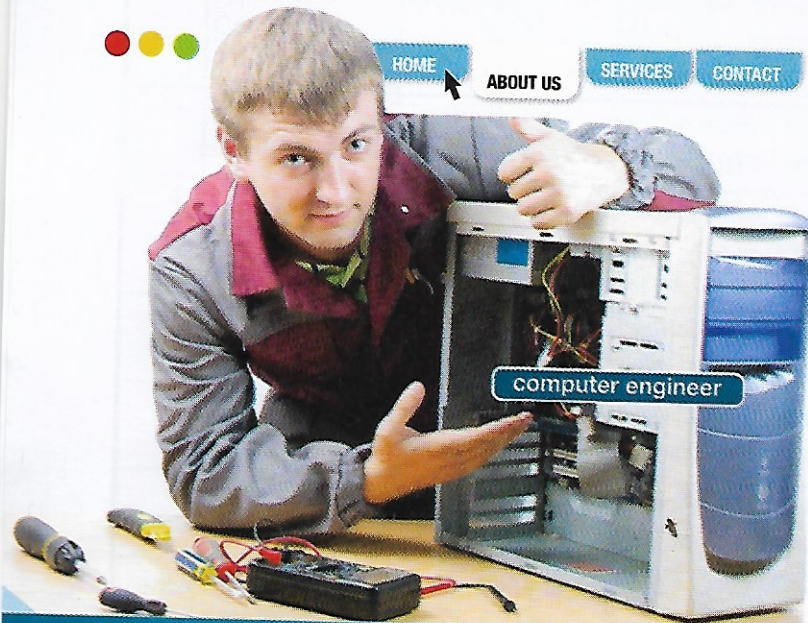


Get ready!

1 Before you read the passage, talk about these questions.

- 1 What basic subjects do computer engineers study?
- 2 What kind of work are computer engineers trained for?



Kempko Technical Institute >
Department of Computer Engineering >
Program Overview

What will I learn in the Computer Engineering Program?

Start your career as a **computer engineer** at Kempko! Our program teaches everything you need to know about computer engineering. This growing field has many career opportunities.

- Begin with fundamental courses in engineering and **computer science**. Gain a strong understanding of **mathematical analysis** and theory.
- Learn to **develop** computer **software**. **Design** your own computer programs. Then other students will **test** them for functionality and usability.
- Also learn to **investigate** problems with **hardware**, **evaluate** causes and implement appropriate solutions. These skills will make you invaluable to potential employers.

mathematical analysis

Reading

2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 ___ Students must study computer science before they apply to the program.
- 2 ___ Computer engineering students test each other's software.
- 3 ___ According to the webpage, the school places students with potential employers.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|---------------|-------------------|
| 1 ___ test | 4 ___ evaluate |
| 2 ___ design | 5 ___ investigate |
| 3 ___ develop | |

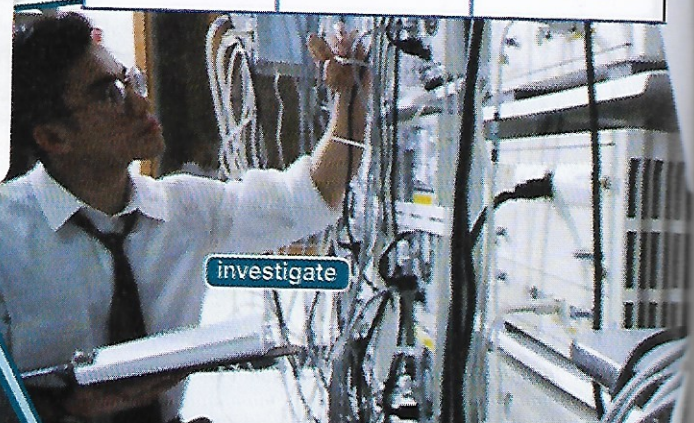
- A to plan the way that something will be created
B to get more information about something
C to carefully study and assess the qualities of something
D to bring something from conception to action
E to operate something to see if it works properly

4 Place the words or phrases from the word bank under the correct headings.

Word BANK

mathematical analysis software
computer engineer
hardware computer science

| Parts of a computer | Computer Studies | People who work with computers |
|---------------------|------------------|--------------------------------|
| | | |
| | | |
| | | |



investigate

- Listen and read the webpage again.
What parts of a computer do computer engineers work with?

Listening

- Listen to a conversation between an academic advisor and a student. Choose the correct answers.

- What is the purpose of the conversation?
 - to review the requirements for computer engineering students
 - to list different foci within the computer engineering major
 - to discuss the woman's experience with the computer engineering program
 - to determine if the man is interested in computer engineering
- What has the man already completed?
 - an application to major in computer science
 - a few mathematical analysis courses
 - an overview course on hardware and software
 - an entrance exam for the computer engineering program

- Listen again and complete the conversation.

Advisor: Okay, let's look at your next semester. Did you decide on a major?

Student: I'm not sure. My 1 _____
_____ to go for something with good career potential.

Advisor: I see you already took some 2 _____
_____ courses.

Student: I want to do a course 3 _____
solving problems.

Advisor: How about the computer engineering program? You will probably do well on the 4 _____.

Student: I don't know much about that. Do computer engineers focus on 5 _____
_____?

Advisor: Both, actually. The program teaches 6 _____ and electrical engineering.

Student: Hmm. That sounds interesting. I'll look into it.

Speaking

- With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

My goal is to ...

I see you already took ...

I want to do ...

Student A: You are an academic advisor. Talk to Student B about:

- his or her interest in computer engineering
- which courses he or she has already taken
- subjects that the program covers

Student B: You are a student. Talk to Student A about your interest in computer engineering.

Writing

- Use the conversation from Task 8 to fill out the email from an advisor to a student.



Dear Tim,

I think you would be a great fit for the computer engineering program. You have already taken _____.

That means you already know about _____.

In the program, you will take _____.

where you will learn about _____.

You will also learn about _____.

Let me know if I can answer any further questions.

Sincerely,

Gina Farrell
Academic Advisor
Kempko Technical Institute

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are the benefits of different types of personal computers?
- 2 What types of computers do businesses use?

Seacrest
COMPUTERS

embedded computer

desktop

Seacrest
COMPUTERS
HOMESeacrest
COMPUTERS
ABOUT US

PRODUCTS

Seacrest **Computers** manufactures a variety of products. We mostly create custom **PCs** for individuals. Our **desktops** are great for your home or office. We also create **laptops** and **notebooks** for mobile customers. Don't miss Seacrest's first **tablet**! It is scheduled for release later this year.

Seacrest also has a great product lineup for businesses. Our **servers** are secure and reliable. Your job will become easier with our custom **workstations**. Does your company process a lot of data? Allow us to design your new **computer cluster**. We also install **embedded computers** in company vehicles.

For more information,
click here to contact us!

HOME

ABOUT US

SERVICES

CONTACT

workstation

laptop

tablet

notebook

Reading

2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The company advertises laptops for mobile customers.
- 2 ☐ The company's tablet is one of its most popular products.
- 3 ☐ The webpage recommends installing workstations in company vehicles.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|-----------------------------------|--|
| 1 <input type="checkbox"/> PC | 4 <input type="checkbox"/> desktop |
| 2 <input type="checkbox"/> tablet | 5 <input type="checkbox"/> computer cluster |
| 3 <input type="checkbox"/> laptop | 6 <input type="checkbox"/> embedded computer |

- A a computer designed for individual use
 B a computer intended to be used in a single place
 C a portable, folding computer
 D a computer that is part of a larger product
 E a portable computer with a flat touch screen
 F a computer that can process large amounts of data

Read the sentence pairs. Choose which word best fits each blank.

1 computer / server

A These days, many families have more than one _____ at home.

B All of the company's data is transmitted through a single _____.

2 notebook / workstation

A The company uses a _____ for advanced graphics design.

B The student used a _____ to write an essay on an airplane.

Listen and read the webpage again. What types of computers does the company create for businesses?

Listening

Listen to a conversation between two computer engineers. Choose the correct answers.

1 What is the conversation mostly about?

- A the types of computers that the engineers prefer
- B how to design particular types of computers
- C problems that the engineers encountered with a computer
- D which computers are best for different projects

2 Which is the man's favorite computer?

- A computer cluster
- B workstation
- C desktop
- D laptop

Listen again and complete the conversation.

Engineer 1: Hey, Jack. What's your favorite 1 _____ to work on?

Engineer 2: I don't know. I'd have to think about it. What's yours, Kate?

Engineer 1: I think I 2 _____ over other computers.

Engineer 2: Really? 3 _____ like laptops?

Engineer 1: Well, I travel a lot. Laptops are 4 _____ and their capabilities are similar to desktops.

Engineer 2: That makes sense. I guess I 5 _____, because of their power.

Engineer 1: I bet you'd really enjoy using 6 _____.

Engineer 2: Yeah, I think I probably would.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

What's your ...?

I think I prefer ...

I bet you'd ...

Student A: You are an engineer. Talk to Student B about:

- the type of computer he or she prefers to use
- the type of computer you prefer to use
- the benefits of different computers

Student B: You are an engineer. Talk to Student A about your favorite computer.

Writing

9 Use the conversation from Task 8 to fill out the customer survey.

Seacrest Computers Customer Survey:

What kind of computer did you purchase today?

Why did you choose this kind of computer?

What kind of computer do you typically use?

Why?

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How have computer monitors improved over time?
- 2 What is the purpose of a frame buffer?



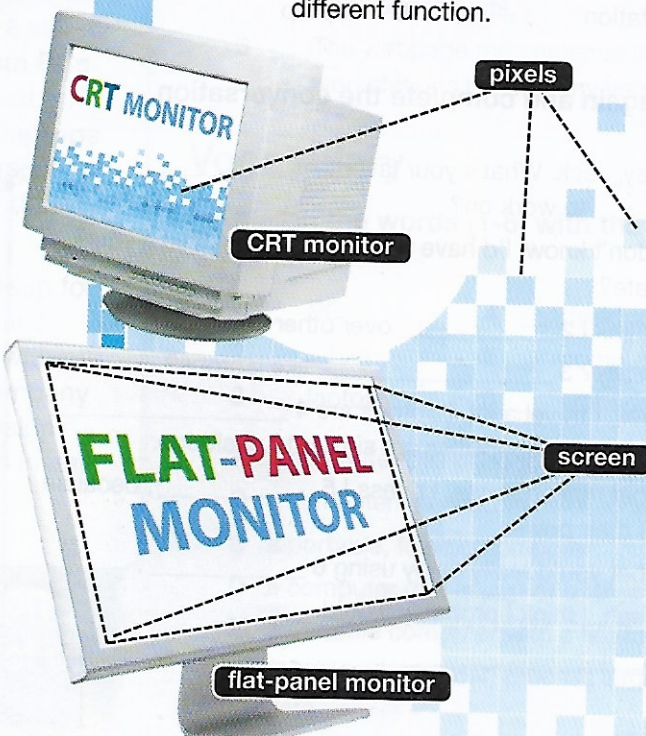
Chapter 3.2

Monitors

A **monitor** is a computer **component** that shows images. **Displays** appear on monitor **screens**.

