

Brownie Cybersecurity

Explore cybersecurity by earning these three badges!

Badge 1:
Cybersecurity Basics

Badge 2:
Cybersecurity Safeguards

Badge 3:
Cybersecurity Investigator



This Cybersecurity badge booklet for girls provides the badge requirements, background information, and fun facts about cybersecurity for all three Brownie Cybersecurity badges. It does not include all the information needed to complete the badges. Volunteers may access the full meeting plans—including detailed activity instructions—on the Volunteer Toolkit (VTK) or by contacting their local council.

Welcome to the world of cybersecurity!

We use computers every day to send emails, watch videos, and shop online. Computers are also a part of our lives in many other ways that aren't as easy to see. Computers power up skyscrapers and streetlights, keep air conditioners and security systems humming, run medical devices in hospitals, control cars and planes, and much more.

Cybersecurity is the way we protect all those computers—and ourselves—from crime.

When you've earned these three badges, you'll know the basics of cybersecurity, what privacy means, and how to protect yourself when you're on a computer.

Volunteers please see the Volunteer Toolkit (VTK) or contact your local council for the full meeting plans, including detailed activity instructions.



Badge 1:

Cybersecurity Basics

We use digital devices such as laptops, tablets, and smartphones to work, shop, and play. Technology is such a big part of our lives that we don't usually stop to think about it. In this badge, you'll find out more about how you use technology and how you can keep your technology safe.

Steps

1. Find out how you use technology
2. Discover what your technology can do
3. Find out how to create layers of security
4. Find out how to use real-life safety rules when you go online
5. Find out how messages travel on the internet

Purpose

When I've earned this badge, I'll know the basics of cybersecurity and understand the role technology plays in my life.

My Smart City

Did you know that traffic lights, elevators, streetlights, fire alarms, and the energy grid can all be run by computers?



STEP

1 Find out how you use technology

The first step to understanding cybersecurity?

Realizing that technology is all around us and that you use it every day—even in ways that may surprise you! Once you know how you use technology, you can learn more about how to keep yourself and your information safe.

Do you think computers are a big or small part of your life?

Circle the ways in which you use your computer, mobile phone, or tablet.

- Play games
- Do homework
- Talk to my family members or friends
- Watch a video, TV show, or movie
- Listen to music
- Learn fun facts about something I'm interested in
- Take a photo or video
- Other _____

Here are some appliances that can be connected to a computer or to the internet. Take a look around your home. Are any of these appliances connected to your computer or the internet?

- Dryers
- Stoves
- Televisions
- Heaters
- Refrigerators
- Other _____

Did you know that computers are also used in these places?

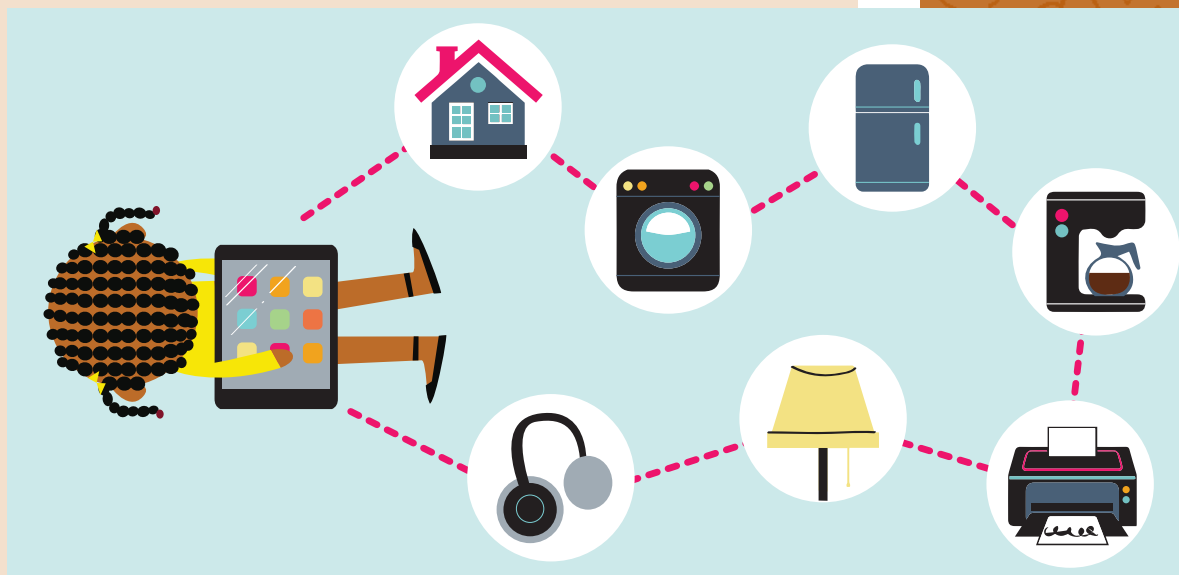
- Banks
- Schools
- Hospitals
- Police stations
- Fire stations
- Trains
- Planes

