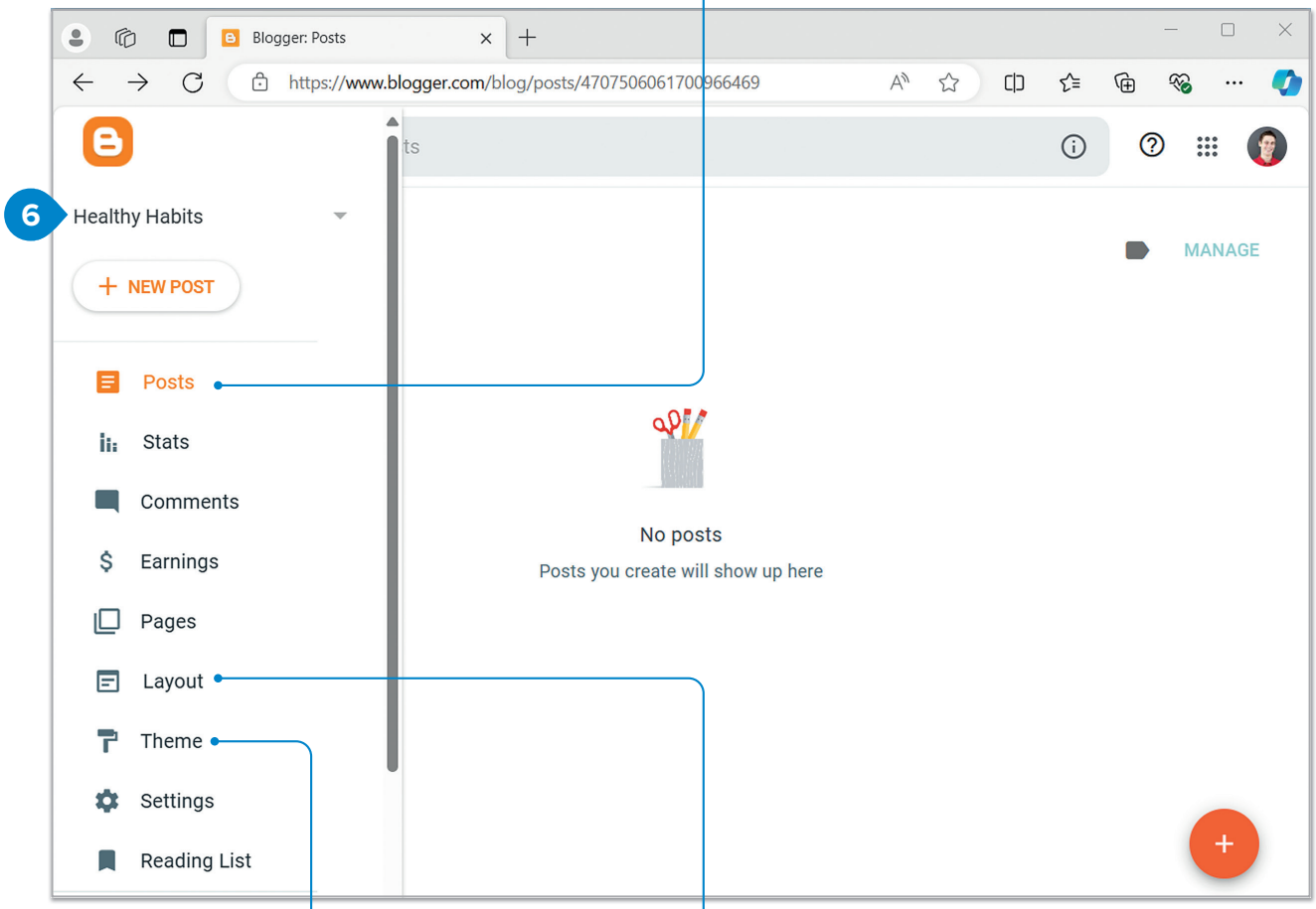
> In the **Address** text box, type a blog address 3 and click **NEXT**. 4

> Confirm the name of your blog and click **FINISH**. 5

> Your new blog will show up. 6



By choosing **Posts**, you will have the list of all your posts.



By choosing a **Theme**, you actually choose what your blog will be like.

By choosing **Layout**, you can get an idea of how your blog will be on the screen.

Be Safe

Remember that you should be very careful about the information that you post on your blog. The information described on your posts must be accurate. Also, you have to protect yourself by not posting any personal information like phone numbers or home addresses. Your posts will be accessible to everyone on the Internet and this means that your personal information will also be accessible to everyone.

Edit your profile

You can also edit your profile in order to specify the information you want to share with other people. In order to edit your profile, you should follow some specific steps.

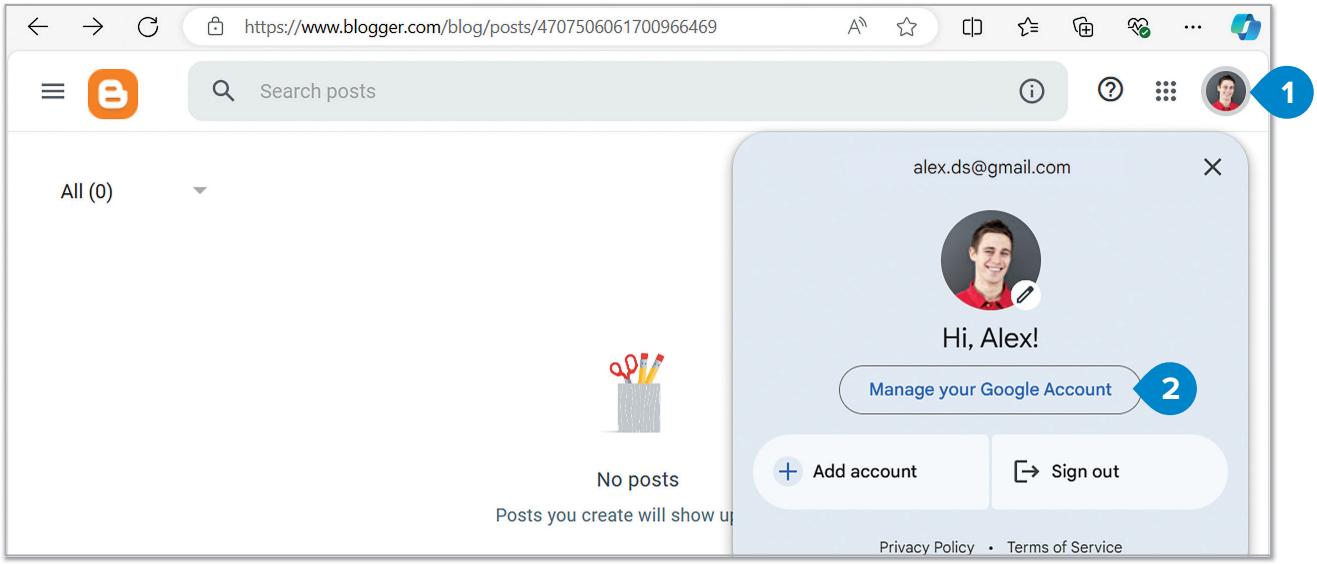
To edit your profile:

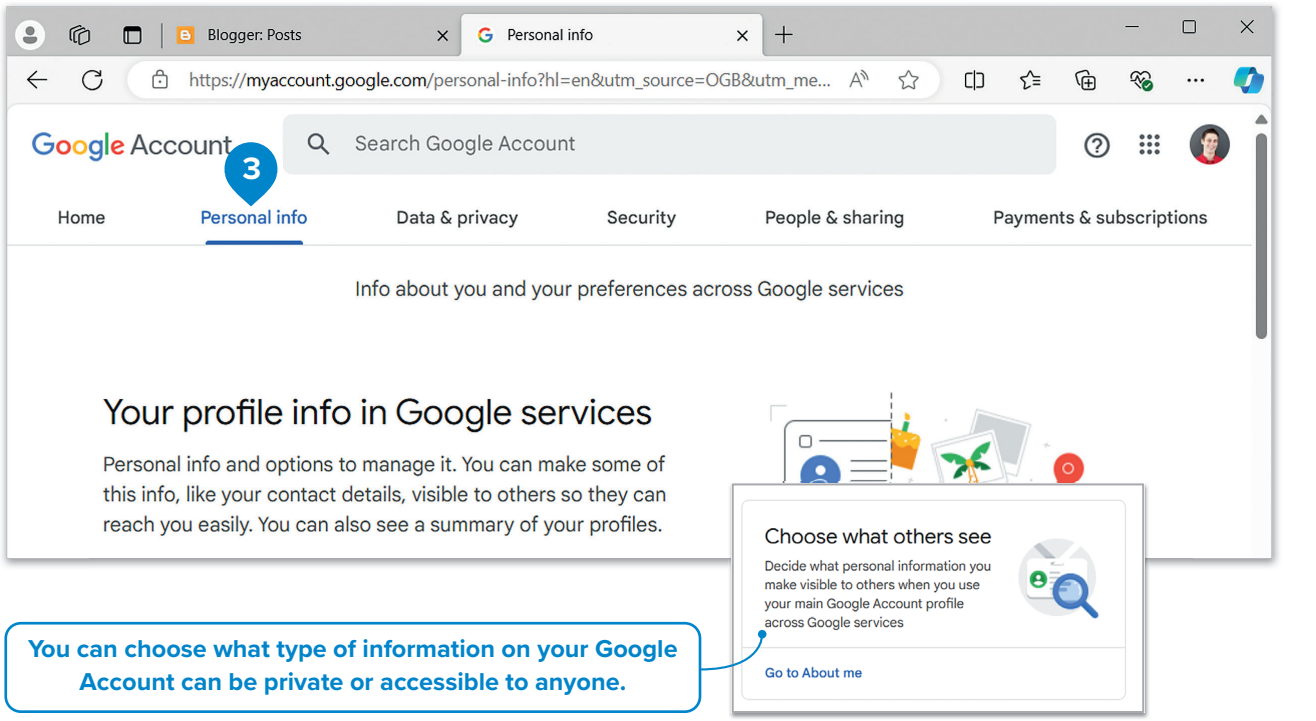
> In the upper-right corner, click your photo 1 and then click **Manage your Google Account**. 2