Most of today's monitors have **flat-panel** displays. They usually produce images using **LCDs**. Older monitors used **CRTs**, which made them bulky. As monitors became thinner, image resolution also improved. Current **HD** displays have far better resolution than standard ones. **Active matrices** give monitors this capability.

Displays are made up of many tiny **pixels**. A **bitmap** organizes many pixels into a single image. To display images, computers switch between bitmaps. **Frame buffers** store bitmaps before displaying them on the monitor.



Reading

2 Read the textbook chapter. Then, mark the following statements as true (T) or false (F).

- 1 F Most flat panel monitors use CRTs to display images.
- 2 T Active matrices allow monitors to display HD images.
- 3 F Multiple bitmaps come together to create a single image.

Vocabulary

3 Fill in the blanks with the correct words from the word bank.

Word BANK

CRT screen flat-panel
component HD pixel

- 1 People can control tablet PCs by touching the screen.
- 2 The customer was impressed by the thinness of the flat-panel monitor.
- 3 On very old displays, you could see each individual pixel ~~component~~ pixel.
- 4 Old monitors were bulkier than new ones because they each used a(n) CRT.
- 5 For the best resolution, get a(n) HD display.
- 6 Each components of the computer performs a different function.

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 bitmap / LCD

- A The computer's LCD is capable of showing detailed, vibrant images.
B A(n) bitmap tells pixels on a screen how to form into an image.

2 active matrix / frame buffer

- A The display's active matrix allows it to control each individual pixel.
B The Frame buffer stores bitmaps before the monitor displays them.

3 display / monitor

- A Jim's monitor is so old that it still uses a CRT.
B Consumers really like the sharp display on the new screens.

5 Listen and read the textbook chapter again. How do HD displays differ from standard displays?

Listening

6 Listen to a conversation between two managers. Choose the correct answers.

- 1** What is the conversation mostly about?
A a request for new monitors in an office
B which company makes the highest-quality monitors
C the type of monitor that a company used to use
D a disagreement about which monitors are best
- 2** Which monitor feature does the woman especially like?
A flat panel design C LCD technology
B HD resolution D bitmap display

7 Listen again and complete the conversation.

- Manager 1: Have you seen **1** _____? They're pretty nice.
Manager 2: Yeah. I really like the new **2** _____.
Manager 1: It's great. Then again, **3** _____ we have flat-panel monitors now.
Manager 2: Did the office have those bulky monitors before?
Manager 1: Yes. When I started here, we had CRT-based monitors.
Manager 2: What's **4** _____?
Manager 1: A cathode ray tube. **5** _____ the old monitors so bulky.
Manager 2: Oh, yeah. I've seen those. Those took up way **6** _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Have you seen ...?

I really like ...

It's great.

Student A: You are a manager. Talk to Student B about:

- how monitors have improved
- benefits of the new monitors
- features of the old monitors

Student B: You are a manager. Talk to Student A about how monitors have improved.

Writing

9 Use the conversation from Task 8 to fill out an email from one manager to another manager.

To: d.g@digisyst.com
From: e.m@digisyst.com
Subject: New monitors

Hi Dave,

I think we need to get some new monitors for the office. The old ones are _____ because _____. I think we should get _____ instead. This would be better because _____ and _____.

Let me know what you think.

-Erica

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What information do keyboards and mice input into computers?
- 2 What is the difference between a mechanical mouse and an optical mouse?

Vanrey 5650 Desktop Computer

What comes with my new computer?

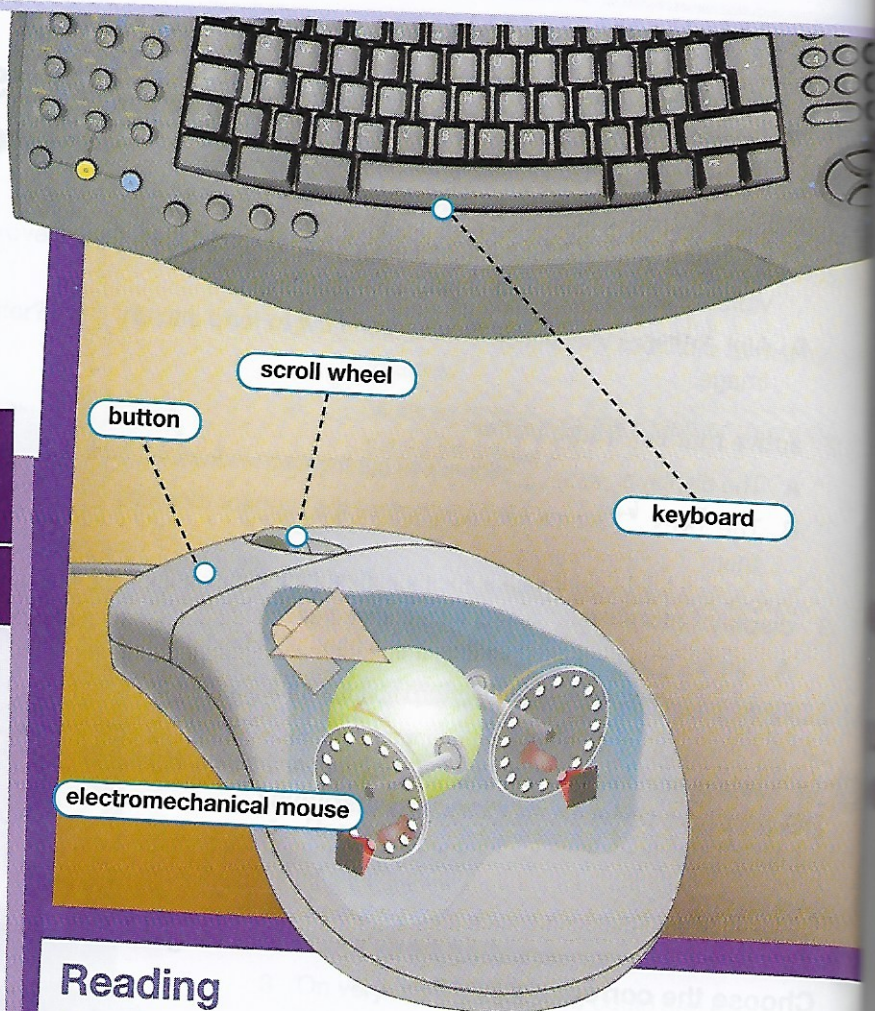
Included Peripherals

Every desktop model comes with a Vanrey **keyboard**. This **QWERTY** keyboard features new quiet-key technology. It also comes with wrist support to reduce muscle strain.

Each unit also comes with the Vanrey EM750 **electromechanical mouse**. Scroll smoothly with a durable **scroll wheel**. Then easily **click** your selections with the two large **buttons**. This standard mouse is perfect for light, everyday use.

Recommended Peripherals

The Vanrey Omega **optical mouse** tracks movements with **LEDs**. This mouse is recommended for architects, engineers, and other design professionals. It guides **pointers** across **GUIs** with precise, smooth movements. This accessory is sold separately.



Reading

2 Read the product description. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Users can choose which keyboard the computer comes with.
- 2 ☐ An electromechanical mouse is included with the computer.
- 3 ☐ The optical mouse is recommended for design professionals.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|-------------------------------------|--|
| 1 <input type="checkbox"/> GUI | 5 <input type="checkbox"/> scroll wheel |
| 2 <input type="checkbox"/> button | 6 <input type="checkbox"/> optical mouse |
| 3 <input type="checkbox"/> pointer | 7 <input type="checkbox"/> electromechanical mouse |
| 4 <input type="checkbox"/> keyboard | 8 <input type="checkbox"/> peripheral |

- A an icon on a computer's display controlled by a mouse
- B an input device that uses a ball to track its movement
- C the part of a device that a user presses to perform a function
- D an input device with many keys for inputting data
- E an input device that uses an LED to track its movement
- F a visual display that computer users can interact with
- G a device on a mouse that lets users move up and down smoothly on a screen
- H any device that is connected but not built into a computer

optical mouse

pointer

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 scroll / click

- A Use the button to _____ on different selections.
B The wheel lets users _____ smoothly through documents.

2 QWERTY / LED

- A The mouse uses a(n) _____ to track its movements.
B Keyboards for English speakers usually have _____ layouts.

5 Listen and read the product description again. What are an electromechanical mouse's main features?

Listening

6 Listen to a conversation between a salesperson and a customer. Choose the correct answers.

- 1 What is the conversation mostly about?
A prices for computer accessories
B the benefits of a new mouse
C a problem with the man's current equipment
D why the man prefers his old keyboard
- 2 Which product does the woman recommend?
A an optical mouse C an electromechanical mouse
B a new computer D a QWERTY keyboard

7 Listen again and complete the conversation.

Customer: Hi, I'd like to buy this keyboard.
Salesperson: Great! Can I also 1 _____ in a new mouse?
Customer: No. That's okay. I'm pretty happy with 2 my old one.
Salesperson: Are you sure? What 3 _____?
Customer: It's an 4 _____. It came with my old computer.
Salesperson: I think 5 you really like an optical mouse. They're much more precise.
Customer: Yeah? That could really help me out. I'm a graphic designer.
Salesperson: Then you should definitely have the 6 new keyboard. Come take a look.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

*I'd like to buy ...
I think you'll ...
That could really ...*

Student A: You are a salesperson. Talk to Student B about:

- peripherals for a computer
- your recommendation
- how he or she will benefit from your recommendation

Student B: You are a customer. Talk to Student A about peripherals for your computer.

Writing

9 Use the conversation from Task 8 to fill out the customer feedback form.

Computers Direct

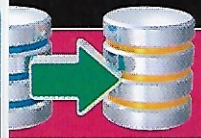
Customer Feedback Form

What did you purchase?

Was the salesperson helpful? **Y / N**

Why or why not?

Let's Talk Storage!

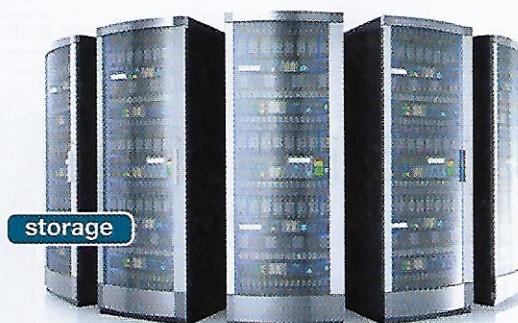


Computer technology grows rapidly. The **capacity** of data **storage** is no exception. **Hard drives** and storage devices improve all the time.