The Internet of Things

More and more devices—from coffee makers and washing machines to lightbulbs and headphones—can be connected to the internet.

This network of connected devices is called the **Internet of Things** or IoT for short. It allows objects to be controlled remotely and is getting bigger every day.

Billions of connected devices can make life easier for people, but can also make those devices less secure. That's why cybersecurity experts are working to make the IoT as safe as possible.



What Does the Word “Cybersecurity” Mean?

The word “cybersecurity” means computer safety. Cyber is another word for computer and security means safety. We all need to protect our computers and ourselves from people who want to know too much about us.

STEP 2 Discover what your technology can do

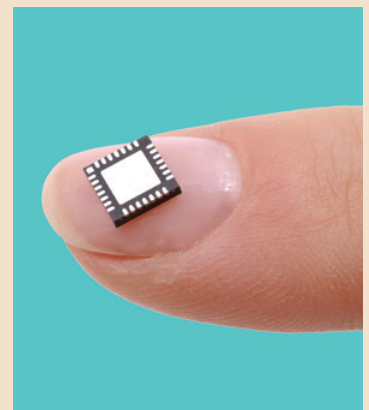
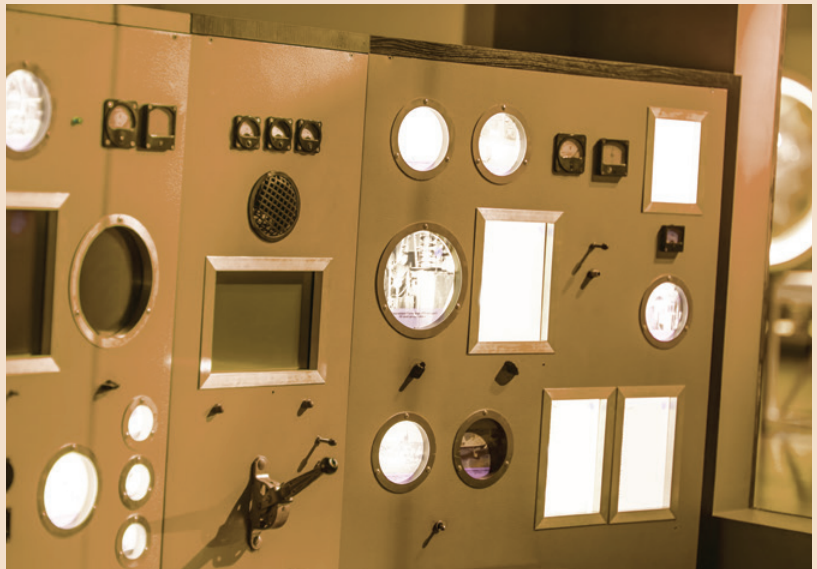
In Step 1, you found out how you use technology.

