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Using Computers

Devices

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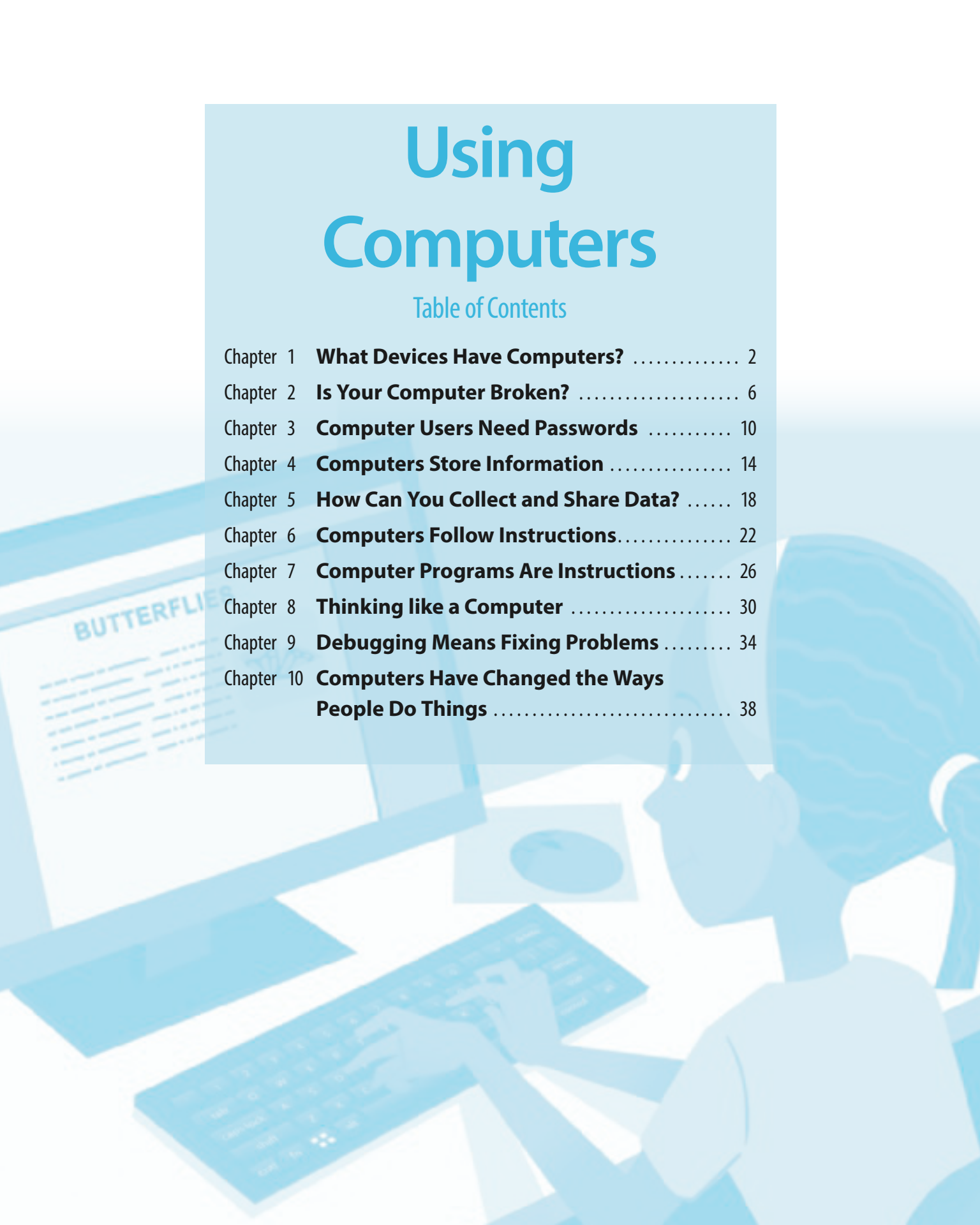


CHAPTER
1

What Devices Have Computers?

Hanna's mom fixes cars. Today she is fixing a computer in a car.

Hanna asks her mom, "Is the car computer like the computer I use at school?"

"In a way, yes," her mom says. "The car has a computer processor in it the way your school computer does."