Early computers relied on **magnetic tape**. Developers soon replaced these with more efficient **floppy disks**. However, these still had limited space. For a while, **Zip drives** were a larger-capacity solution.

Then **CDs** came along. These lightweight, inexpensive devices are easy to store and discard. **DVDs** have similar benefits, and hold much more data. However, erasing and reprogramming these devices is often unreliable.

Today, we have compact **flash memory**. Tiny **flash drives** hold more information than earlier devices, including DVDs. Unlike most DVDs and CDs, flash drives are easily erasable.



Get ready!

① Before you read the passage, talk about these questions.

- 1 What are some early forms of computer data storage?
- 2 What are the benefits of flash memory?

Reading

② Read the article. Then, choose the correct answers.

- 1 What is the main idea of the article?
 - A the rising costs of data storage devices
 - B a history of data storage devices
 - C materials used to make data storage devices
 - D addressing problems with data storage devices
- 2 Which of the following is NOT a benefit of CDs?
 - A They are easy to store.
 - B They are lightweight.
 - C They can be erased and reprogrammed.
 - D They have a lower capacity than DVDs.
- 3 According to the article, what makes Zip drives better than floppy disks?
 - A a smaller size
 - B more affordable cost
 - C a higher capacity
 - D the ability to be erased

Vocabulary

③ Write a word that is similar in meaning to the underlined part.

- 1 The engineer could not erase the data from the flat, round data device.
CDs
- 2 Most new computers cannot read flat, square, low-capacity data devices.
floppy disks
- 3 The firm needs a new method of saving information for its electronic files.
storage
- 4 New devices have more space to store information than old devices.
capacity

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 hard drive / flash drive

- A A hard is built into a computer.
B A flash is designed to move easily from one computer to another.

2 flash memory / magnetic tape

- A _____ was one of the earliest methods of computer data storage.
B _____ has a larger storage capacity than earlier methods, like DVDs.

3 CDs / Zip drives

- A _____ were popular because they were cheap and disposable.
B _____ were popular because they were like large-capacity floppy disks.

5 Listen and read the article again. What product does the article recommend?

Listening

6 Listen to a conversation between a customer and a salesperson. Mark the following statements as true (T) or false (F).

- 1 ___ The man needs help choosing a new hard drive.
- 2 ___ The man requests a product that will not meet his storage needs.
- 3 ___ According to the woman, the man needs multiple storage devices.

7 Listen again and complete the conversation.

Customer: Excuse, me. Can you help me 1 _____ some CDs?

Salesperson: Of course. What do you need them for?

Customer: Data storage. I'm moving about ten gigabytes off my employer's 2 _____.

Salesperson: That's going to take a lot of CDs. I'd recommend a 3 _____ instead.

Customer: Why is that better?

Salesperson: I 4 _____ with a sixteen-gigabyte capacity.

Customer: Oh, so all the data will fit on 5 _____?

Salesperson: Right. Plus, you can 6 _____ later and use it for something else.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Can you help me ...?

What do you need ...?

Plus, you can ...

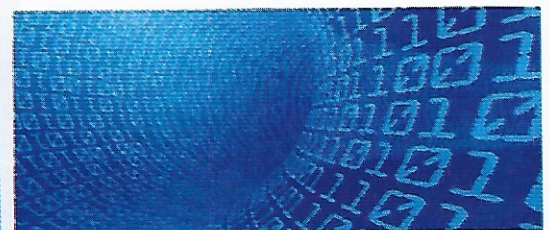
Student A: You are a customer. Talk to Student B about:

- your data storage needs
- a product you are looking for
- his or her recommendations

Student B: You are a salesperson. Talk to Student A about his or her data storage needs.

Writing

9 Use the conversation from Task 8 to fill out the note from the customer to his or her employer.



Hi Jenny,

I picked up a storage device at the electronics store today. I know you said that you wanted _____. However, I got _____ instead. The salesperson recommended that because _____ and _____. I hope that's okay.

-Glenn

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 Why do computers have fans and heat sinks?
- 2 What is the purpose of a computer bay?

Reading

- 2 Read the troubleshooting guide. Then, mark the following statements as true (T) or false (F).

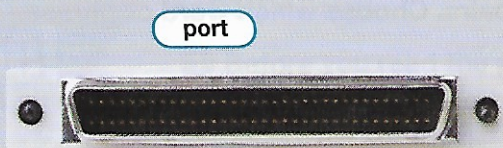
- 1 ___ According to the guide, the most likely cause of overheating is a problem with the fan.
- 2 ___ The first troubleshooting step is to disconnect the fan from the motherboard.
- 3 ___ According to the guide, malfunctioning fans produce additional heat.

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- | | |
|-------------|--------------------|
| 1 ___ fan | 4 ___ processor |
| 2 ___ bay | 5 ___ motherboard |
| 3 ___ cover | 6 ___ CD/DVD drive |

- A a device that makes something cooler by moving air
- B a part of a computer that interprets and runs programs
- C a part of something that protects its interior components
- D a location where hardware is stored inside a computer
- E a part of a computer that reads disc-based media
- F a computer's central circuit board



Troubleshooting Guide

Overheating

The most common cause of overheating is a malfunctioning **fan**. Most computers have a **heat sink**. This has its own fan. Other computers have a separate fan in the **case**.

To troubleshoot overheating, first remove the computer's **cover**. Then check whether the fan is functioning.

- If the fan is not functioning, check the **power supply**. Some fans attach to the **motherboard**. Others connect directly to the PSU. Reconnect it to the proper **port** if it is disconnected.
- If the fan is functioning, it may be inadequate. Additional hardware installations produce extra heat. Check **bays** for heat from added **processors** or **CD/DVD drives**. In this situation, you may need to purchase a stronger fan.



4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 heat sink / power supply

- A The computer's _____ regulates the computer's temperature.
B The computer won't turn on without a _____.

2 case / port

- A To connect the monitor, make sure the cable is in the right _____.
B The computer has a clear _____ so users can see the interior components.

5 Listen and read the troubleshooting guide again. What is the first step when troubleshooting an overheating computer?

Listening

6 Listen to a conversation between a technician and a customer. Choose the correct answers.

- What is the purpose of the conversation?
 - to determine why a computer will not turn on
 - to discuss a possible solution to a temperature problem
 - to explain why some hardware components are more effective than others
 - to record a formal complaint about a manufacturer's product
- What will the woman likely do next?
 - replace the central processor
 - move hardware to other bays
 - reconnect the fan to the port
 - open the computer's case

7 Listen again and complete the conversation.

Technician: This is tech support. How may **1** _____?

Customer: My computer **2** _____.

Technician: Have you checked whether **3** _____ working?

Customer: Yes. I opened **4** _____, and I can see the fan spinning.

Technician: Go ahead and try moving the hardware to different bays.

Customer: How would that help?

Technician: It helps to **5** _____ from other heat-producing hardware.

Customer: Okay. I'll call back if that **6** _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Have you checked ...?

Yes. I opened the case and ...

Go ahead and do that.

Student A: You are a technician.
Talk to Student B about:

- a problem with his or her computer
- what he or she has already tried
- possible solutions to the problem

Student B: You are a customer.
Talk to Student A about fixing your computer.

Writing

9 Use the conversation from Task 8 to fill out the tech support log.

Tech Support Log

Customer ID: _____

Problem: _____

Actions already taken: _____

Actions recommended: _____

Get ready!

- 1 Before you read the passage, talk about these questions.
- 1 What are some different types of networks?
 - 2 What is the difference between a router and a modem?

Reading

- 2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 ___ The bronze package includes a wireless network.
- 2 ___ The silver package connects computers through a router.
- 3 ___ The gold package is the least expensive option.

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- | | | |
|--------------|----------------|-------------------|
| 1 ___ LAN | 3 ___ WLAN | 5 ___ wireless |
| 2 ___ signal | 4 ___ Internet | 6 ___ CAT-5 cable |

- A a large network that reaches all over the world
 B a small network of computers that are connected by cables
 C a collection of information transmitted by hardware
 D not requiring or involving wires
 E a type of cable used to create computer networks
 F a small network of computers that are connected wirelessly

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LinkoConnect

Linko Connect provides a wide variety of products and services. Are you in need of a **network**? Linko Connect has many different networking packages.

Get our lowest available price with the **bronze package**. Link multiple home or office computers together with a **LAN**. We use enhanced **CAT-5 cables** to connect your machines.

Don't like wires and cables? Don't worry! With our **silver package** you'll get a **WLAN**. Our **wireless** networks transmit **signals** through a central **router**. Each router's **antenna** can transmit signals from blocks away.

Finally, our **gold package** includes our best high speed **broadband**. You'll surf the **Internet** at 50 Mbps!

All packages come with separate or built-in modems.



4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 modem / antenna

- A A computer uses a(n) _____ to connect to the telephone line.
B Some devices receive wireless signals through a(n) _____.

2 router / network

- A The computers are all part of the same _____.
B A _____ directs information to the computers it is connected to.

5 Listen and read the webpage again. What kind of network is available with the bronze package?

Listening

6 Listen to a conversation between a representative and a customer. Choose the correct answers.

- What is the conversation mostly about?
A a problem with a network connection
B the most appropriate Internet package
C the benefits of purchasing an additional product
D the costs of different connection speeds
- Why does the woman decline a particular product?
A She thinks it is too expensive.
B She does not want wireless access.
C She wants a better connection speed.
D She already has the product.

7 Listen again and complete the conversation.

Representative: This is Linko Connect. How may I help you?

Customer: I'm interested in an 1 _____. What are my options?

Representative: Well, our gold package comes with 2 _____. And its connection speed is forty megabits per second.

Customer: I don't need that. 3 _____ a router.

Representative: In that case, 4 _____ basic package. It doesn't come with a router.

Customer: But is it 5 _____?

Representative: Yes, it's the same speed. You'll just 6 _____ on the router.

Customer: Great. I'll take that.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

How may I help you?

I don't need ...

I recommend ...

Student A: You are a representative for an Internet service provider. Talk to Student B about:

- his or her Internet connection options
- his or her Internet needs
- your recommendation

Student B: You are a customer. Talk to Student A about Internet connection options.

Writing

9 Use the conversation from Task 8 to fill out the order form.

LinkoConnect Service Order Form

Customer Name: _____

Customer ID: _____

Order: _____

This package includes: _____

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some commonly used operating systems?
- 2 What are the benefits of an operating system that you use?