> In the menu bar of your Google account, click **Personal Info** and complete more information about yourself. 3

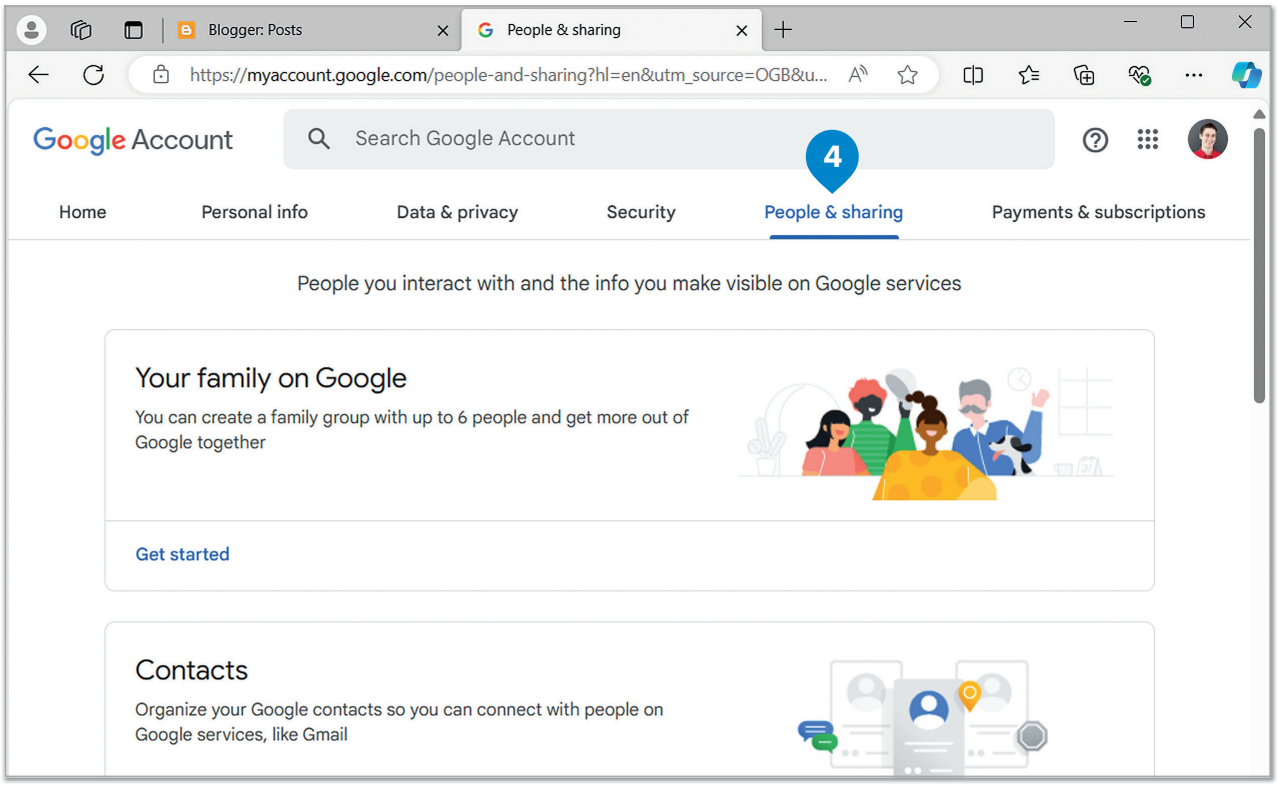
> Click the **People & Sharing** tab to search for people you know. 4

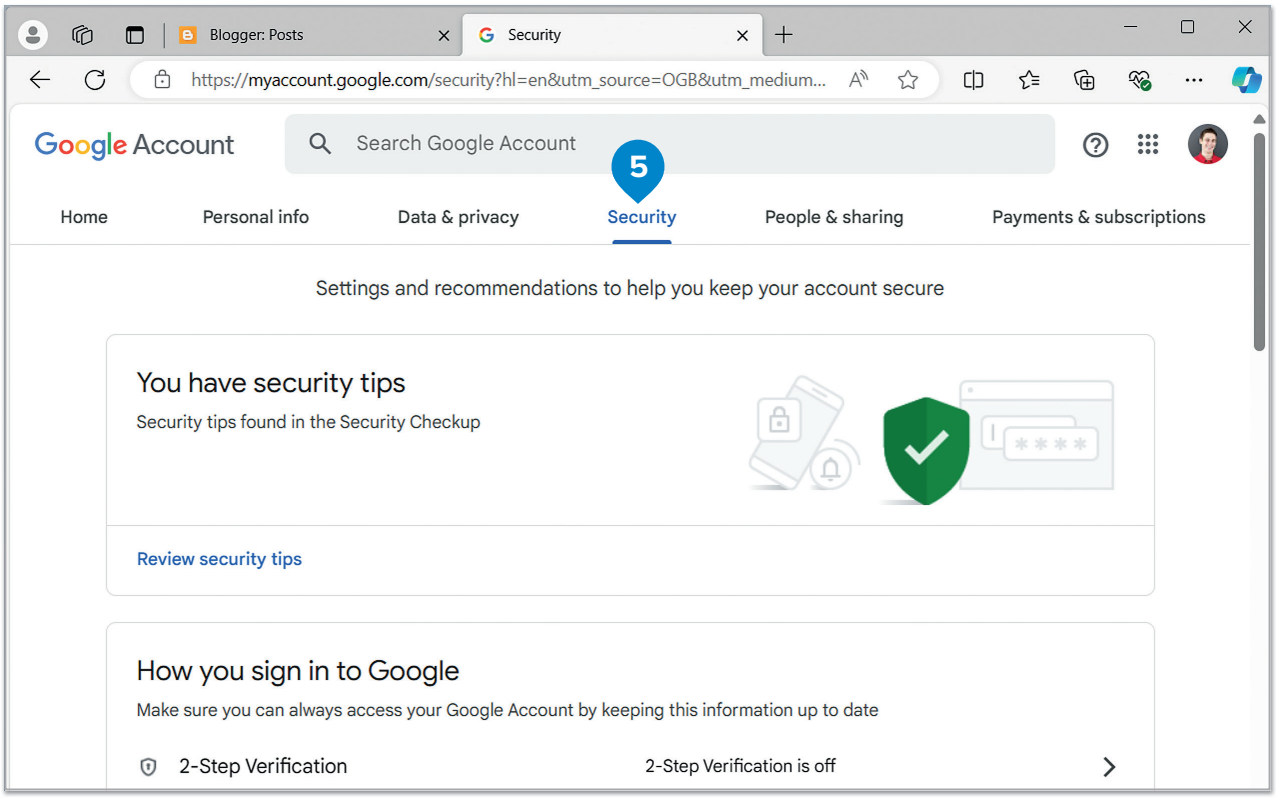
> Click **Security** to manage the privacy of your account. 5





You can choose what type of information on your Google Account can be private or accessible to anyone.





When you communicate or share content on Google, other people who use Google services can have access to your name and your profile picture. The type of information you can choose to show or hide is your birthday, gender, employment info, personal contact info, places you've lived, education info, etc.