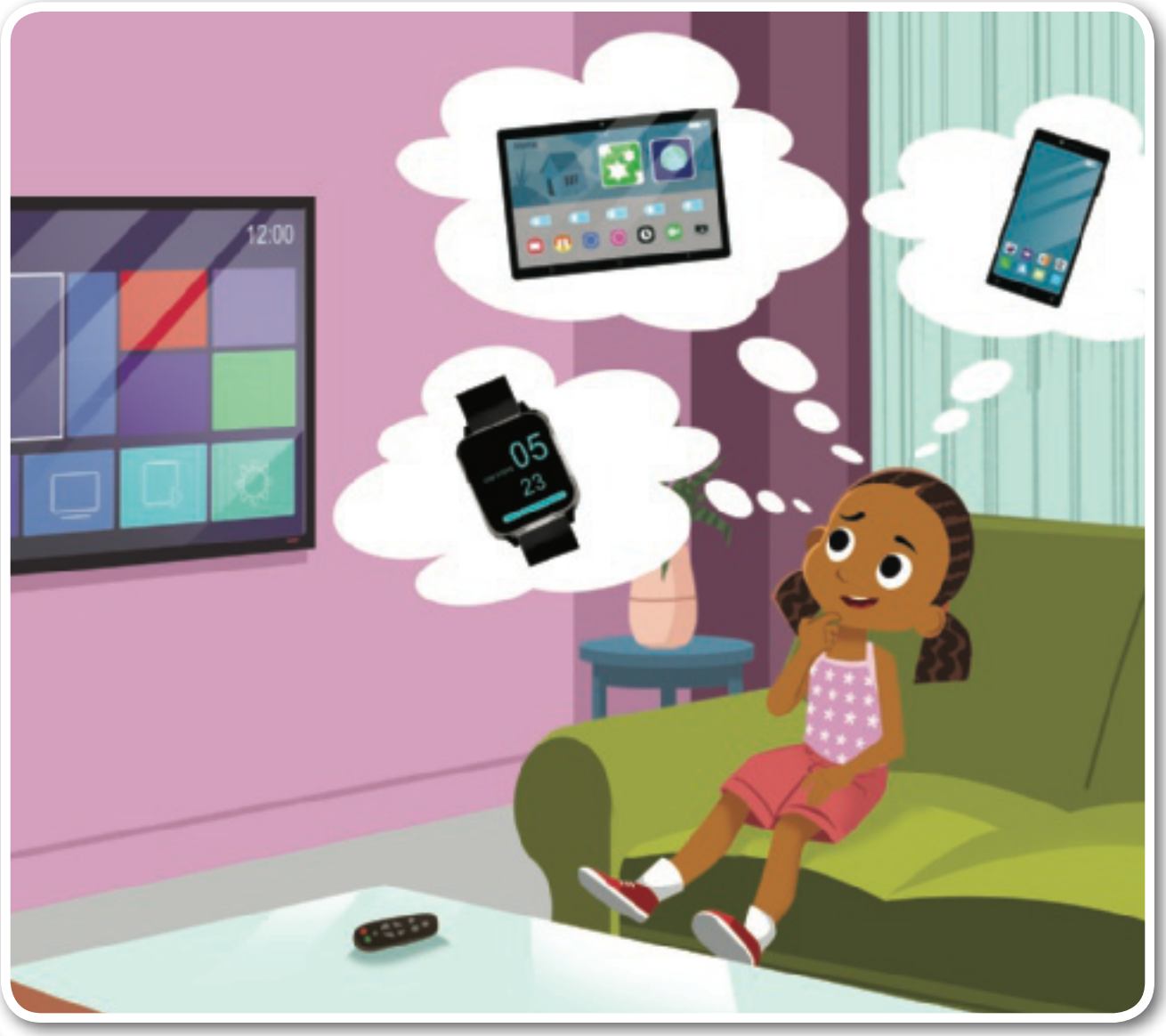
Hanna's mom explains, "Many things we use have computer systems in them."

"Inside your school's computer is a processor," her mom says.

"My smartphone has a computer processor. The car I'm working on has a processor too."

Hanna wants to know more about devices that have computer processors.

Hanna thinks of devices that might have computer processors in them. Mom's phone and Hanna's tablet have some of the same games on them. Mom's phone has a computer processor. So she thinks her tablet must have one too. Dad's smart watch is like Mom's phone in some ways. It must also have a processor. All these things have screens to look at. Since the TV also has a screen, Hanna wonders if the TV also has a computer processor in it.



Computing devices have different parts. At school, Hanna uses a computer system that has a screen, a keyboard, and a mouse. It works with a printer. At home, Hanna uses a tablet. She tells the tablet what to do with a touchscreen. She operates the TV with a remote control.