Reading

2 Read the advice column. Then, complete the table.

| Operating System | Benefit |
|------------------|--------------------------|
| 1 _____ | Has fewer known viruses. |
| Windows® | 2 _____ _____ |
| Linux® | 3 _____ _____ |

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 The new computer was made by a company that produces both operating systems and computers. _ _ p l _ ®
- 2 The engineer works for the company that makes the Windows operating system. M _ _ o _ o _ _ ®
- 3 Some people prefer an open source operating system. _ i n _ _
- 4 The operating system made by Apple® is popular for its virus security. _ _ _
- 5 The operating system made by Microsoft® is popular for its wide range of uses. _ _ n d _ _ s®

operating system

Dear Mr. Tech,

I'm considering buying a new computer. However, I don't know which **operating system** to choose. Which one do you recommend? – James in Glenwall

Dear James,

Each operating system (OS) has different benefits. **Apple®** produces a popular OS called **OS X®**. This system has fewer known viruses than other systems. **Microsoft®** makes an OS called **Windows®**. One of its benefits is **software compatibility**. Windows works with a wide variety of programs. Finally, there is also the **Linux®** OS. Linux® is **open source** and easy to **customize**. I hope this helps you make your decision! – Mr. Tech

Apple®

Linux®

Linux®

Microsoft®

Microsoft®

Windows®

- 4 Fill in the blanks with the correct words from the word bank.

Word BANK

operating system open source
customize software compatibility

- The source code for _____ software is freely available.
- _____ determines whether a computer can run certain programs.
- Most complex computers cannot function without a(n) _____.
- Many people like to _____ software to fit particular needs.

- 5 Listen and read the advice column again. Which company's operating system is least likely to get a virus?

Listening

- 6 Listen to a conversation between two computer engineers. Choose the correct answers.

- What is the conversation mostly about?
 - which software a particular operating system can run
 - which companies produce different operating systems
 - which operating system has the best features
 - which operating system is the easiest to install
- What is true about the man?
 - He dislikes the Windows® operating system.
 - He likes a larger software selection.
 - He prefers the system that's less likely to get a virus.
 - He wants a system that is more customized.

- 7 Listen again and complete the conversation.

Engineer 1: Hey, you prefer OS X® 1 _____, don't you?

Engineer 2: Not at all. Windows® is my favorite 2 _____.

Engineer 1: Really? I'm surprised.

Engineer 2: What's surprising about it? Windows® has great 3 _____.

Engineer 1: Perhaps, but OS X® is less 4 _____ viruses.

Engineer 2: I see where 5 _____. But I prefer a large software library.

Engineer 1: But don't you agree that OS X® is better all around?

Engineer 2: Nope. I guess we have to 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I prefer ...

But wouldn't you agree that ...?

We have to agree to disagree.

Student A: You are an engineer. Talk to Student B about:

- your favorite operating system
- his or her favorite operating system
- the advantages of each operating system

Student B: You are an engineer. Talk to Student A about your favorite operating system.

Writing

- 9 Use the conversation from Task 8 to fill out an email from a computer engineer to a client.

Dear _____,

I heard that the office is getting new computers. Did you choose an operating system yet? I recommend _____ because _____.

Some people in the office would prefer _____ because _____. Let me know what you decide.

Regards,

Computer Engineer

Get ready!

1 Before you read the passage, talk about these questions.

- What are some different ways to describe combining numbers?
- What are some different ways to describe splitting numbers apart?

1,400

-hundred

How do they say it?

| Symbol | Interpretation | Examples |
|-----------|---|---|
| = | equals | $\frac{1}{4} = 0.25$ One quarter equals point two five. |
| + | plus, add | $A + B = C$ A plus B equals C. Add A and B to get C. |
| - | minus, less, subtract | $A - B = C$ A minus B is C. Subtract B from A to get C. |
| \times | multiplied by, times | $A \times B = C$ A multiplied by B is C. A times B equals C. |
| $\div, /$ | divided by, over | $A \div B = C$ A divided by B equals C. $A / B = C$ A over B is C. |
| 1,900 | one thousand nine hundred or nineteen hundred | We spent nineteen hundred dollars on office supplies. |

Reading

2 Read the chart. Then, mark the following statements as true (T) or false (F).

- Four times seven equals seven minus five.
- Two plus three equals five.
- Six divided by three is the same as six over three.

Vocabulary

3 Read the sentences and choose the correct words or phrases.

- Five **less** / **plus** three equals two.
- Eight **divided by** / **times** two equals four.
- Subtract** / **Equal** one number from another to find the difference between them.
- Two **multiplied by** / **divided by** three is six.
- If you **add** / **subtract** two amounts of something, you get a larger amount.

$$2 + 3 = 5$$

plus

$$3 - 2 = 1$$

minus

$$2 \times 3 = 6$$

times

$$6 \div 2 = 3$$

divided by

$$4 + 3 = 7$$

equals

- 4 Place the correct words from the word bank under the correct headings.

Word BANK

equal minus times plus over

| Combining amounts | Splitting amounts | Expressing results |
|-------------------|-------------------|--------------------|
| | | |
| | | |
| | | |

- 5 Listen and read the chart again. What is the result if someone multiplies two quantities instead of dividing them?

Listening

- 6 Listen to a conversation between two engineering students. Choose the correct answers.

- What is the main idea of the conversation?
 - why the man got the wrong answer to a test question
 - which student got a higher grade on a test
 - when the students will be tested on new math concepts
 - how the woman's test score was calculated
- Which operation was required in the first part of the equation?
 - dividing
 - adding
 - subtracting
 - multiplying

- 7 Listen again and complete the conversation.

Student 1: How did you do on the 1 _____ ?

Student 2: I missed something on the first part. I don't know what I 2 _____ .

Student 1: Let's see. The equation started with fourteen hundred 3 _____ .

Student 2: So 4 _____ five equals seven thousand, right?

Student 1: No, that's not it. You 5 _____ instead of dividing.

Student 2: Oh, of course. I get it now. It 6 _____ fourteen hundred over five.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I don't know what I did...

You ... instead of ... / I get it now.

Student A: You are an engineering student. Talk to Student B about:

- his or her performance on a math test
- a question he or she answered incorrectly
- the mathematical operation he or she should have used

Student B: You are an engineer student. Talk to Student A about your performance on a math test.

Writing

- 9 Use the conversation from Task 8 to fill out the test revision sheet.

Course: Math 100

Student:

Please write the equation you missed. Then, explain what you did wrong and write the corrected equation.

| Incorrect Equation | What did you do wrong? | Corrected Equation |
|-----------------------------|-----------------------------------|-----------------------|
| 1. $4 - 1 = 3$ | I subtracted instead of adding. | $4 + 1 = 5$ |
| 2. $1,400 \times 5 = 7,000$ | I multiplied instead of dividing. | |
| 3. _____ | I subtracted instead of adding. | $1,500 + 500 = 2,000$ |

Get ready!

- 1 Before you read the passage, talk about these questions.
- How are fractions expressed?
 - How are percentages expressed?

Reading

- 2 Read the textbook chapter. Then, mark the following statements as true (T) or false (F).

- ___ The numerator of a fraction expresses the total units possible.
- ___ Percentages can be expressed as whole or decimal numbers.
- ___ A percentage as a numerator over 100 is a fraction.

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- ___ point
- ___ percent
- ___ -out of
- ___ numerator
- ___ denominator
- ___ decimal number

- the number above the line on a fraction
- the number below the line on a fraction
- describing the ratio between actual and potential quantities
- the quantity of something expressed in terms of 100
- a dot that separates whole and partial numbers
- a number with whole and partial numbers separated by a dot

10.1

Quantities Expressed in Engineering

Numbers appear in multiple forms. Some quantities are expressed in **fractions**.

Example: 4 **out of** every 5 people in a region have home computers. Therefore, $\frac{4}{5}$ of people have home computers.

The same number can be a **percentage**.

Example: 80 **percent** of people have home computers.

Percentages sometimes appear as **decimal numbers**. In this case, the percentage comes after a zero and a **point**.

Example: 0.80 of people have home computers.

It is easy to **convert** a percentage to a fraction. Simply use the percentage as a **numerator** and 100 as the **denominator**. Then, **reduce** the fraction to its lowest form.

Example: 80 over 100 equals 4 over 5

 $\frac{1}{4}$

fraction

 $\frac{1}{4}$

denominator

 $\frac{1}{4}$

numerator

25%

percentage

0.25

decimal number

0.40

point

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 fraction / percentage

- A The denominator of a _____ is the number on the bottom.
B The _____ stated the quantity as a number out of one hundred.

2 convert / reduce

- A The student attempted to _____ the fraction to its lowest form.
B The student explained how to _____ fractions to percentages.

5 Listen and read the textbook chapter again. How are percentages expressed as decimal numbers?

Listening

6 Listen to a conversation between a student and an instructor. Choose the correct answers.

- What is the conversation mostly about?
 - a conversion error that the woman made on a test
 - the benefits of expressing numbers as percentages
 - how to convert a number into a fraction
 - the importance of including points in decimal numbers
- What does the man remind the woman to do?
 - remove points from whole numbers
 - reduce fractions to the lowest forms
 - convert whole numbers into decimal numbers
 - use a percentage as a denominator

7 Listen again and complete the conversation.

Student: Mr. Logan, could you help me with something?
Instructor: Of course. What **1** _____?
Student: I'm having trouble converting **2** _____ fractions.
Instructor: Just make a fraction with 100 as **3** _____ and the percentage as the numerator.
Student: So the decimal number is 0.75. I **4** _____ 100?
Instructor: Not exactly. You need to convert the percentage into a **5** _____.
Student: Oh, of course. So it's 75 over 100.
Instructor: Exactly. Then **6** _____ reduce the fraction to its lowest form.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

What do you need?

I'm having trouble ...

Don't forget to ...

Student A: You are a student. Talk to Student B about:

- your difficulty performing a conversation
- a number you are trying to convert

Student B: You are an instructor. Talk to Student A about converting numbers.

Writing

9 Use the conversation from Task 8 to fill out the student's notes.

Number

Conversions:

Notes

- To convert a percentage into a decimal number, simply put _____.
- To convert a decimal number into a percentage, simply remove _____.

Get ready!

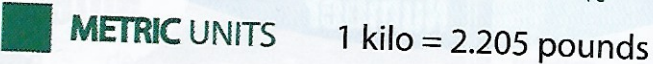
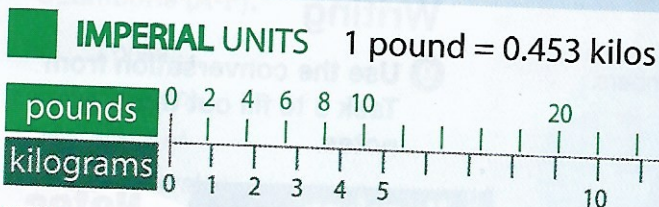
1 Before you read the passage, talk about these questions.