Now you know just how often you use it. You know that you use technology at home and at school. You also use it at the bank, the mall, and the grocery store. In this step, you'll find out how many everyday tasks you can do using your digital devices. Your devices hold all your important information. They also can do important tasks for you. What are some ways you can keep your devices safe?

The Incredible Shrinking Computer

One of the first digital computers was called ENIAC. That odd name stood for Electrical Numeric Integrator and Computer. It was so big that it filled an entire room. It was built in 1945 with almost 18,000 vacuum tubes. It weighed more than 30 tons—the same as six elephants.

Today, you can put a computer in your pocket! A smartphone is a computer with tiny microchips inside it. Those microchips can hold a lot of information and they are powerful—1,300 times more powerful than ENIAC.



PUTTING THE PARTS TOGETHER

It's important to know about computer parts so you can understand which parts need protection. Can you identify all of the parts in your computer and the digital add-ons?

Match the parts to the names by looking at the numbers in the boxes.

1. CPU: This stands for Central Processing Unit, which is the main chip in a computer responsible for carrying out all the tasks. It is often referred to as the “brain” of the computer. Laptops, phones, and even televisions have CPU chips inside them.

2. Power supply: The source that delivers power or energy. In a computer, the cord and plug are the power source that turns it on and off.

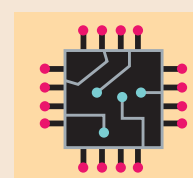
3. Webcam: A digital camera that can take and send images. Your webcam might be built into your computer or it might be something separate that you attach to your computer.

4. Monitor: A screen that shows pictures and words.

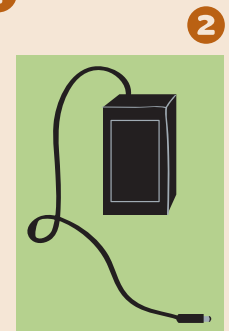
5. Keyboard: A panel of keys with letters and numbers that lets you type messages.

6. Mouse: A little device that you move with your hand—it helps you move the arrow on the computer screen. (If you have a laptop, you use a trackpad instead of a mouse. A trackpad is a surface you touch with your finger. It helps you move the arrow on the computer screen.)

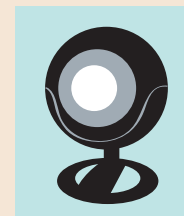
7. Speakers or headphones: Devices that let you hear sounds from your computer.



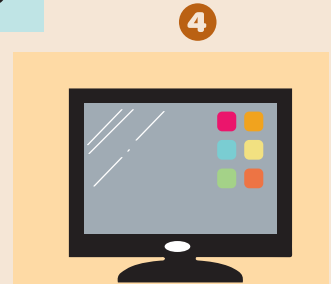
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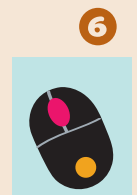
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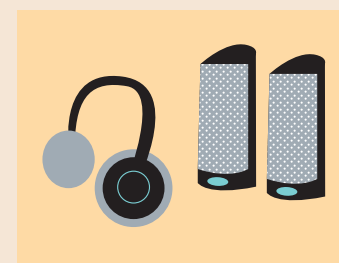
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5



6



7

Cyber Scramble

Look at the scrambled words below. Each word is a computer part. Unscramble each one. Then read the circled letters in order to answer this riddle: **What is an astronaut's favorite place on a computer keyboard?**

① ASREKEP

— — — — —

② CESENR

— — — — —

③ SEMOU

— — — — —

④ EKBYODAR

— — — — —

THE — — — — —

— — — — —!

Answer on page 10

STEP

3 Find out how to create layers of security

When you want to keep something safe, you need to protect it. When it comes to cybersecurity, many layers of protection work better than just one.

What is a layer of security? Imagine that you were asked to protect an egg so that it doesn't break if it falls off a table.