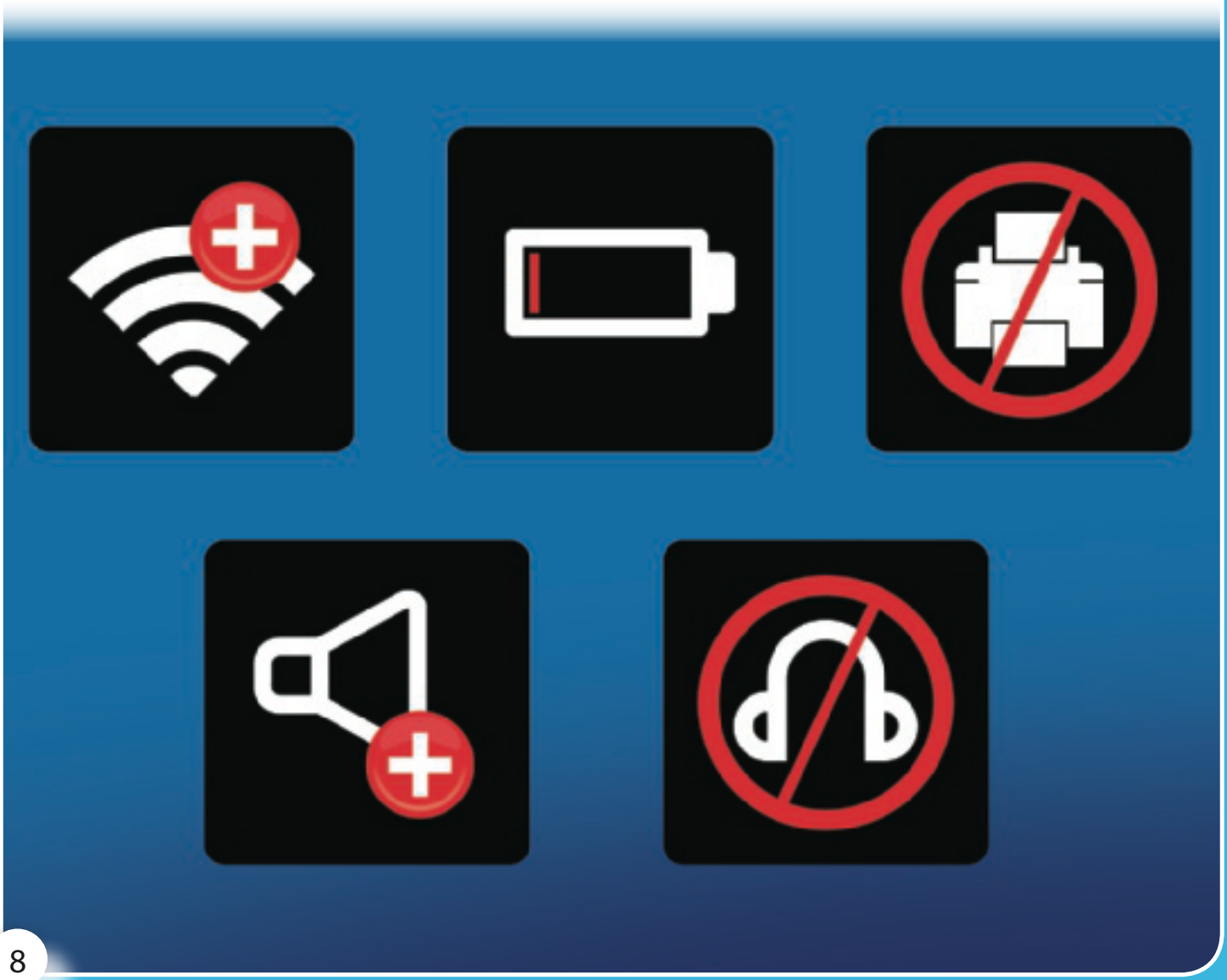
CHAPTER
2

Is Your Computer Broken?

Have you tried to play a game on a tablet and it would not turn on? Maybe you have tried to listen to music and there was no sound. At times, computer systems do not work. There can be many reasons why. Later you will learn how many computer problems can be fixed.

Some computer problems are with the parts of the device. The parts are called hardware. Other computer problems are with software. Software is the instructions that tell the computer what to do. A keyboard that won't type certain letters might have a hardware problem. A computer game not opening is a software problem. Understanding what might be causing a problem can help when we try to fix it. Hanna's mom can fix the car's computer if she knows more about the problem.

If a tablet does not turn on, it might need to be charged. If headphones are not connected to a device, you will not hear music through them. If a printer won't work, its instructions might not be set right. Turning a device off and then back on might help. Closing an app and then reopening it might fix the problem.



Most hardware and software problems can be fixed. Some problems can be fixed quickly by checking connections and settings. Others can take more time and might require help from an expert. Some software problems can be solved with an update. An update is a new set of instructions for a computer device.