- 1 What units of measurement do people use in your country?
- 2 What advantages does the metric system have compared to the imperial system?

Imperial VS Metric UNITS

CONVERSION CHART

Don't know the difference between a pound and a kilogram? This chart will help you figure it out!



Measurements of Temperature

Use the following formula to convert **degrees** in **Fahrenheit** (°F) to **Celsius** (°C): $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times \frac{5}{9}$

Measurements of Weight

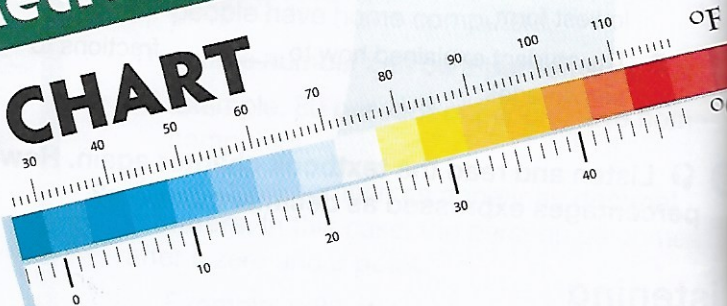
1 **pound** = .45 **kilograms**
1 **ounce** = 28.35 **grams**

Measurements of Length

1 **inch** = 2.54 **centimeters**

To **convert** a measurement from imperial units to the metric system, just multiply.
5 inches to centimeters: $5 \times 2.54 = 12.7$ centimeters.

To convert a measurement from metric units to imperial units, just divide.
12 kilograms to pounds: $12 \div .45 = 26.67$ pounds.



Reading

2 Read the conversion chart. Then, mark the following statements as true (T) or false (F).

- 1 ☐ A two-pound object is heavier than a two-kilogram object.
- 2 ☐ A gram of matter is equal to several ounces.
- 3 ☐ To calculate inches, someone can divide a number of centimeters by 2.54.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|-------------------------------------|---------------------------------------|
| 1 <input type="checkbox"/> ounce | 5 <input type="checkbox"/> kilogram |
| 2 <input type="checkbox"/> metric | 6 <input type="checkbox"/> centimeter |
| 3 <input type="checkbox"/> Celsius | 7 <input type="checkbox"/> Fahrenheit |
| 4 <input type="checkbox"/> imperial | |

- A a system of measurement based on meters and grams
- B a temperature system in which water boils at 212 degrees
- C a temperature system in which water freezes at zero degrees
- D a system of measurement based on feet and pounds
- E a unit equal to one sixteenth of a pound
- F a unit equal to one hundredth of a meter
- G a unit equal to one thousand grams

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 inch / pound

- A The sandwich weighed almost a(n) _____ .
B The coin is about a(n) _____ inch in diameter.

2 gram / degree

- A The paperclip weighed about one _____ .
B The temperature cooled one _____ over ten minutes.

5 Listen and read the conversion chart again. How can someone convert grams into ounces?

Listening

6 Listen to a conversation between two engineers. Choose the correct answers.

- What is the conversation mostly about?
A why the woman prefers the metric system
B an error while making a measurement conversion
C the challenges of working with the imperial system
D the conversion rate for units of length
- According to the woman, why should the man show measurements in both systems?
A It will make further conversions easier.
B Everyone will be able to read the measurements.
C Engineers tend to use both measurement systems.
D Other products include both types of measurements.

7 Listen again and complete the conversation.

Engineer 1: How should I list 1 _____
_____ this hardware component?

Engineer 2: You should probably list them in both metric
2 _____ units.

Engineer 1: So, to be clear that's centimeters 3 _____,
right?

Engineer 2: Yeah. That way, everyone will be able to read them.

Engineer 1: Good idea. Do you know the conversion rates? I
always 4 _____.

Engineer 2: I think an inch 5 _____ 2.54
centimeters.

Engineer 1: Okay. This component is eight 6 _____.
Eight times 2.54 equals 20.32 centimeters.

Engineer 2: Yeah, that sounds about right.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

How should I ...?

So to be clear, that's ...

I think ...

Student A: You are an engineer.
Talk to Student B about:

- which system you should use to measure something
- how to convert measurements into the correct units

Student B: You are an engineer.
Talk to Student A about conversion rates between measurement units.

Writing

9 Use the conversation from Task 8 to fill out the conversion notes.

Measurements of: Weight

There are _____
in a(n) _____.

Two _____ equals
_____.

Measurements of: _____

There are _____
in a(n) _____.

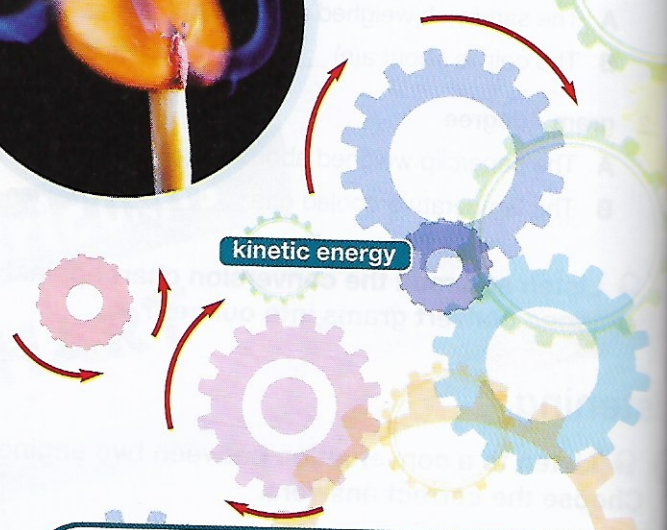
Half of a(n) _____ equals
_____.

12 Energy

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some different types of energy?
- 2 What happens when two surfaces rub against each other?



Chapter 12.1.1

energy

All **energy** is either **kinetic energy** or **potential energy**. For instance, **chemical energy** is a form of potential energy. During a chemical reaction, a substance **releases** potential energy. When this happens, the energy becomes kinetic. The result of kinetic energy is often called **work**.

Energy cannot be destroyed. In physics, the law of **conservation of energy** states that the total amount of energy in a system remains constant over time. However, energy can change forms. Many processes **transfer** energy between objects. For example, substances rubbing together encounter **friction**. This prevents objects from sliding smoothly against each other. Friction prevents some potential energy from becoming kinetic. During friction, some of the energy is released as **heat energy**.

Reading

2 Read the textbook chapter. Then, mark the following statements as true (T) or false (F).

- 1 ___ The two main types of energy are potential energy and chemical energy.
- 2 ___ Chemical reactions convert potential energy into kinetic energy.
- 3 ___ The laws of physics prevent the transfer of energy between objects.

Vocabulary

3 Match the words or phrases (1-6) with the definitions (A-F).

- 1 ___ heat energy
- 2 ___ work
- 3 ___ conservation of energy
- 4 ___ kinetic energy
- 5 ___ potential energy
- 6 ___ chemical energy

- A action or movement produced by kinetic energy
- B energy expressed through activity or movement
- C to keep constant through physical or chemical reactions
- D energy that is released through a chemical reaction
- E energy which is stored, ready to be released
- F a form of energy that causes temperatures to rise

4 Read the sentence pairs. Choose which word best fits each blank.

1 friction / energy

- A According to the laws of physics, it is impossible to destroy _____.
- B Ice is slippery because it does not have much _____.

2 transfers / releases

- A An explosion usually _____ a large amount of energy into the surrounding area.
- B A stove _____ heat from the burner to the pot.

5 Listen and read the textbook chapter again. What are the energy transfers during friction?

Listening

6 Listen to a conversation between an instructor and a student. Choose the correct answers.

- What is the main idea of the conversation?
 - methods for conserving energy
 - how to classify a type of energy
 - ways to avoid releasing energy
 - which type of energy is most useful
- What does the woman identify incorrectly?

| | |
|-------------------|--------------------|
| A friction | C potential energy |
| B chemical energy | D heat energy |

7 Listen again and complete the conversation.

Instructor: Are you ready for the test tomorrow?

Student: Yeah, I think so.

Instructor: Okay, then. What are the two basic 1 _____?

Student: Are they 2 _____ and kinetic energy?

Instructor: Correct. And which type of energy is 3 _____?

Student: Hmm. Chemical energy is a form of 4 _____, right?

Instructor: Nope. You've 5 _____. Chemical energy is actually a form of potential energy.

Student: Ah, that's right. Chemical energy becomes kinetic energy through 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

What are the ...?

You've got that backwards.

That's right.

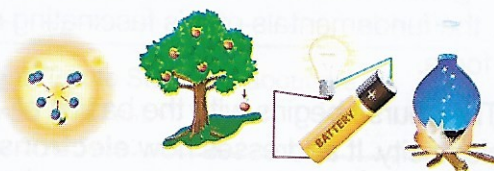
Student A: You are an instructor. Talk to Student B about:

- the basic types of energy
- an error that he or she makes
- the characteristics of a particular type of energy

Student B: You are student. Talk to Student A about types of energy.

Writing

9 Use the conversation from Task 8 to fill out the student's notes.



Notes on Energy

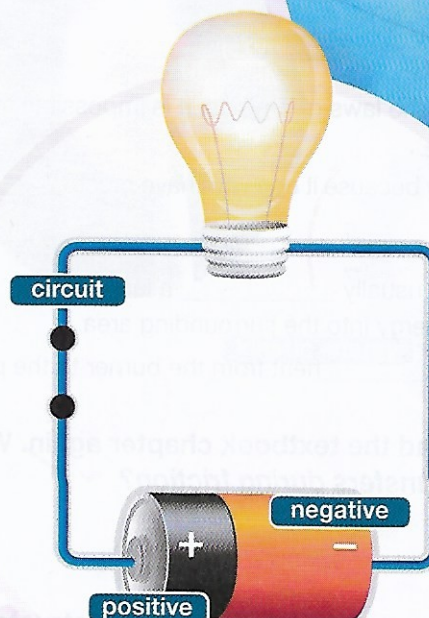
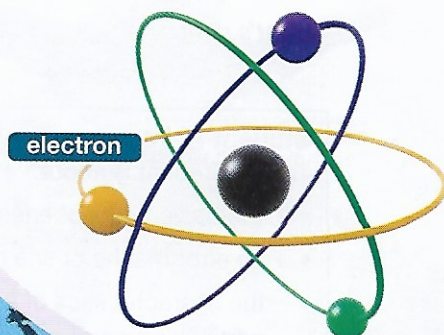
- The two basic types of energy are _____ and _____.
- _____ is a type of _____.
- _____ becomes _____ when _____.