You might put the egg in a small box filled with cotton balls. To be even safer, you could seal the box with lots of tape. Then you could wrap the box in bubble wrap and put it in a larger box.

That's five layers of protection: cotton balls, small box, tape, bubble wrap, and large box.

The egg would be much better protected inside all those layers. In cybersecurity, many layers of protection work better than one layer, just like in real life.

STEP

4 Find out how to use real-life safety rules when you go online

In real life, you have rules that you follow so you don't get hurt or lost. For example, when you go out in public, your parents might tell you to stay close to them so you don't get lost in a crowd, to look both ways when you cross a street, or to obey traffic lights.

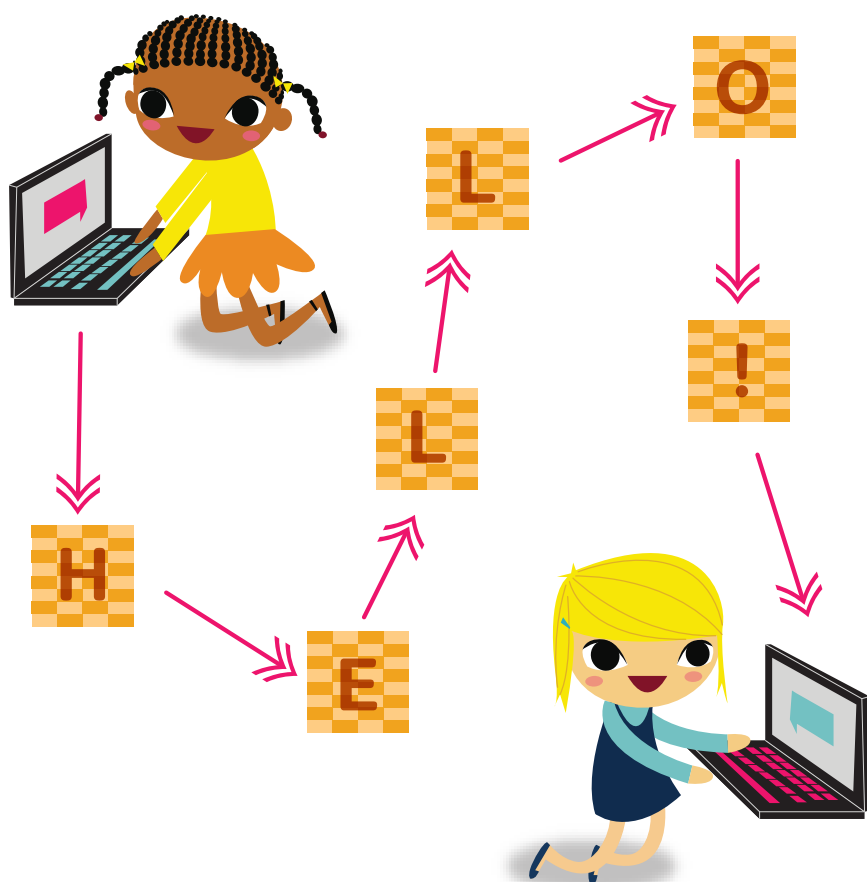
It's the same when you go online. The safety rules we follow in real life can be used in the digital world too.

STEP 5 Find out how messages travel on the internet

Every message, text, or picture that is sent on the internet is broken down into pieces called packets.

Imagine you're shipping a large object, such as a playhouse. If the playhouse is put together, it will be too large to ship—unless you had a very big box! So you would probably decide to ship all the pieces of the playhouse in separate boxes.

That's how it works on the internet too. When you send information on your computer—like an email, a photo, a meme, or a text—it's too big to send in one piece. It's broken into smaller packets of information that can ship from computer to computer.



What Is the Internet?

The word “internet” comes from two words: interconnected and network. Interconnected means linked together. A network is a group of people or objects that are connected. For example, your Brownie troop is a network—and you're also a part of a network that includes all Girl Scouts around the country and around the world!