CHAPTER
3

Computer Users Need Passwords

Hanna and her mom play a game they call Guess My Number. Hanna says, "I'm thinking of a number from one through five. What is my number?" Mom guesses the number three.

Hanna asks, "How did you know?"

They play the game a few more times. Mom picks the number Hanna is thinking of more than once!

Hanna's mom explains her guesses. "It's pretty easy to guess a number when there are not many choices," she says. "This is why passwords we use must have many letters and numbers. That makes them hard to guess."

Hanna thinks about the password she must enter to start her video game console.

Passwords help keep computer information private. A password can protect a device like a phone. Only the person with the password can use the phone. A password can protect a game or app or program. Only people with the password can use that game, app, or program. Some people who do not know the password will try to guess it. Passwords that use numbers, letters, and other symbols are harder to guess. That makes a good password.

Hanna says, “Let’s play Guess My Password. My password has numbers and letters.” Hanna’s mom does not win the game this time!

CHAPTER
4

Computers Store Information

Data is information. Data can be stored on a computer device. Photos, art, and videos on a device are data. The music stored on a tablet is data. Even the apps on a smartphone or smart watch are data. Files with words and digital books are data.

Data in a car's computer system makes the car work. Hanna's mom copied data from the car's computer to her own computer. Now Mom can see the car's data. She will use a software program to figure out how to fix the car.

Hanna's older sister, Lesia, is doing homework for school. Lesia is writing a report about butterflies. Typing her report on the computer makes it easy to make changes. Lesia can also fix mistakes. She can save her report to work on later. The words Lesia types for her report are data that she enters into the computer's memory.

Lesia wants to put some videos in her report. She and Hanna go to the butterfly garden. They use Mom's smartphone to record videos of butterflies. They also take some pictures. When they get home, Lesia will move the videos and pictures to the home computer. She will save all the data she collected on the computer at home.

CHAPTER
5

How Can You Collect and Share Data?

Hanna, Lesia, and Mom are home from the butterfly garden. Lesia plugs Mom's phone into the computer with a cord. She moves the picture and video data from the phone to the computer. That way Lesia can use the data in her report.

Lesia double-clicks a folder icon on her computer screen. Small pictures of her butterfly videos and photos appear. She clicks on commands in the software for her report. That lets her insert videos and pictures into her report file. Lesia also makes a graph with the data she collected. She puts the graph on a digital slide. She will show the slide when she shares her report in class.

Now Lesia uses the internet to send her report to her teacher. The report is a computer file. Lesia attaches the file to an email and clicks “send.” The teacher will read Lesia’s report on his computer. He will be able to see the pictures. He will be able to watch the videos.

Next Lesia sends her report to the printer. She wants to have a paper copy to use in class. Then Lesia emails her graph slide to her tablet. Her report is finished and shared to different devices.

Lesia tells about her butterfly report in class. She shows the graph slide on her tablet. Then her teacher projects the photos and videos from her report onto a screen in the classroom.

How many devices did Lesia use to create and deliver her report? How may ways did she use technology to move information from one place to another?

CHAPTER
6

Computers Follow Instructions

Hanna and her dad go to get the mail. Each mailbox has a number on it. Hanna notices the mailboxes are in numbered order. Her dad gets their mail out of mailbox "4." The mailbox is after "3" and before "5." The "4" on the mailbox matches the "4" in Hanna's street address.

When they get home, Hanna's dad makes sandwiches. First, he puts a piece of bread on a plate. Next, he spreads peanut butter on the bread. Then, he spreads jelly on the peanut butter. Last, he puts another piece of bread on top of the jelly.

Hanna asks, "Dad, do you always put the peanut butter on before the jelly?"

Her dad says, "I suppose I could put the jelly on before peanut butter. But I always need to start with bread!"

The mailboxes are in order. There are steps in making a sandwich. Order and steps are useful for computers, too.

Computers work because they follow instructions. The instructions are written in a computer language. Computer language is like the language you see on this page. It is made up of letters and symbols. Instructions tell computers what to do one step at a time. Step-by-step computer instructions are called algorithms.

Hanna thinks about the routine of her day. Her daily routine has steps that happen in a certain order. With her dad's help, Hanna lists the steps she follows in her daily routine. Routines can be helpful as a way to remember the next thing to do. But Hanna doesn't have to follow the same routine every day. She can decide to follow different steps. Unlike Hanna, computer devices only follow the steps in their programs.

CHAPTER
7

Computer Programs Are Instructions

Hanna and Lesia are listening to music. Hanna's favorite song comes on. She says, "This is my favorite song. Will you play it again?"