13 Electricity 1

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What determines whether an object has a positive or negative charge?
- 2 What is the difference between a direct current and an alternating current?



ENGR 120

INTRODUCTION TO electricity

Harnessing **electricity** is one of mankind's greatest achievements. ENGR 120 introduces the fundamentals of this fascinating natural force.

The course begins with the basics of electricity. It addresses how **electrons** and electron holes create **positive** and **negative charges**. Students will learn why some substances **conduct** electricity while others do not. They will also learn what determines a circuit's **polarity**.

Later in the semester, the course covers applications of electricity. The class will visit a power plant. There, they will learn about generating electricity. Students must also attend a workshop on everyday applications of electricity. The workshop includes practical experiments with **direct currents** and **alternating currents**.

Reading

2 Read the course description. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The course begins with practical uses of currents.
- 2 ☐ Students will go to a power plant later in the semester.
- 3 ☐ Students must attend a workshop on generating electricity.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|-------------------------------------|--|
| 1 <input type="checkbox"/> conduct | 4 <input type="checkbox"/> electricity |
| 2 <input type="checkbox"/> positive | 5 <input type="checkbox"/> direct current |
| 3 <input type="checkbox"/> negative | 6 <input type="checkbox"/> alternating current |

- A possessing a charge the same as that of an electron
- B possessing a charge opposite to that of an electron
- C to allow electricity to pass through something
- D a form of energy caused by charged particles
- E a charge that switches the direction of its flow constantly
- F a charge that flows in a single direction

- 4 Read the sentence pairs. Choose which word best fits each blank.

1 charge / circuit

- A A negative _____ has extra electrons.
B If a _____ is broken, electricity cannot flow all the way through it.

2 electron / polarity

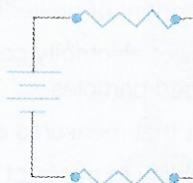
- A A(n) _____ is a very small particle.
B The circuit's _____ changed from positive to negative.

- 5 Listen and read the course description again. How will the class learn about generating electricity?

Listening

- 6 Listen to a conversation between two students. Choose the correct answers.

- 1 What is the conversation mostly about?
A a test question that the man missed
B what information is likely to be on a test
C a concept that the woman misunderstands
D which concepts will be covered in class
- 2 What is the man mistaken about?
A the types of electrical charges
B where electricity comes from
C the definition of an electron
D the difference between direct and alternating currents



- 7 Listen again and complete the conversation.

Student 1: Hey, do you know what 1 _____ tomorrow's electricity test?

Student 2: Well, it'll probably ask what 2 _____ is.

Student 1: Oh, I know that one. It's a subatomic particle with a 3 _____.

Student 2: Right. The test might ask about different charges, too.

Student 1: Charges are 4 _____, right?

Student 2: No. You're thinking of currents. A charge can be either 5 _____.

Student 1: Oh, that's right. And that depends on how many electrons it has.

Student 2: You've got it. 6 _____ you'll do fine on the test.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Do you know ...? / Isn't that ...? / You're thinking of ...

Student A: You are a student. Talk to Student B about:

- the information that will likely be on a test
- definitions of electrical terms
- a concept that you are not sure about

Student B: You are student. Talk to Student A about the information that will likely be on a test.

Writing

- 9 Use the conversation from Task 8 to fill out the student's notes.

CHAPTER 7: ELECTRICITY

Notes:

- _____ can be either _____. This is determined by _____.
- The definition of a(n) _____ is _____.

Reminder: Study for the test next week. It will cover _____.

14 Electricity 2

HANDY'S HOME GUIDES

COMPUTERS

Power Supply Units (PSU)



Before you purchase a power supply unit, you should understand its basic functions. A computer's PSU controls its supply of **electrical energy**. It works by managing the strength of electrical **currents**.

A PSU receives energy from a wall outlet. Then, it regulates the **electrical power** that travels through the circuit. The power is delivered to the computer at the appropriate **wattage**. Most computers require between 300 and 350 **watts**.

However, different computer components require different **voltages**. To find a component's voltage requirements, you need to know its **resistance**. Some components are better **conductors** than others. These components have fewer **ohms** of resistance. Many processors require 100 **amperes** of power at about two **volts**. Understand your system's specifications before you install a PSU.

Get ready!

① Before you read the passage, talk about these questions.

- 1 What are some different units that are used to measure electrical currents?
- 2 What is the difference between electrical energy and electrical power?

Reading

② Read the guide. Then, choose the correct answers.

- 1 What is the main idea of the guide?
 - A how to improve a computer's performance
 - B how to choose the right part for a computer
 - C how to install replacement components
 - D how to know when to replace a computer
- 2 Which of the following is NOT determined by a PSU?
 - A a circuit's electrical power
 - B the voltage of a power supply
 - C a conductor's resistance
 - D the strength of a current
- 3 Why do different components require different voltages?
 - A they have different levels of resistance
 - B some of them do not conduct electricity
 - C they use electrical energy differently
 - D some have independent power sources

Vocabulary

③ Match the words (1-6) with the definitions (A-F).

- | | |
|---------------|------------------|
| 1 ___ ohm | 4 ___ current |
| 2 ___ watt | 5 ___ conductor |
| 3 ___ voltage | 6 ___ resistance |

- A a unit that measures electrical power
- B a material that transmits electricity
- C the amount of power in an electrical current
- D a flow of electricity caused by the movement of charged particles
- E a unit that measures an object's resistance
- F the ability to obstruct the flow of electricity

Read the sentence pairs. Choose which word or phrase best fits each blank.

1 electrical energy / electrical power

A Some computer components manipulate a circuit's _____.

B The movement of electrons generates _____.

2 ampere / volt

A A(n) _____ measures an electrical current's flow.

B A(n) _____ measures the electrical power of a current.

Listen and read the guide again. What are the power requirements of most processors?

Listening

Listen to a conversation between an engineer and a homeowner. Mark the following statements as true (T) or false (F).

- 1 ___ The man connected the power supply incorrectly.
- 2 ___ The man's PSU cannot handle the resistance of the computer components.
- 3 ___ The woman recommends replacing most of the computer components.

Listen again and complete the conversation.

Engineer: No, your wiring was fine. But it looks like you
1 _____ an older PSU.

Homeowner: That's right. I got one from a friend.

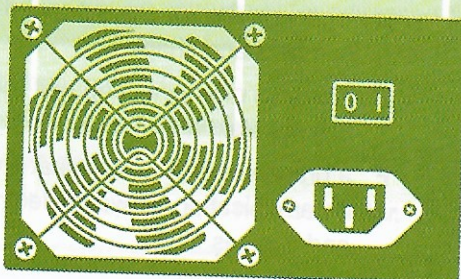
Engineer: Well, your computer requires a higher wattage. This PSU isn't 2 _____.

Homeowner: Why 3 _____ need to be higher?

Engineer: You have a number of extra cables and components. That 4 _____ on the current.

Homeowner: Oh, I see. Can 5 _____ a better PSU?

Engineer: Certainly. Give me 6 _____ to check all the specifications.



Speaking

With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I found the problem ...

Did I ... incorrectly?

You need to have something that ...

Student A: You are an engineer. Talk to Student B about:

- a problem with his or her computer
- the cause of the problem
- how to fix the problem

Student B: You are a homeowner. Talk to Student A about a problem with your computer.

Writing

Use the conversation from Task 8 to fill out the engineer's receipt for services.

Receipt for Services

Customer: _____

Malfunction: _____

Cause of malfunction: _____

Actions taken: _____

Recommendations: _____

15 Education

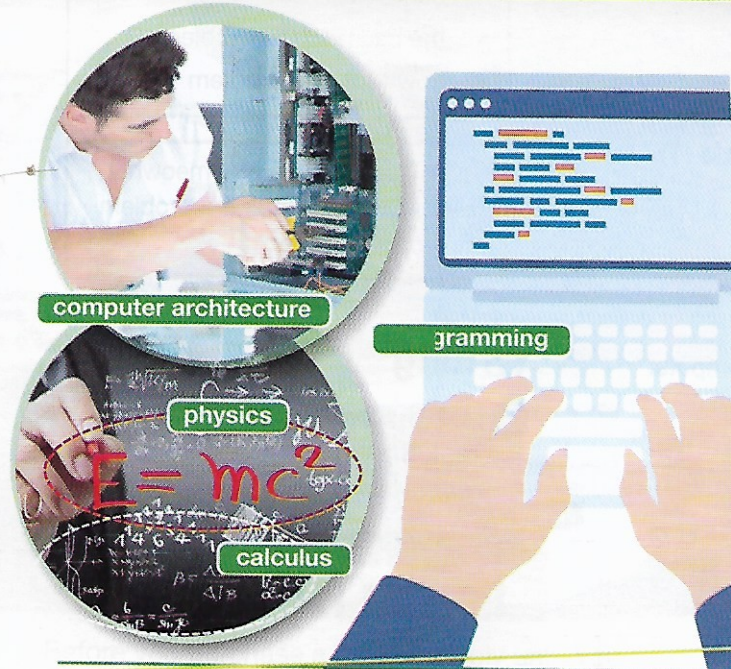
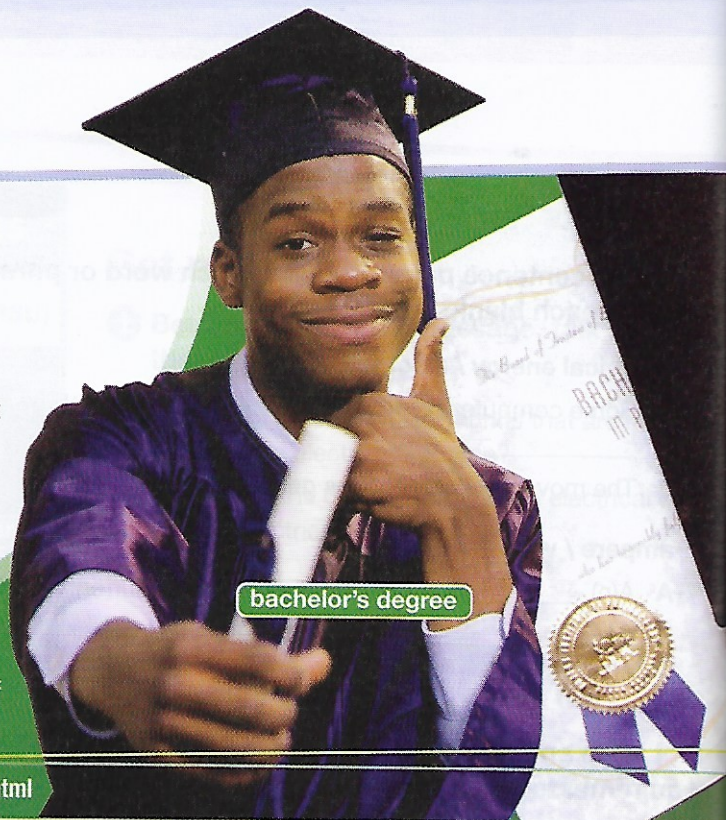
Get ready!