The internet is many different computers and networks all around the world. Your computer sends information to another computer in another location. That computer sends information back to your computer. That's how you connect to websites and get information. The internet has billions of connected computers.

**Now that I've earned this badge,
I can give service by:**

- Telling my family and friends the rules to stay safe online.
- Doing a show-and-tell at school demonstrating layers of security, using the egg-in-a-box activity.
- Teaching others the basics of cybersecurity by using a cybersecurity game I played while earning this badge.

I'm inspired to:



Badge 2:

Cybersecurity Safeguards

The internet connects people and computers all over the world. A lot of information passes through computers: names, addresses, bank account numbers, and credit card numbers. This information needs to be protected so private information doesn't end up in the hands of someone who will use it to cause harm. Find out how you can be safe when you go online.

Steps

1. Create your identity
2. Find out what information to keep private when you go online
3. Find out about sharing information safely online
4. Find out why you have to be careful about who you trust online
5. Test your knowledge of online safety rules

Purpose

When I've earned this badge, I will know what information about me is private and how to share information safely.

Fun Fingerprint Facts

- 1 Your fingerprints start to form before you're even born.
- 2 Your fingerprints are ridges that help you grab onto objects.
- 3 Scientists group fingerprints according to their patterns: whorls, loops, and arches.
- 4 Koalas have ridges on their fingers that look a lot like human fingerprints.
- 5 Identical twins may look exactly alike but their fingerprints are different.

STEP 1 Create your identity

What makes you *you*? The way you look, your favorite movies, books, games, what you like and don't like. Your identity includes all of this information and more—it's what makes you different from other people. No one is exactly like you, right down to your fingerprints.

Fingerprints are used to identify people. They can also be used to unlock computers and phones.

Fingerprint Types



Whorl



Loop



Arch

STEP 2 Find out what information to keep private when you go online

Where you live, what you like and dislike, who your family is, and where you go to school say a lot about who you are. Some of that information—such as where you live and go to school—is private. It should not be shared online where everyone can see it. That's because cyber criminals can steal your information and use it to cause harm.

STEP 3 Find out about sharing information safely online

There is a lot of information that describes you.

You now know that some of it is private. Imagine if you put information about you on a T-shirt that you would wear in public. What would you want people to know about you? Some information that describes you is just fine to wear on a T-shirt. Other information could never go on a T-shirt because it wouldn't be safe.

Are these T-shirts OK to wear in public?



Words to Know

Your **identity** includes all the information about you that makes you different from other people. For example, your name, age, family members, beliefs, favorite colors or hobbies form your identity.

Private information are facts about you that you don't want everyone to know. Private information includes your home address or the name of your school.

Protect means to keep you or your information from harm. For example, you put on sunscreen to protect yourself from sunburn and you wear a bike helmet to keep from getting hurt if you fall.

Safety means to be free from danger or harm. You follow safety rules to avoid danger and to keep from being hurt or losing something.

Follow These Ten Rules to Stay Safe Online

- Don't talk to strangers online.
- Always check with an adult before going on a computer.
- Always have an adult with you when you're on a computer.
- Tell an adult if you feel scared or uncomfortable when you are on a computer.
- Don't share your password with anyone.
- Never give your private information to anyone online.
- Never open emails, files, or webpages without an adult's permission.
- Follow your parents' or school's rules for going online.
- Be careful about who and what you trust online.
- Be careful when you use your school's devices or your friends' devices.

STEP

4 Find out why you have to be careful about who you trust online

To trust is to believe in something or someone. You trust your parents to pick you up from school when they say they will. You trust your teacher to help you learn. You trust your best friend to keep promises. When you trust someone, you know it's OK to share something private.

In real life, you have to be careful who you trust. That's true when you're online, too.