Lesia says, "I like it, too. I'll put it on repeat."

Lesia says, “I have an idea! Let’s make a dance routine to this song.”

Hanna thinks that is a great idea! The sisters start with both arms in the air. Then they each put one arm down and keep one arm up. They take turns deciding what moves to do next.

At bedtime, Hanna is tired from dancing. But she still wants to try out her new ceiling light. She can give the light directions to tell it what colors to display. The light must have a computer device in it!

Hanna first looks at the light when it is set on red. Then she tries blue, green, and yellow. She decides she likes the blue and yellow lights best. She pushes the buttons to make the blue and yellow lights shine on the ceiling. The colors change back and forth. Then she sees the “mix” button. She pushes the “mix” button, and both yellow and blue lights shine at the same time.

Hanna decides she likes the mix of lights, too. Hanna reprograms the ceiling light to be blue, yellow, and mix.

Lesia's smartphone is programmed to repeat a song. Hanna's ceiling light is programmed to shine colors in a pattern. The pattern repeats.

A computer program is a set of instructions. The instructions tell the computer processor what to do, step by step. Computer programs can contain many steps. Some steps might repeat. A repeating set of computer steps is called a loop. People who write computer programs are called computer programmers.

CHAPTER
8

Thinking like a Computer

Hanna and her family are eating dinner. Mom shares some exciting news. “I talked to Grandma today,” Mom says. “She is graduating with her teaching degree next week!”

Hanna asks, “Can we give her a party?”

Mom answers, “I think that is a wonderful idea, Hanna.”

The next morning, Hanna’s family starts to plan the party. Lesia says, “At school we learned how computers break down tasks into steps. Once one step is done, the computer starts on the next step. Maybe we could also break down the bigger party task into steps. And like a computer’s processor, we can carry out the steps in order.”

Hanna's mom starts making a plan of all they need to do. Then each family member works on a different set of steps for the party. Hanna's mom calls Grandma's friends to invite them to the party. Dad plans a menu of the food and drinks they will have. Hanna and Lesia make decorations.

Finally, the day of Grandma's graduation party has arrived. Everyone is having a great time. Grandma says, "This party is so much fun! How did you all put it together so quickly?"

"Lesia had the idea," Hanna answers. "We acted like computers and followed many smaller steps."

CHAPTER
9

Debugging Means Fixing Problems

Hanna walks into her mom's office to ask for help. "Mom, will you help me with my math homework? I keep getting stuck on a problem."

Her mom answers, "Sure, Hanna. Let me log this bug first."

"WHAT? You have a log with bugs in it?" Hanna gasps.

Hanna's mom smiles. She explains that to log something means to make a record of it. And when a computer program does not work correctly, the error is called a bug. Fixing the bug is called debugging. Computer programmers debug problems on computer devices. Hanna's mom logs the car computer bug so she can debug it later.

"Let's look at your math problem," Mom says.

Hanna shows Mom her math homework. Mom lists a few ways they might answer the problem:

- They can break the problem down into steps.
- They can guess and then check their answers.
- They can work backward.
- They can draw a picture.

Hanna decides to break the problem down into steps.

"Thank you for helping me!" Hanna says. "I guess we debugged my math homework together."

CHAPTER 10

Computers Have Changed the Ways People Do Things

Hanna and Lesia go to visit Grandma. When they arrive, they notice Grandma is packing up some items. "Grandma, what are you doing?" asks Hanna.

Grandma answers, "I'm donating some older items to the community center. They are making a display to show how technology has changed over the years."

Lesia asks, “What items are you donating, Grandma?”

“Oh, just things I used when I was around your age,” Grandma says.

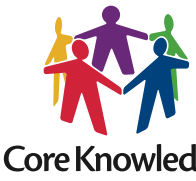
“I have a rotary phone, a vinyl record, and a camera that uses film and flashes.” She continues, “Here’s an electronic board game, and my favorite, my library card.”

Changes in technology can be good.

- A picture can be seen in seconds on a smartphone. It could take a week before getting pictures back from a camera using film.
- You could only go to the library or record shop when they were open. Now you can use the internet to read books or listen to music whenever you want.

But you also need to be safe and respectful when using technology. Computer devices can break easily. And you have to be careful using the internet and remember that not everyone on the internet is a friend.

Hanna, Lesia, and Grandma drop off the donations at the community center. Then they decide to have an old-fashioned picnic. But they bring some technology so they can listen to their favorite musical playlist.



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Editorial Director

Daniel H. Franck

Subject Matter Expert

Sarah J. Huibregtse, PhD

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