Posting on your blog

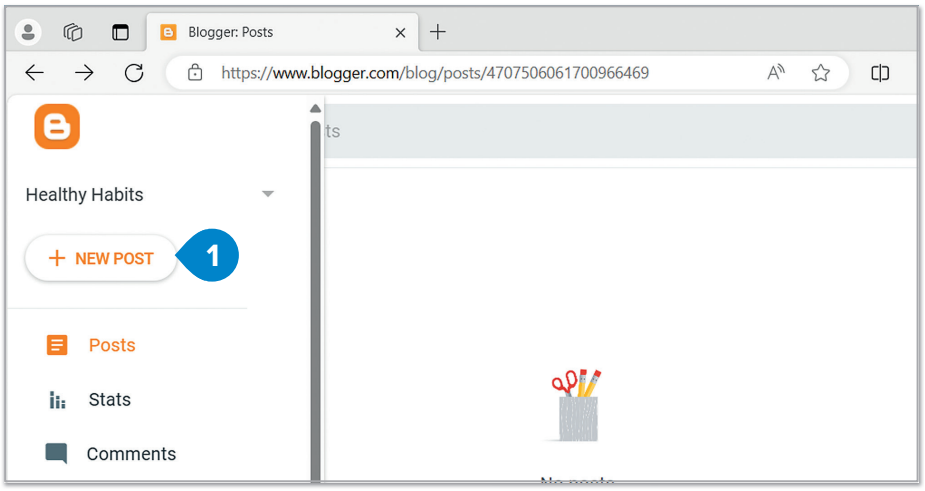
Once you have created a new blog, it's a piece of cake to add a new post onto your blog.

To create a new post:

> Click the **New Post** button to create a new post. 1

> Start by giving your post a title. 2

> Write your post. 3

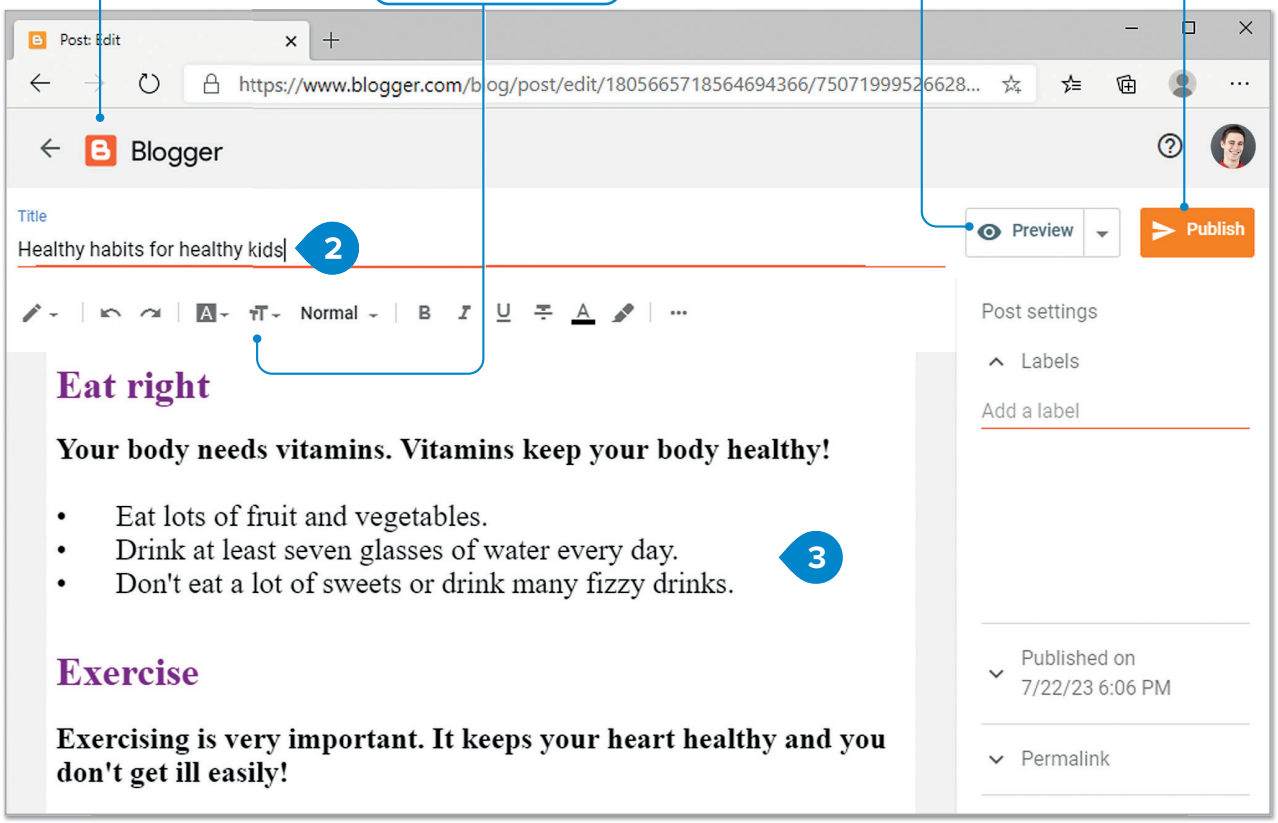


Click the orange B in the top-left corner to return to your Blogger home page.

On the Toolbar, you can choose the font type you like.

Click **Preview** to check how your post looks.

Click **Publish** when your post is ready to go.

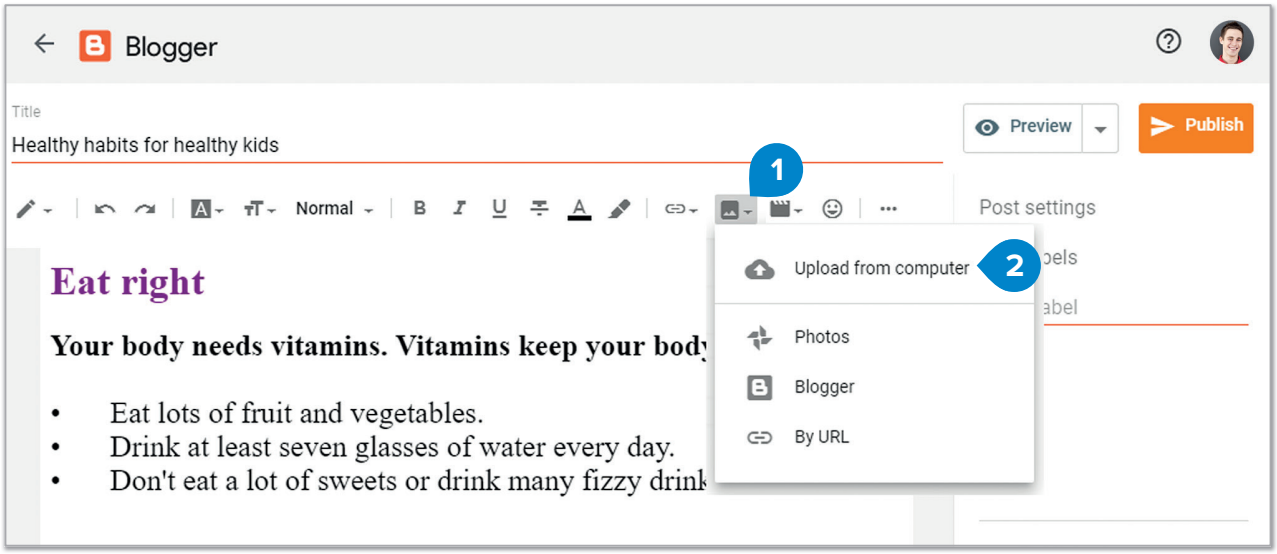


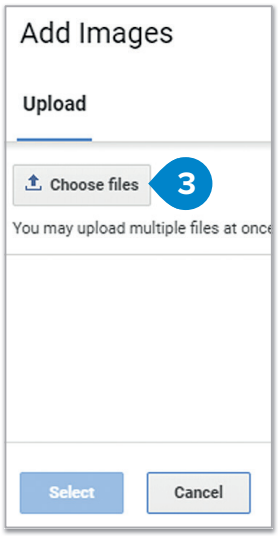
Insert images and videos in your post

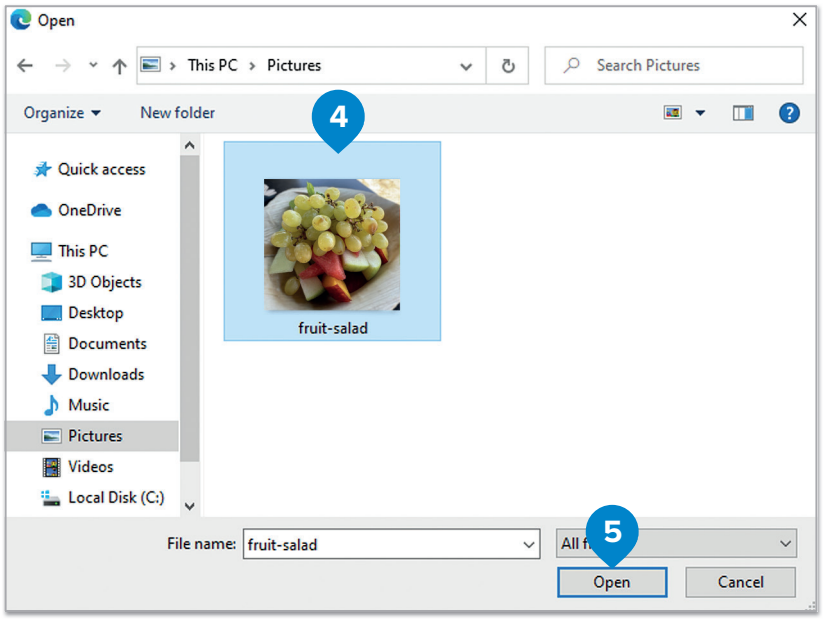
To make your post lively and more interesting, it is recommended that you use images and videos from sites such as **youtube.com**. Here, we are going to learn how you can do such things.