Cool Cybersecurity Jobs

If you decide to work as a cybersecurity expert some day, here's what you could do:

- **Outsmart the bad guys:** Hack your way into a computer network so you can find the system's weak spots and fix them.
- **Carry out digital detection:** Investigate cyber attacks and gather evidence.
- **Keep people safe:** Set up secure computer networks to defend schools, hospitals, businesses, and government offices from cyber attacks.

STEP

5 Test your knowledge of online safety rules

Now that you know more about technology, you know that you have to be careful when you go online. Not to worry, though! When you follow common sense rules online—in the same way you follow rules in real life—you and your information will be safe.

**Now that I've earned this badge,
I can give service by:**

- Telling my friends and family what information is safe to share online.
- Sharing what I've learned about online safety with my parents and grandparents.
- Making posters of online safety rules for my classroom or library.

I'm inspired to:



Badge 3:

Cybersecurity Investigator

Do you enjoy doing puzzles and solving mysteries? Cybersecurity investigators are people who solve crimes that happen on digital devices and the internet. In this badge, you'll put on your detective hat and explore cyber crimes.

Steps

1. Crack a code to solve a problem
2. Investigate what's real and fake in photos
3. Find out about digital footprints
4. Investigate how a computer virus can spread
5. Explore a cyber attack

Purpose

When I've earned this badge, I will know how to use investigative skills to spot problems in the cyber world.

STEP 1 Crack a code to solve a problem

Computers use codes to send information. The code uses numbers to stand for different letters. That's because numbers are much easier to transmit and send than letters. Once you know the code, you can figure out what the messages mean.



Cybersecurity Savvy

Could you be a cybersecurity investigator? Take this quiz to find out!

- 1 Do you like using computers?
- 2 Do you love to learn new things? Are you always asking “why?”
- 3 Are you always ready to solve a puzzle, whether it’s a jigsaw puzzle, crossword puzzle, or puzzle app?
- 4 Do you dream of spotting clues and solving mysteries?
- 5 Do you want to help and protect people?

If you answered “yes” to any of the questions above, you might want to think about having a cybersecurity job someday!

MISSION POSSIBLE: CRACKING CODES

One way of keeping private messages private is to use a code.
Try your hand at cracking this code.

If A=1, B=2, and so on, can you figure out the coded message
and answer this riddle?

Why did the computer show up late for work?

9 20 8 1 4 1 8 1 18 4 4 18 9 22 5 !

A=1	H=8	O=15	V=22
B=2	I=9	P=16	W=23
C=3	J=10	Q=17	X=24
D=4	K=11	R=18	Y=25
E=5	L=12	S=19	Z=26
F=6	M=13	T=20	
G=7	N=14	U=21	

Answer on page 23

STEP 2 Investigate what's real and fake in photos

It's easy to look at a photo and think that what it shows is real. But photos can be easily changed with editing software. You can often spot how a photo is changed—using your cybersecurity investigation skills!

Truth or Hoax

Guess which ones are real and which are fake:

- You can charge an iPod with an onion.
- Bill Gates wants to give you money!
- Bananas are berries but strawberries are not.

Answer on page 23



Pasta Prank

In 1957, a British news network broadcast a fake report to celebrate April Fool's Day. They showed a family in Switzerland picking spaghetti from a spaghetti tree.

This was before the internet existed. People couldn't search online to find out where spaghetti comes from. (It's made from flour and water.)

British viewers believed the report! Hundreds of people called the BBC the next day to find out how they could grow their own spaghetti trees.

STEP 3 Find out about digital footprints

When you walk along a sandy beach, you leave a trail of footprints. When you use a computer, you also leave a trail of footprints.







These footprints are called digital footprints. They are made up of information that you leave behind. Some of this information is OK to leave behind, but there is some private information that's not OK to include in your digital footprint.