1 Before you read the passage, talk about these questions.

- 1 What classes do students usually take as part of a computer engineering degree?
- 2 What are some common prerequisites for computer engineering programs?

Central University – Bachelor's of Science in Computer Engineering

www.central-university.edu/programs/degrees/computerengineering.html



Central University offers a **bachelor's degree** in computer engineering. The program covers circuitry and other aspects of **electrical engineering**. It also includes a comprehensive education in computer science. Students will gain an advanced understanding of computer hardware and software.

The first semester includes courses in **computer architecture**. These teach the basic physical structure of computers. Then, students move on to **programming**. This is where they will learn how to create software. Later courses include **signal processing** and **hardware design**.

Program applicants must have a strong background in **mathematics** and science. Before officially entering the program, students must take several **foundation** courses. These include introductory courses in **physics** and **calculus**.

Reading

2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Students study mathematics before they are admitted to the program.
- 2 ☐ The first semester includes a course in signal processing.
- 3 ☐ Students are required to take calculus courses during the first year of the program.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--|---|
| 1 <input type="checkbox"/> foundation | 4 <input type="checkbox"/> signal processing |
| 2 <input type="checkbox"/> mathematics | 5 <input type="checkbox"/> electrical engineering |
| 3 <input type="checkbox"/> bachelor's degree | 6 <input type="checkbox"/> computer architecture |

- A a certificate that is earned after four years of study
- B a class that students take to prepare for a degree program
- C the process of creating computers from hardware components
- D a general field of study concerned with numbers and shapes
- E a branch of engineering that focuses on the uses of electricity
- F a branch of engineering that studies communication between electrical components and devices

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 calculus / physics

- A The lecture on _____ explains how gravity works.
B The student used _____ to find the slope of the curve.

2 programming / hardware design

- A The student's skill at _____ helped her rewrite the software.
B The man created a new processor in his _____ class.

5 Listen and read the webpage again. What courses must students take before applying to the computer engineering program?

Listening

6 Listen to a conversation between an academic advisor and a student. Choose the correct answers.

- 1 What is the conversation mostly about?
A the woman's grades in the previous semester's courses
B the woman's application to enter the computer engineering program
C the woman's progress towards a bachelor's degree
D the woman's concerns about completing her engineering courses
- 2 Which of the following courses did the woman already take?
A programming C hardware design
B electrical engineering D signal processing

7 Listen again and complete the conversation.

Advisor: So, Lisa. You wanted to discuss 1 _____ towards your degree?
Student: Yes. I'd also like to plan my next 2 _____.
Advisor: Let's see. You're about 3 _____ the bachelor's degree program.
Student: That sounds about right. I just finished classes in programming and 4 _____.
Advisor: Good. It looks like you're ready for advanced 5 _____.
Student: What does that include?
Advisor: Well, I'd recommend enrolling in 6 _____ and hardware design.
Student: Okay. I'll sign up for both next semester.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

You're about halfway ...

I just finished ...

I thought I'd ...

Student A: You are an academic advisor. Talk to Student B about:

- his or her progress towards a degree
- the classes the student has already taken
- the classes the student still needs to take

Student B: You are a student. Talk to Student A about your progress towards a degree.

Writing

9 Use the conversation from Task 8 to fill out the degree progress report.

Mid-Year Progress Report

Advisor: _____

Student: _____

Before entering the program, the student completed _____

After entering the program, the student completed _____

Next, the student should _____

Glossary

- active matrices** [N-PLURAL-U3] **Active matrices** are display systems that control each of the pixels individually.
- add** [V-T-U9] To **add** a number to another number is to increase it by that amount.
- alternating current** [N-COUNT-U13] An **alternating current** is an electrical current that changes the direction it flows in at regular intervals.
- ampere** [N-COUNT-U14] An **ampere** is a unit that measures the flow of an electrical current.
- antenna** [N-COUNT-U7] An **antenna** is piece of hardware that is used to send and receive radio signals.
- Apple®** [TRADEMARK-U8] **Apple®** is a company that designs and develops computers and computing systems.
- bachelor's degree** [N-COUNT-U15] A **bachelor's degree** is a certificate indicating that someone has completed an educational program, usually after four years of study, and is qualified to practice a particular profession.
- bay** [N-COUNT-U6] A **bay** is an area of a computer where hardware can be installed.
- bitmap** [N-COUNT-U3] A **bitmap** is an organization of bits or pixels that forms an image when it is displayed on a computer screen.
- broadband** [N-UNCOUNT-U7] **Broadband** is a system that allows large amounts of information to be sent very quickly between computers.
- button** [N-COUNT-U4] A **button** is a part of a device that a user presses to perform a function or make a selection.
- calculus** [N-UNCOUNT-U15] **Calculus** is a complex branch of mathematics that deals with rates of change and advanced measurements of physical properties.
- capacity** [N-UNCOUNT-U5] **Capacity** is the amount of information, such as computer data, that can be stored on a disk or usb drive.
- case** [N-COUNT-U6] A **case** is a protective enclosure that contains the parts of something.
- CAT-5 cable** [N-COUNT-U7] A **CAT-5 cable** is a wire that is commonly used to connect computers on a LAN.
- CD** [ABBREV-U5] A **CD** (compact disc) is a flat, round computer data storage device that usually cannot be reliably erased and reprogrammed.
- Celsius** [ADJ-U11] If a measurement is **Celsius**, is uses the temperature scale in which water boils at 100 degrees and freezes at 0 degrees.
- centimeter** [N-COUNT-U11] A **centimeter** is a metric unit of length. A meter is made up of 100 centimeters.
- charge** [N-COUNT-U13] A **charge** is the amount of electricity that something carries.
- chemical energy** [N-UNCOUNT-U12] **Chemical energy** is the energy in a substance that can be released through a chemical reaction.
- circuit** [N-COUNT-U13] A **circuit** is a complete, closed path through which an electrical current can flow.
- click** [V-T-U4] To **click** something on a computer screen is to place the pointer on it and press the mouse button to select it.
- component** [N-COUNT-U3] A **component** is one of multiple parts of something, usually performing an important role in the overall function of the whole.
- computer** [N-COUNT-U2] A **computer** is an electronic instrument for storing data and performing various electronic tasks and functions.
- computer architecture** [N-UNCOUNT-U15] **Computer architecture** is the physical configuration of hardware components and subcomponents of a computer.
- computer cluster** [N-COUNT-U2] A **computer cluster** is a group of interconnected computers, designed to process large quantities of data.
- computer engineer** [N-COUNT-U1] A **computer engineer** is a professional who is trained in computer science and electrical engineering, and can usually design both hardware and software components for computers.
- computer science** [N-UNCOUNT-U1] **Computer science** is the study and application of mathematical principles in computer technology.

conduct [V-T-U13] To **conduct** electricity is to allow it to flow through something.

conductor [N-COUNT-U14] A **conductor** is a material that transmits electricity.

conservation of energy [N-UNCOUNT-U12] **Conservation of energy** is a law in physics that states that the total energy of a system remains constant over time.

convert [V-T-U10] To **convert** something is to change it into a different form or system of measurement.

cover [N-COUNT-U6] A **cover** is something that is placed over something else for protection.

CRT [ABBREV-U3] A **CRT** (cathode ray tube) is a vacuum tube used in older computer monitors.

current [N-COUNT-U14] A **current** is a flow of electricity caused by the movement of charged particles.

customize [V-T-U8] To **customize** something is to change it to fit individual needs.

decimal number [N-COUNT-U10] A **decimal number** is a number that contains a decimal point.

degree [N-COUNT-U11] A **degree** is a unit in a system of measuring temperature.

denominator [N-COUNT-U10] A **denominator** is the number that is below the line in a fraction. In the fraction $\frac{1}{2}$, the denominator is 2.

design [V-T-U1] To **design** something is to plan the way that something will be created.

desktop [N-COUNT-U2] A **desktop** is a personal computer intended to be used at a single location, such as a desk in a home or office.

develop [V-T-U1] To **develop** something is to bring it from the initial stages of conception to action or implementation.

direct current [N-COUNT-U13] A **direct current** is an electrical current that flows in only one direction.

display [N-COUNT-U3] A **display** is the image on a monitor screen.

divide by [V PHRASE-U9] To **divide** a number (A) **by** another number (B) is to split number A evenly into B number of parts.

DVD [ABBREV-U5] A **DVD** (digital video disc) is a flat, round computer data storage device that is similar to a CD, but is capable of storing a much larger amount of data.

electrical energy [N-UNCOUNT-U14] **Electrical energy** is energy generated by the movement of electrons.

electrical engineering [N-UNCOUNT-U15] **Electrical engineering** is a branch of engineering that studies how electricity can power machines and communication.

electrical power [N-UNCOUNT-U14] **Electrical power** is the rate at which electrical energy is transferred through a circuit.

electricity [N-UNCOUNT-U13] **Electricity** is a form of energy caused by charged particles and people use it for many purposes, including heat, light, and mechanical movement.

electromechanical mouse [N-COUNT-U4] An **electromechanical mouse** is a computer mouse that uses a rubber ball to track hand movements across a surface.

electron [N-COUNT-U13] An **electron** is a subatomic particle that carries a negative charge.

embedded computer [N-COUNT-U2] An **embedded computer** is a computer that is a part of a larger product.

energy [N-UNCOUNT-U12] **Energy** is the ability to cause movement or action, or to transfer heat.

equal [V-T-U9] To **equal** something is to be precisely the same number or amount as something.

evaluate [V-T-U1] To **evaluate** something is to carefully study it and assess its qualities.

Fahrenheit [ADJ-U11] If a measurement is **Fahrenheit**, it uses the temperature scale in which water boils at 212 degrees and freezes at 32 degrees.

fan [N-COUNT-U6] A **fan** is a device that makes something cooler by moving air.

flash drive [N-COUNT-U5] A **flash drive** is a data storage device containing flash memory.

flash memory [N-UNCOUNT-U5] **Flash memory** is a type of computer data storage that can be easily erased and reprogrammed with new information.