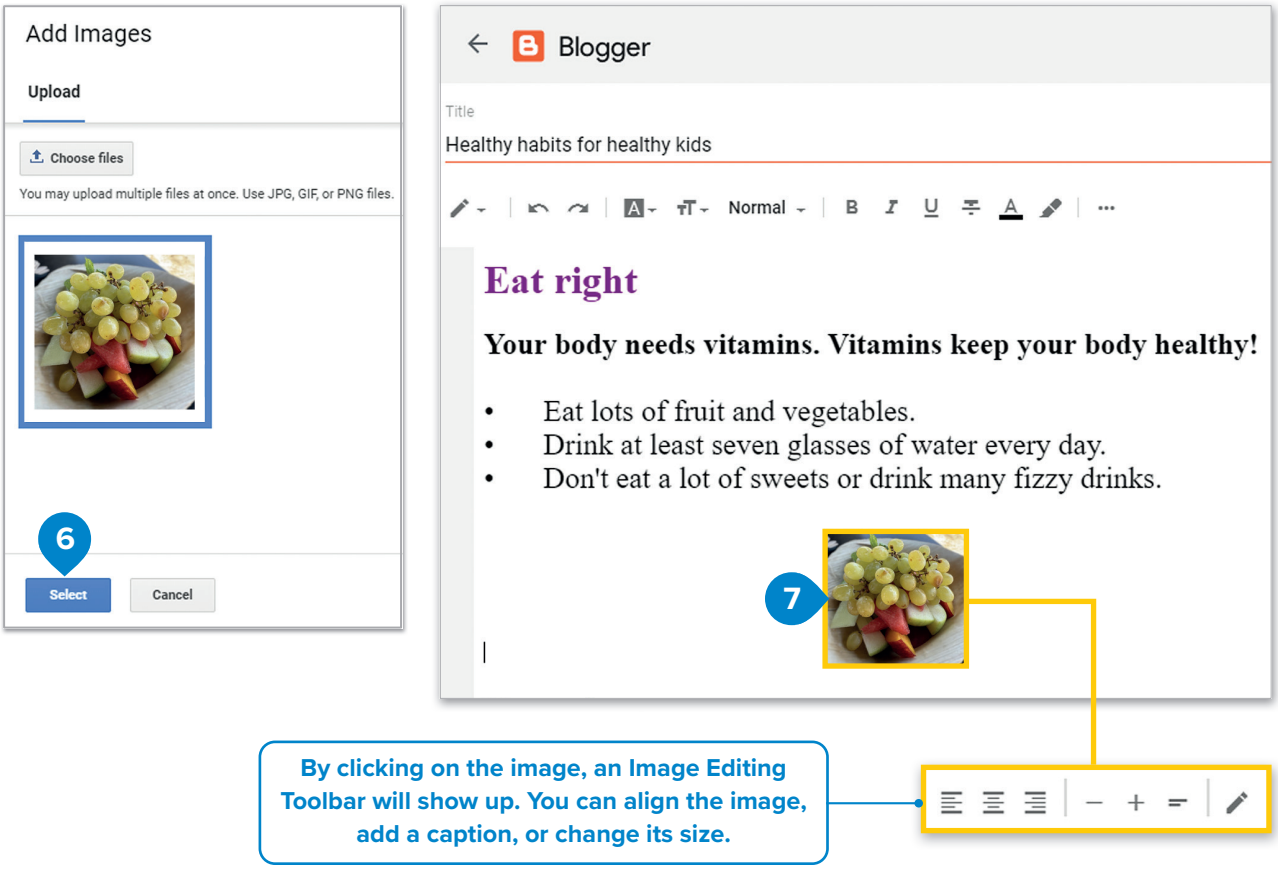
To insert an image:

> From the toolbar, click the **Insert Image button**. 1
> From the drop-down menu, click **Upload from computer**. 2
> In the **Add Images** window, click **Choose files**. 3
> In the **Open** window, select the appropriate image 4 and click **Open**. 5
> Click **Select**. 6
> The photo will be inserted into your post. 7





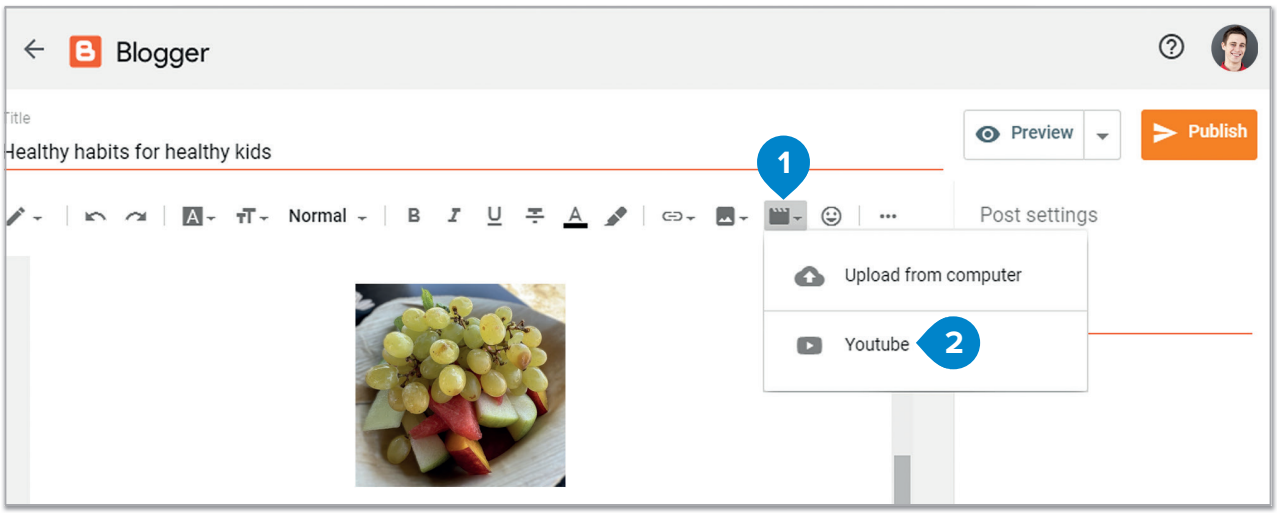


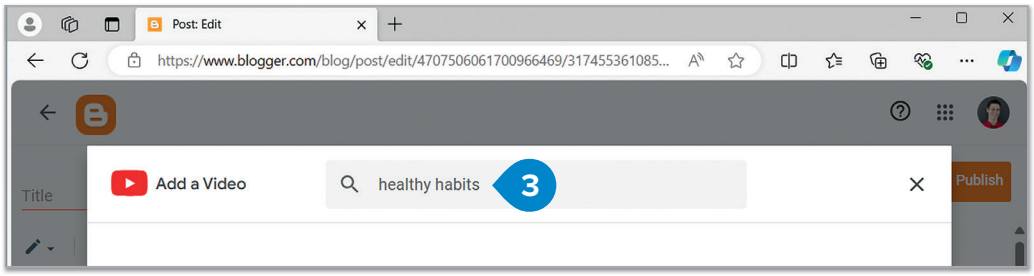


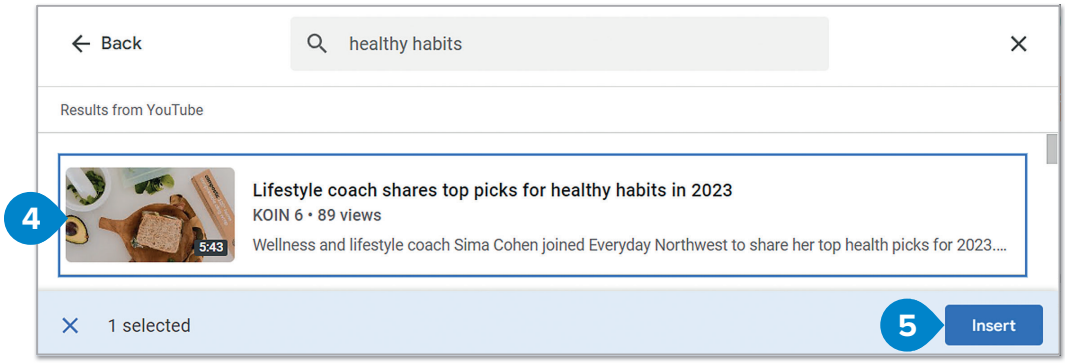
To insert a video from YouTube in your post:

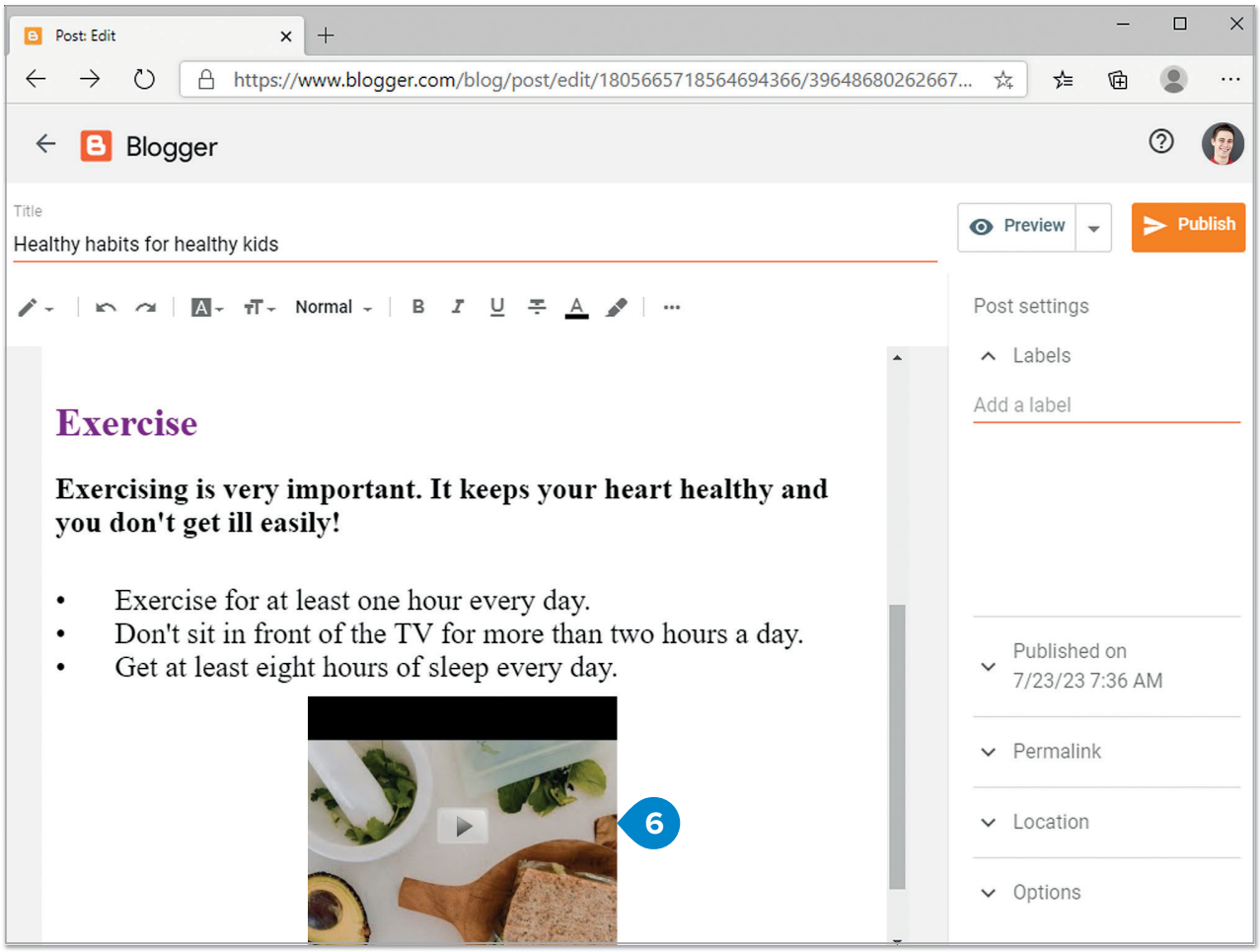
> On the **Toolbar**, click the **Insert video** button. 1
> From the drop-down menu, click **Youtube**. 2
> In the **Add a Video** window, type your search query in the search box 3 and press **Enter**.
> Choose the video you want 4 and click **Insert**. 5
> The video is added to your post. 6

To remove a video, just click it and press **Delete**.