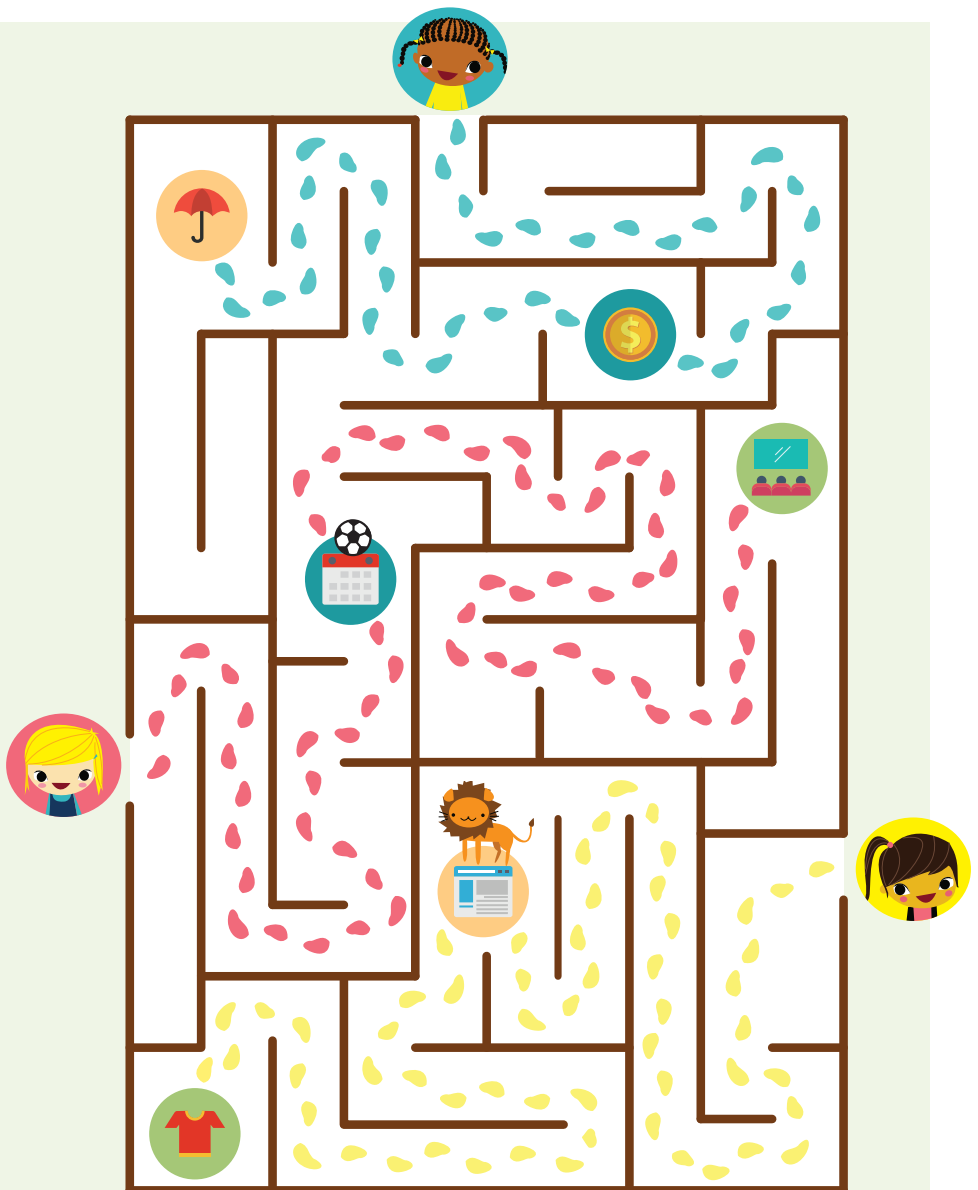
Follow the Footprints

**Alejandra, Campbell, and Jamila
have been busy online!**

To see where each girl went, follow their footprints (yellow for Alejandra, red for Campbell, blue for Jamila). Take a look at the locations they visited. Which ones are safe places to leave a digital footprint? Which ones aren't?