Glossary

- flat-panel** [ADJ-U3] If a monitor has a **flat-panel** display, it is much lighter and thinner than a monitor that has a CRT.
- floppy disk** [N-COUNT-U5] A **floppy disk** is a low-capacity computer data storage device in the form of a flat square of plastic.
- foundation** [N-COUNT-U15] A **foundation** is a general course of study that students take to prepare for a degree program.
- fraction** [N-COUNT-U10] A **fraction** is a part of a whole number, such as $\frac{1}{2}$, or one half.
- frame buffer** [N-COUNT-U3] A **frame buffer** is part of a computer's memory that stores the images displayed on the screen before they are displayed.
- friction** [N-UNCOUNT-U12] **Friction** is a force that causes resistance when surfaces rub against each other.
- gram** [N-COUNT-U11] A **gram** is a metric unit of weight equal to 1/1000 kilogram or about 0.035 ounces.
- GUI** [ABBREV-U4] A **GUI** (graphical user interface) is a visual way of interacting with a computer using menus, icons, and windows.
- hard drive** [N-COUNT-U5] A **hard drive** is the main data storage device that is built into a computer.
- hardware** [N-UNCOUNT-U1] **Hardware** is the physical components of a computer, such as the processor, memory, and hard drive.
- hardware design** [N-UNCOUNT-U15] **Hardware design** is a branch of computer and electrical engineering that focuses on creating functional hardware components.
- HD** [ABBREV-U3] If a computer display is **HD** (high-definition), it has a higher resolution than a standard display.
- heat energy** [N-UNCOUNT-U12] **Heat energy** is a form of energy that produces high temperatures and includes the kinetic energy of atoms and ions within an object.
- heat sink** [N-COUNT-U6] A **heat sink** is a finned piece of metal that transfers heat to the air.
- hundred** [N-COUNT-U9] **-Hundred** is a way of expressing numbers in the thousands by counting how many times 100 goes into the number. For example, the number 1,400 could be expressed as "fourteen hundred."
- imperial** [ADJ-U11] If a measurement is **imperial**, it uses the system that is based on the pound and the foot.
- inch** [N-COUNT-U11] An **inch** is an imperial measurement of length equal to 1/12 of a foot.
- Internet** [N-UNCOUNT-U7] The **Internet** is a global network of computers that allows users all over the world to exchange information.
- investigate** [V-T-U1] To **investigate** something is to get more information about something.
- I/O device** [N-COUNT-U3] An **I/O device** is something to input/output data from a computer such as a mouse, keyboard, screen or printer.
- keyboard** [N-COUNT-U4] A **keyboard** is a panel of keys for entering data into a computer.
- kilogram** [N-COUNT-U11] A **kilogram** is a metric unit of weight equal to 1000 grams or about 2.2 pounds.
- kinetic energy** [N-UNCOUNT-U12] **Kinetic energy** is energy that is active or moving.
- LAN** [ABBREV-U7] A **LAN** (local area network) is a small network of computers.
- laptop** [N-COUNT-U2] A **laptop** is a small computer that can be easily carried and used in many locations, and usually has a screen and keyboard that fold together on a hinge.
- LCD** [ABBREV-U3] An **LCD** (liquid crystal display) is a display that uses crystals to show output on a computer screen.
- LED** [ABBREV-U4] An **LED** (light emitting diode) is a semiconductor that converts electricity into light.
- less** [PREP-U9] If a number is **less** another number, the second number is subtracted or taken away from the first number.
- Linux®** [TRADEMARK-U8] **Linux®** is an operating system developed using the free and open source software model.
- magnetic tape** [N-COUNT-U5] **Magnetic tape** is a material used for early computer data storage that involves recording information onto a long strip of plastic.
- mathematical analysis** [N-UNCOUNT-U1] **Mathematical analysis** is the theoretical study of numbers and equations.

- has a CRT. **mathematics** [N-UNCOUNT-U15] **Mathematics** is the study of numbers and shapes used to calculate, represent, and describe entities.
- flat square **metric** [ADJ-U11] If a measurement is **metric**, it uses the system that is based on the kilogram and the liter.
- free program **Microsoft®** [N-UNCOUNT-U8] **Microsoft®** is a company that designs and develops computing systems.
- ed on the **minus** [PREP-U9] If a number is **minus** another number, the second number is subtracted or taken away from the first number.
- modem** [N-COUNT-U7] A **modem** is a device that connects two computers by a telephone line.
- monitor** [N-COUNT-U3] A **monitor** is an electronic device that is used to display computer signals.
- motherboard** [N-COUNT-U6] A **motherboard** is the central circuit board of a computer.
- multiply by** [V PHRASE-U9] To **multiply** a number (A) **by** another number (B) is to add number A to itself B number of times.
- negative** [ADJ-U13] If something is **negative**, it carries the same electrical charge as an electron.
- network** [N-COUNT-U7] A **network** is a collection of computers or devices that are connected so that they can share information.
- notebook** [N-COUNT-U2] A **notebook** is a mobile computer that is typically smaller than a laptop, and often has fewer features or functions.
- numerator** [N-COUNT-U10] A **numerator** is a number that appears above the line in a fraction. In the fraction $\frac{1}{2}$, the numerator is 1.
- ohm** [N-COUNT-U14] An **ohm** is a unit that measures electrical resistance.
- open source** [ADJ-U8] If software is **open source**, its source code is available to anyone.
- operating system** [N-COUNT-U8] An **operating system** is a type of software that controls a computer's basic functions, such as running applications.
- optical mouse** [N-COUNT-U4] An **optical mouse** is a mouse that uses LEDs to track hand movements across a surface.
- OS X®** [TRADEMARK-U8] **OS X®** is an operating system developed by Apple® for use on their computers.
- ounce** [N-COUNT-U11] An **ounce** is an imperial unit of weight equal to 1/16 of a pound or about 28.35 grams.
- out of-** [PREP-U10] If a quantity is **x out of y**, it has x parts per every y parts possible.
- over** [PREP-U9] If a number is **over** another number, it is divided by that number.
- PC** [ABBREV-U2] A **PC** (personal computer) is a computer that is intended for individual use. It is sometimes used specifically to refer to a personal computer with the Microsoft Windows® operating system.
- percent** [N-COUNT-U10] A **percent** is a part of 100 that is usually represented by the "%" symbol.
- percentage** [N-COUNT-U10] A **percentage** is the rate at which something occurs, measured per 100 units.
- peripheral** [N-COUNT-U4] A **peripheral** is a device that is connected to a computer but is not built into it.
- physics** [N-UNCOUNT-U15] **Physics** is a branch of science that focuses on the properties of matter and energy.
- pixel** [N-COUNT-U3] A **pixel** is a small unit on a display screen that is combined with many other units to produce an image.
- plus** [PREP-U9] If a number is **plus** another number, the two numbers are added together.
- point** [N-COUNT-U10] A **point** is a dot placed after a whole unit in a decimal number.
- pointer** [N-COUNT-U4] A **pointer** is an icon, which is usually controlled by a mouse, that a user can move around on a computer's GUI and use to make selections.
- polarity** [N-UNCOUNT-U13] **Polarity** is the positive or negative charge of an electric field.
- port** [N-COUNT-U6] A **port** is an outlet that allows an electronic device to communicate to other devices using a plug or cable.
- positive** [ADJ-U13] If something is **positive**, it carries an electrical charge that is opposite to an electron's charge.

Glossary

- potential energy** [N-UNCOUNT-U12] **Potential energy** is energy that is not active or moving, and is stored for possible future use.
- pound** [N-COUNT-U11] A **pound** is an imperial unit of weight equal to 16 ounces or about 0.45 kilograms.
- power supply** [N-COUNT-U6] A **power supply** is a device that provides energy to something.
- processor** [N-COUNT-U6] A **processor** is a computer part that allows programs to be interpreted and run.
- programming** [N-UNCOUNT-U15] **Programming** is the process of writing computer programs.
- QWERTY** [ABBREV-U4] If a keyboard is **QWERTY**, it uses the standard layout for English-language keyboards that starts with the letters Q, W, E, R, T, and Y in the upper left corner.
- reduce** [V-T-U10] To **reduce** a fraction is to change it into the form with the lowest possible whole numbers.
- release** [V-T-U12] To **release** something is to let it move away from something else that previously held it.
- resistance** [N-UNCOUNT-U14] **Resistance** is the ability of something to obstruct the flow of electricity through it.
- router** [N-COUNT-U7] A **router** is a piece of hardware that directs information around a network.
- screen** [N-COUNT-U3] A **screen** is the surface part of a monitor that displays a computer's output.
- scroll** [V-I-U4] To **scroll** is to move information in a certain direction across a computer screen.
- scroll wheel** [N-COUNT-U4] A **scroll wheel** is a device on a computer mouse that allows a user to scroll.
- server** [N-COUNT-U2] A **server** is a central computer that provides services or stores data for many other computers.
- signal** [N-COUNT-U7] A **signal** is a collection of information sent from one piece of hardware to another.
- signal processing** [N-UNCOUNT-U15] **Signal processing** is a branch of engineering that focuses on examining communication between electrical components and devices.
- software** [N-UNCOUNT-U1] **Software** is a program or set of programs that perform particular functions on a computer.
- software compatibility** [N-UNCOUNT-U8] **Software compatibility** is a computer's ability to run a particular software application.
- storage** [N-UNCOUNT-U5] **Storage** is space where information can be saved.
- subtract** [V-T-U9] To **subtract** one number from another number is to reduce the second number by the amount of the first number.
- tablet** [N-COUNT-U2] A **tablet** is a portable computer with a flat touch screen that is smaller than a laptop and usually does not have a physical keyboard.
- test** [V-T-U1] To **test** something is to operate something to see what it does or whether it works properly.
- times** [PREP-U9] If a number is **times** another number, it is multiplied by that number.
- transfer** [V-T-U12] To **transfer** something is to change its location.
- volt** [N-COUNT-U14] A **volt** is a unit that measures the voltage of an electrical current.
- voltage** [N-UNCOUNT-U14] **Voltage** is the amount of electric potential difference.
- watt** [N-COUNT-U14] A **watt** is a unit used to measure electrical power.
- wattage** [N-UNCOUNT-U14] **Wattage** is the amount of power in an electrical current.
- Windows®** [TRADEMARK-U8] **Windows®** is an operating system developed by Microsoft®.
- wireless** [ADJ-U7] If a network is **wireless**, it does not use wires to connect computers.
- WLAN** [ABBREV-U7] A **WLAN** (wireless local area network) is a wireless LAN.
- work** [N-UNCOUNT-U12] **Work** is action or movement that is produced by kinetic energy.
- workstation** [N-COUNT-U2] A **workstation** is a powerful computer that can process complex tasks that typical desktops cannot handle, such as advanced graphics design.
- Zip drive** [N-COUNT-U5] A **Zip drive** is a moderate-capacity computer data storage device that reads information from a flat square of plastic.