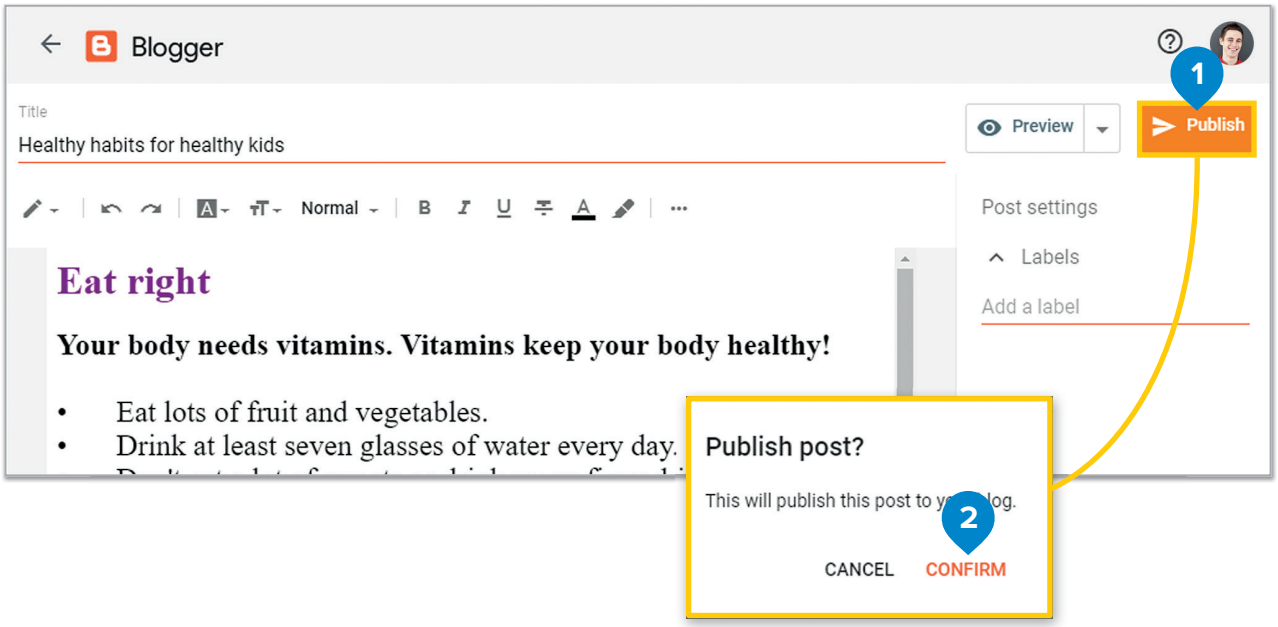


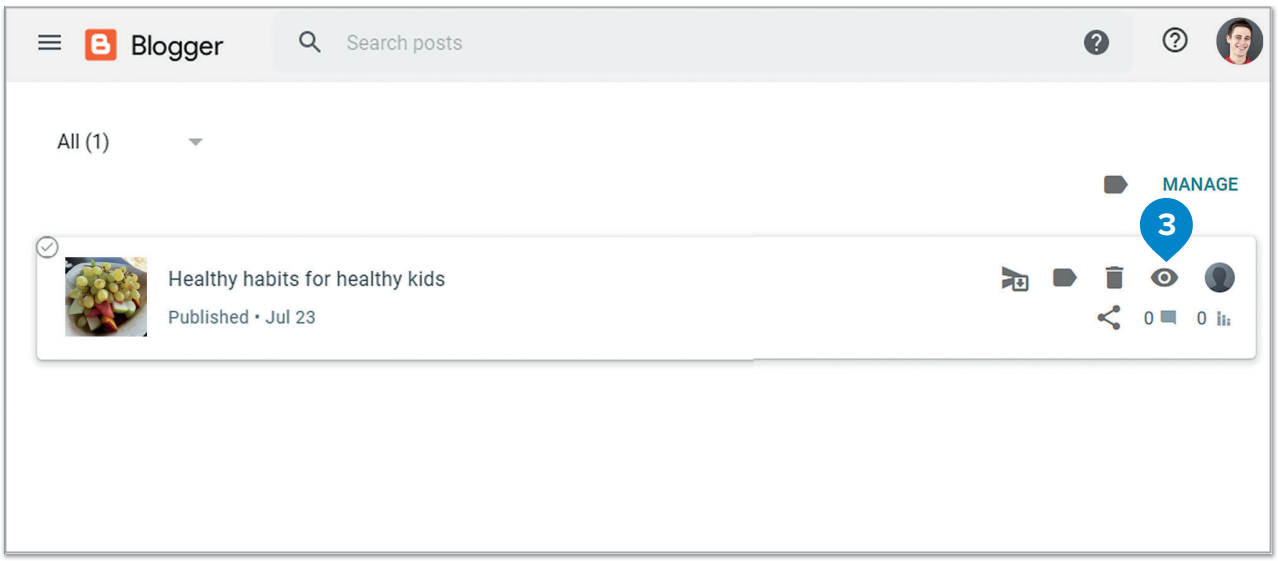
Publish your post

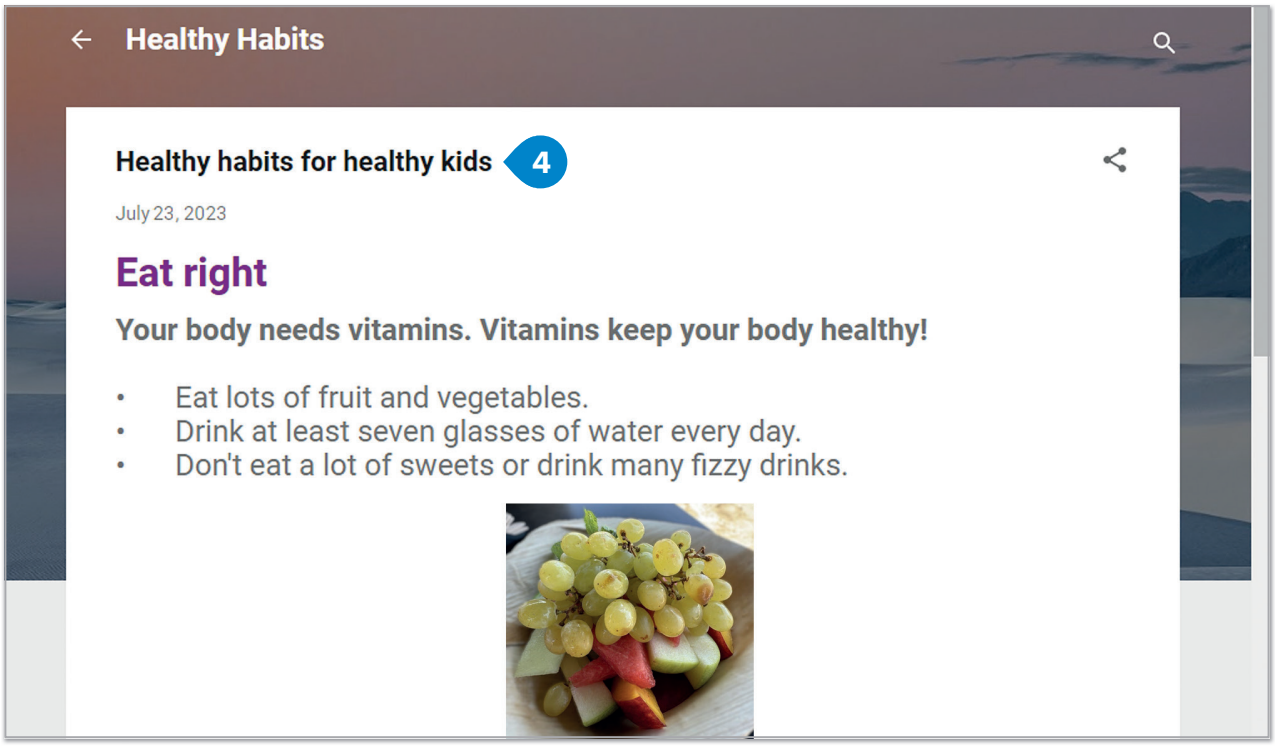
After you finish writing and editing your post, you are ready to publish it. Before that, you can choose the Preview option to check what your post will look like and decide if you want to make some final changes before publishing it.

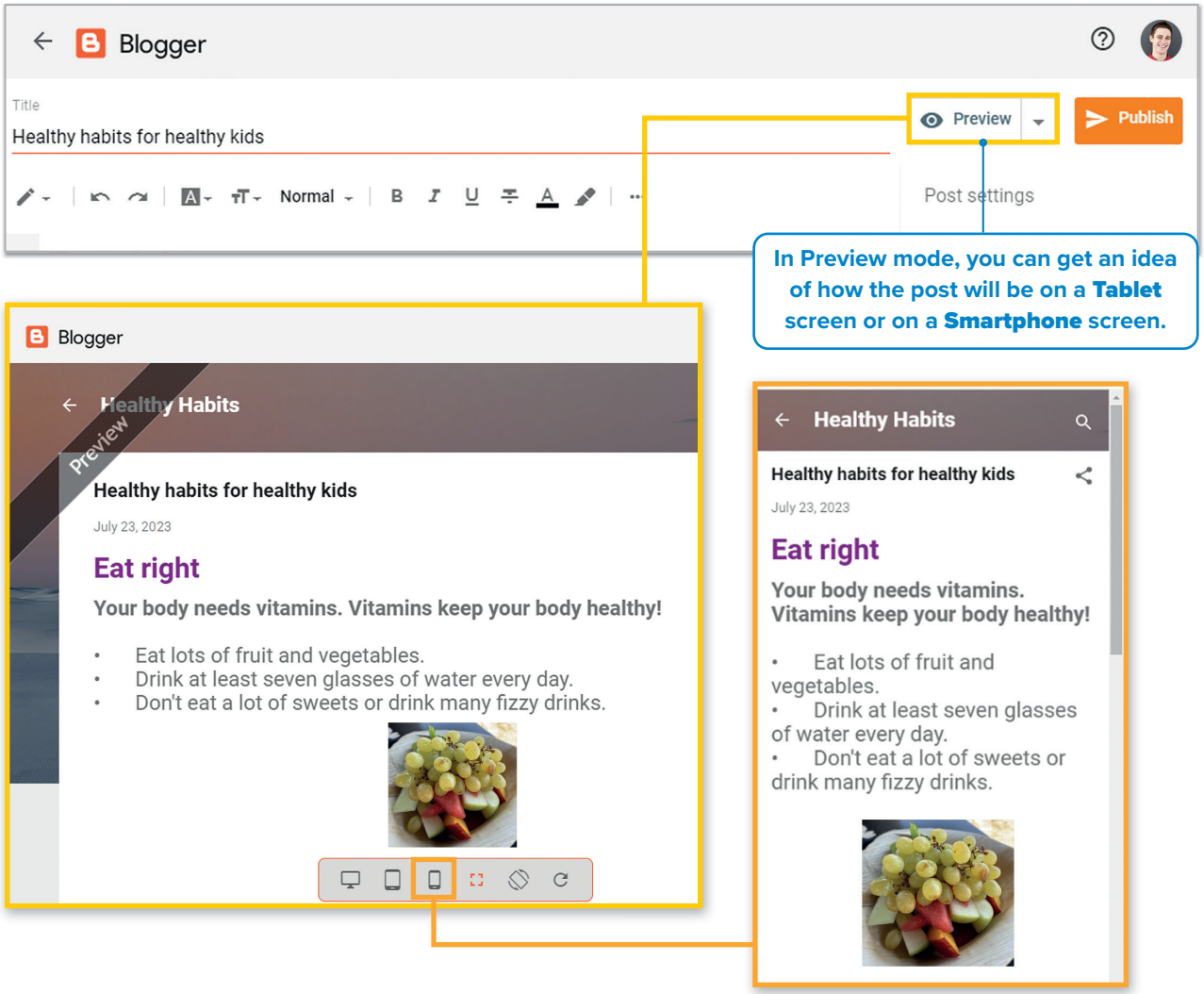
To publish your post:

> From the main window, click the **Publish** button. 1
> In the **Publish post?** window, click **CONFIRM**. 2
> In the main page, click the **View button**. 3
> The post will be published into your blog. 4