KEY

-  = online banking
-  = online shopping
-  = web search for homework
-  = watching a movie
-  = checking the soccer team's schedule
-  = checking the weather



STEP 4 Investigate how a computer virus can spread

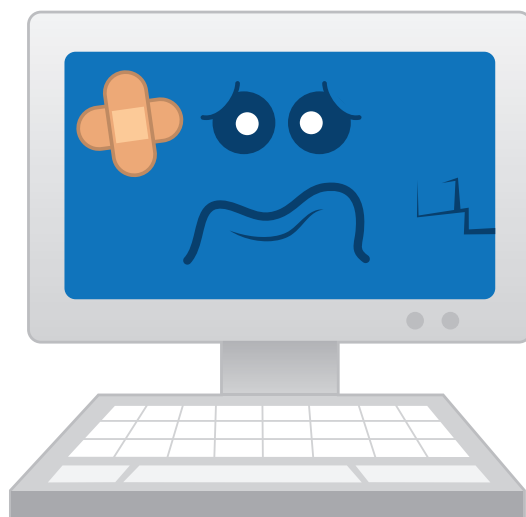
If you have ever had a cold, you have had a virus.

A virus is a tiny germ. When it gets inside your body, it makes copies of itself. Your body reacts. You sneeze, cough, and blow your nose until you fight off the virus. Viruses can make us sick. They can also spread to other people and make them sick.

Computers get viruses, too! A computer virus isn't a germ. It's a software program that was made by someone to cause harm.

How does it get on your computer? If you click on a link in an email from someone you don't know or download information from a website you don't know, the computer virus can sneak into your computer. Then it can spread bad code or destroy information on your computer. Once your computer has a virus, it can spread to other computers you are linked to.

You protect yourself from colds by washing your hands. In the same way, you can protect your computer from viruses by only clicking on links and emails that you know. You can also put anti-virus software on your computer. This software looks for viruses and gets rid of them before they can cause harm.



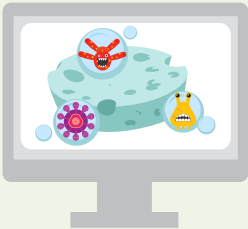
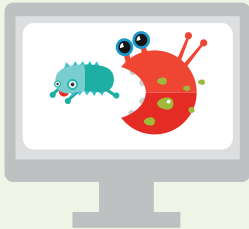
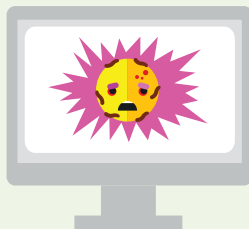

STEP 5 Explore a cyber attack

When one computer attacks another computer, we call it a cyber attack. A cyber attack can also be a group of computers attacking another group of computers. Sometimes the goal is to disrupt—or interrupt—the other computers' connection to the internet. Other times, the goal is to find the private information on the other computers. Companies and governments have big computers that hold a lot of important data. The people who work there are always thinking of ways to stop cyber attacks. That's because they want to protect the data. You'll find out more about the disruptions cyber attacks cause.

Battle of the Bugs

Twenty-five viruses have sneaked into your computer! Don't worry—you have different protection software programs that can help. The software programs are called Scour Power, Virus Muncher, Bug Blaster, and Cyber Clear.

How many viruses out of the 25 were left for you to destroy?

SCOUR POWER	VIRUS MUNCHER	BUG BLASTER	CYBER CLEAR
			
Scour Power zapped three times as many viruses as Cyber Clear.	Virus Muncher gobbled up twice as many viruses as Bug Blaster.	Bug Blaster got rid of three.	Together Cyber Clear and Bug Blaster zapped just as many viruses as Virus Muncher did.

Answer on page 23

**Now that I've earned this badge,
I can give service by:**

- Helping my family understand how viruses work and how we can avoid them.
- Asking my school's computer teacher to talk to our class about cybersecurity.
- Connecting with younger girls and telling them what I found out about cybersecurity investigations.

I'm inspired to:



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