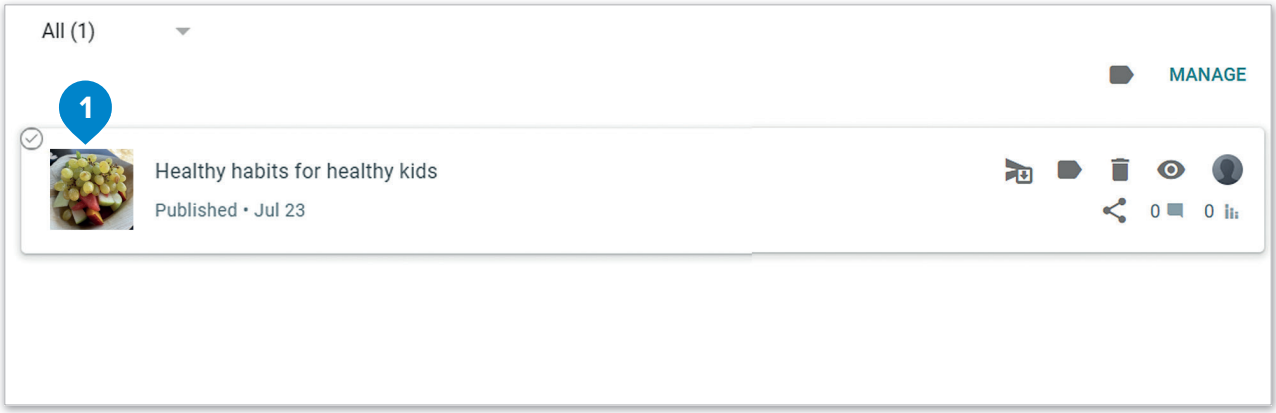


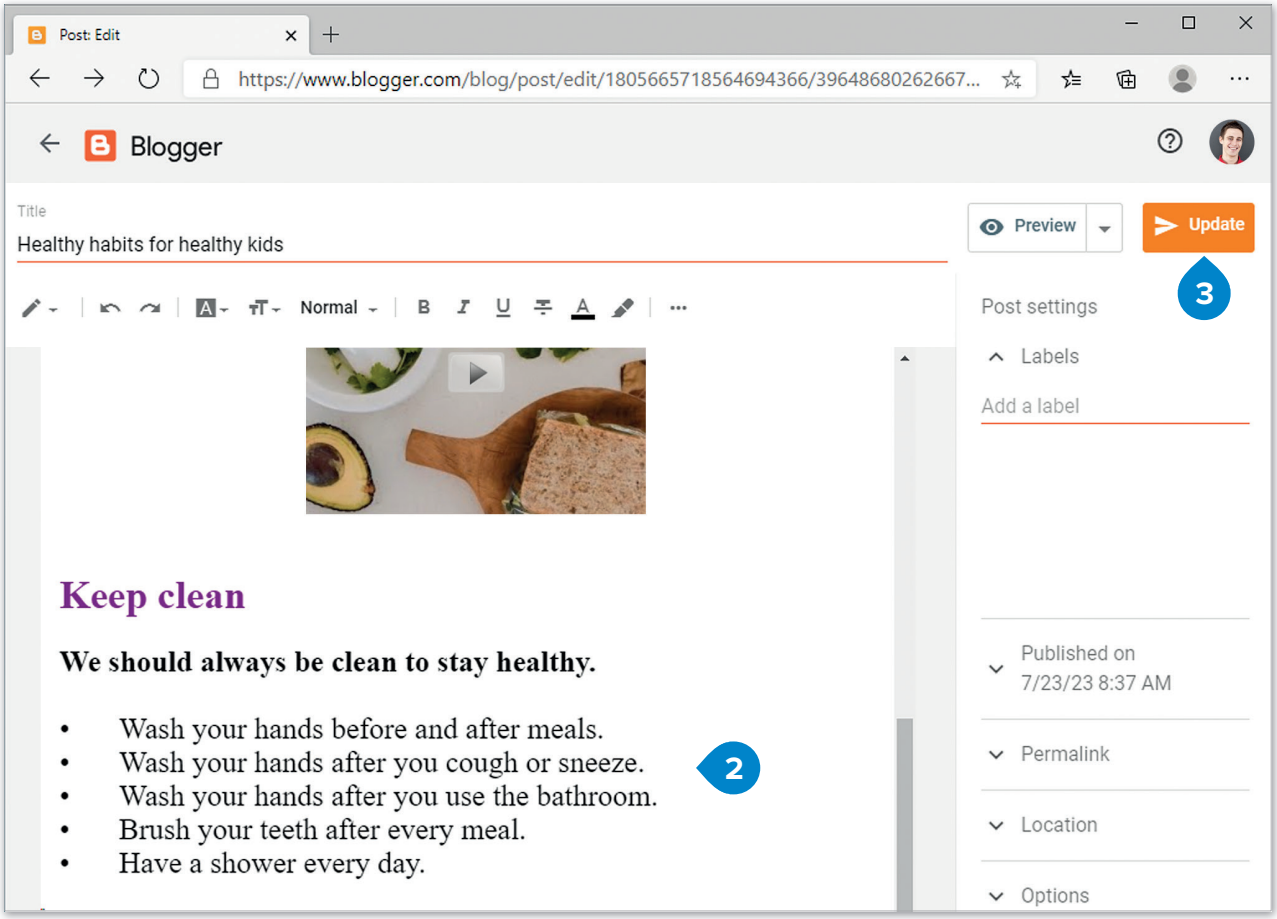
Update your post

Sometimes, you want to update your posts by adding new information or by removing information. To do that, use the **Post Editor**.

To update a post:

> Click on the post to open it. 1
> Make the changes you want. 2
> Click **Update**. 3





Post a comment

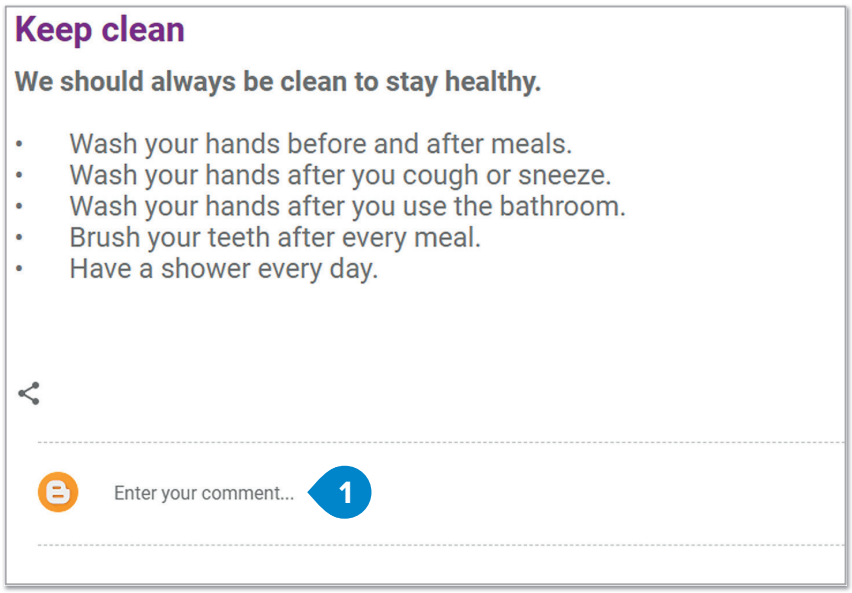
You can comment on your post or reply to someone else's comment.

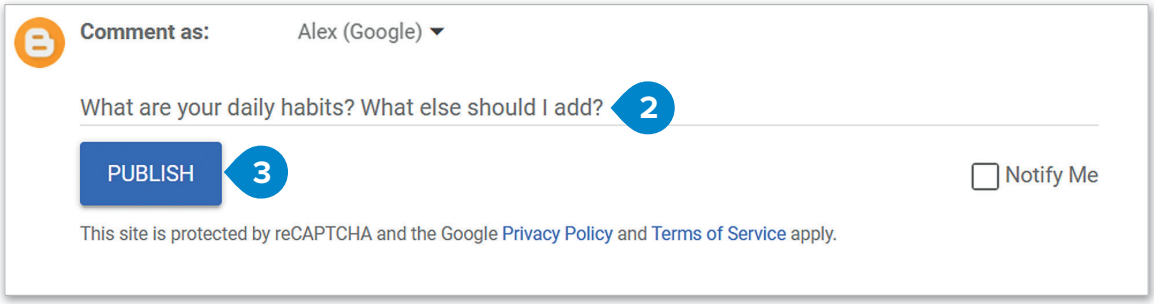
To post a comment:

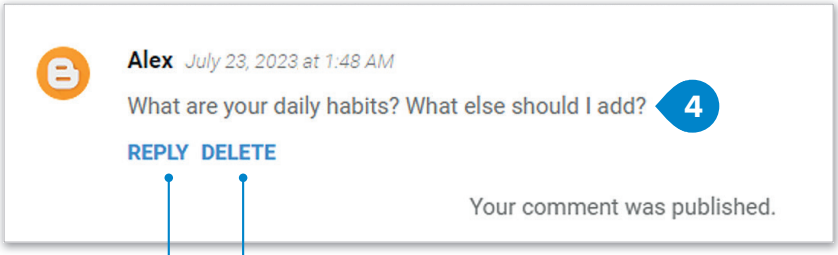
> At the bottom part of the post page, click **Enter your comment**. 1

> Type your comment in the box 2 and click **PUBLISH**. 3

> Now your comment is published. 4







Click **REPLY** to reply to a comment.

Click **DELETE** to delete a comment.

Hands on!

Select a subject you would like to write about (for example, history, technology, sports, etc.) and create a blog with Blogger. Create a new post and type an article, with images and videos. Ask your friends to comment on your article and then reply to them.

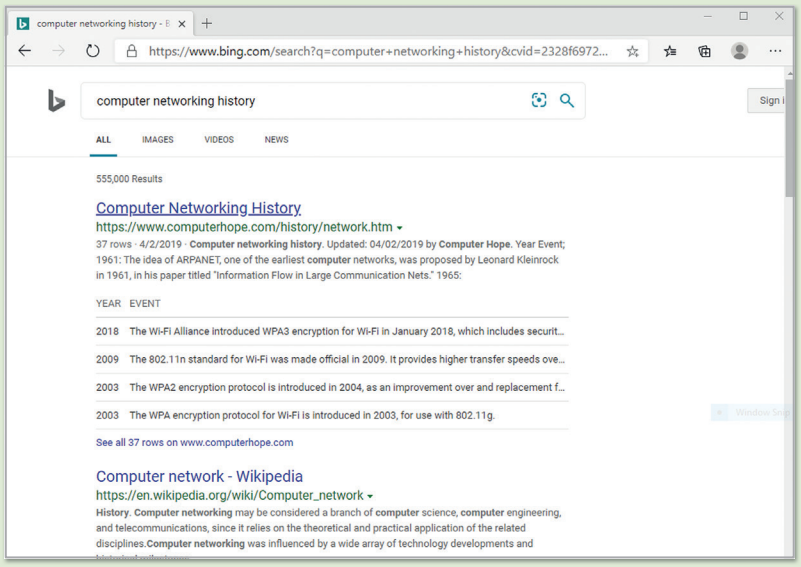
Project

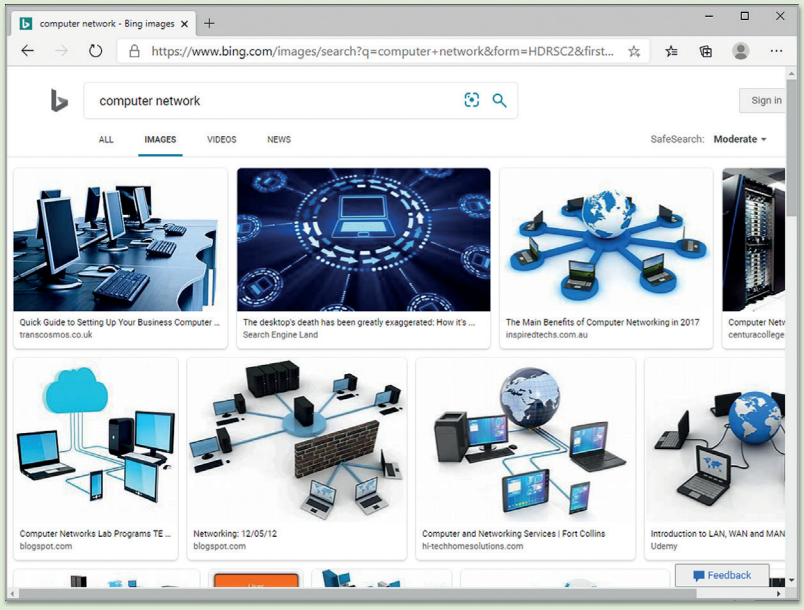
Communicating ideas

Form teams and search the Web to find information about the different kinds of networks and their history, as well as modern communication tools. Gather as much information as you can.

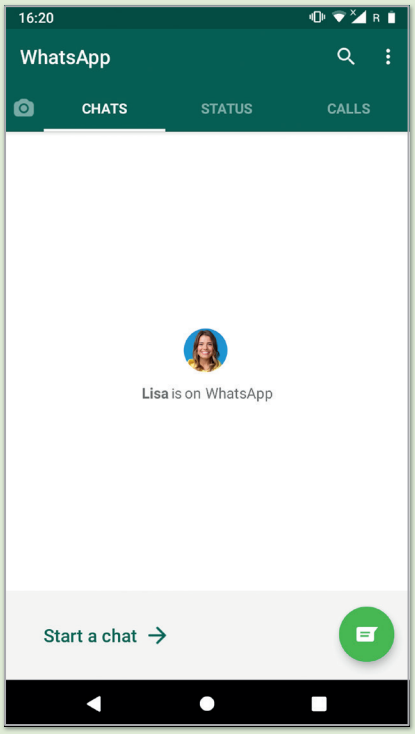
> Ask your teacher for help when you collect information. Ask him or her to provide you with information about books and magazines that can help you with your project.

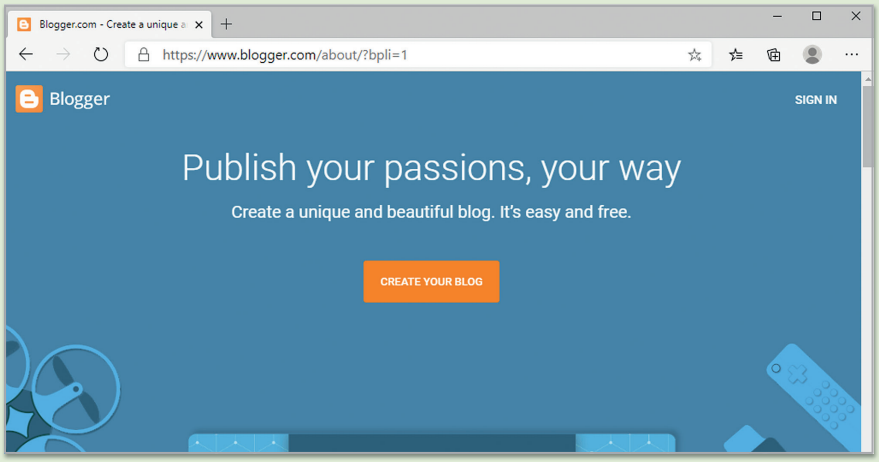
> While working, try to collaborate with your teammates using the communication tools you have learned about. Make team conference calls, exchange files, etc.

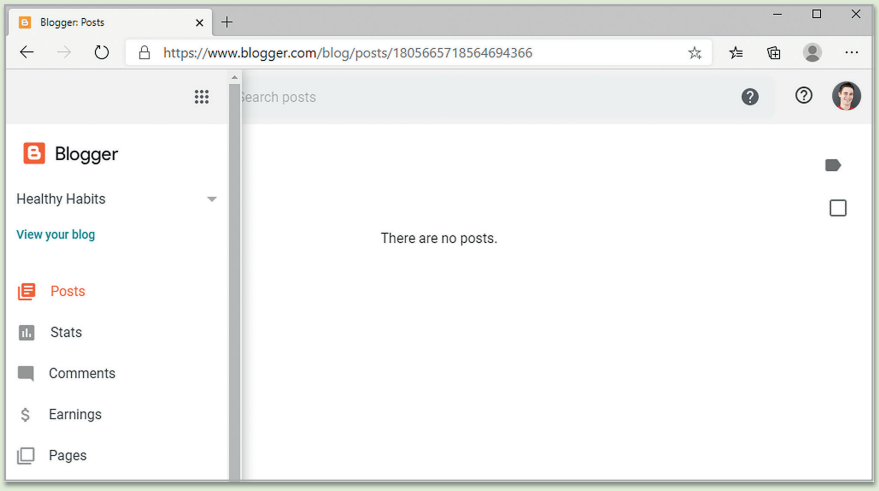




- Ask your friends to read your articles and make recommendations in order for you to make corrections. Do the same with your friends' articles.
- When you have collected the information you want, write a report presenting the evolution of communication tools and how they help modern people in their everyday lives.
- Create a blog and post your team's articles.
- Remember to follow the rules you have learned about the way you should write.
- If you use other people's material, always make a reference to the original work.
- Make your article exciting by using images and videos where possible.







Wrap up

Take a moment to reflect on your progress.

How confident are you in your ability to apply the following skills?

- Explaining what a computer network is and describing various network topologies.
- Describing how communication protocols enable devices to exchange data.
- Identifying the differences between LANs and WANs and explaining their specific uses.
- Using social media platforms, such as Facebook, responsibly and respectfully.
- Understanding the importance of protecting personal information and respecting intellectual property online.
- Communicating over the Internet through an instant messaging application.
- Preventing cyberbullying and taking action when someone is targeted online.
- Outlining the rules of netiquette.

Key Terms

3G	digital citizenship	network	share
4G	digital unit	open source	shareware
ADSL	emoticon	optical fiber	smiley face
binary digits	exchange	personal data	social media
bit	Facebook	plagiarism	status
blog	freeware	point-to-point	Threads
bus	friend	post	topology
byte	information packet	profile	upload
call	instant message	protocol	video call
chat	intellectual property	publish	WAN
client	ISP	request	web server
comment	LAN	restriction	WhatsApp
copyright	license	server	X platform

Skills and Pathways

Computing in Today's World

Navigate the digital world.

Have you ever felt overwhelmed by the endless possibilities of the digital world? What if you had the skills to not only keep up but thrive in today's technology-driven landscape? Imagine confidently managing your computer, browsing the web securely, and staying productive online.

Skills and Pathways: Computing in Today's World walks you step-by-step through everything you need to succeed in the digital age. Learn how to master your computer and operating system, manage files, and customize settings to optimize your digital workspace. You'll also explore how to browse the internet safely, manage emails, and communicate effectively using social media and other online tools. Enhance your productivity with tools for mind mapping, note management, and collaboration on documents, as well as participating in virtual meetings and creating impactful presentations.

By the end, you'll have the confidence to navigate the digital landscape, connect with others, collaborate seamlessly, and work smarter with technology.

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