

About the Book

Text Type: Nonfiction/Informational Page Count: 16 Word Count: 1,453

Book Summary

Yes, printers can print letters, but did you know they can also print shoes, buildings, and dinosaur heads? *You Can Print What?* describes the technology behind 3D printing and some of its many creative and useful applications. The book also briefly traces the development of new printing technologies through the ages. Photographs and a timeline support the information. In addition to educating students about new technology, the book can also be used for lessons on main idea and details and inflectional endings.

About the Lesson

Targeted Reading Strategy

- Summarize

Objectives

- Discern main idea and details in the text
- Summarize to understand text
- Identify and use inflectional ending *-ing*
- Identify, define, and use hyphenated compound words

Materials

Green text indicates resources that are available on the website.

- Book—*You Can Print What?* (copy for each student)
- Chalkboard or dry-erase board
- Dictionaries
- Sheets of paper
- Main idea and details, inflectional ending *-ing*, hyphenated compound words worksheets
- Discussion cards



Indicates an opportunity for students to mark in the book. (All activities may be demonstrated by projecting the book on an interactive whiteboard or completed with paper and pencil if the books are reused.)

Vocabulary

*Boldface vocabulary words also appear in a pre-made lesson for this title on VocabularyA-Z.com.

- Content words:
 Story critical: **customized** (v.), **innovative** (adj.), **prototypes** (n.), **stereolithography** (n.), **technology** (n.), **three-dimensional** (adj.)
 Enrichment: **data** (n.), **digital** (adj.), **engineer** (n.), **industrial** (adj.), **laser** (n.), **particles** (n.)

Before Reading

Build Background

- Draw on the board a square and a representation of a cube. Have students point to the image that is three-dimensional. Hold up a flat square of paper and an actual cube. Have students point to the object that is three-dimensional. Have students take one minute to write everything they know about the term *three-dimensional*.

- Ask students to share their thoughts with a partner. Discuss with students the difference between two-dimensional and three-dimensional items. Invite volunteers to share examples of three-dimensional objects, and record a list on the board with corresponding pictures.

Preview the Book

Introduce the Book

- Give students their copy of the book. Guide them to the front and back covers and read the title. Have students discuss what they see on the covers. Encourage them to offer ideas as to what type of book it is (genre, text type, and so on) and what it might be about.
- Show students the title page. Discuss the information on the page (title of book, author's name).

Introduce the Comprehension Skill: **Main idea and details**

- Review with students that books have a main idea, or the big idea that is the general topic of the book. Remind students that the supporting details provide extra information and descriptions to help readers better understand this main idea.
- Remind students that larger books sometimes have so much information on a topic that it is grouped in sections, and each section has its own main idea and supporting details. Explain to students that the main ideas for each section contribute to the main idea for the entire book. Point out that the author often presents the main idea of the book in the introduction, if the book has one.
- Read page 4 aloud and model identifying the main idea of the book.
Think-aloud: As I read the introduction, I notice that the author begins with an anecdote to hook the reader's attention. The story is about an industrial designer creating a physical shoe with a printer. After the hook, the author explains that three-dimensional printing makes it possible to create a model of almost anything, and although 3D printers have very different products from traditional printers, both types of printing use the same concept. These details center on the concept of three-dimensional printing, so I know this will be the topic of the book. Now I need to determine the main idea. In some cases, authors will use a sentence or two to explicitly state the main idea to be developed in the book, and we just need to discern which sentence offers that big idea. Other times, the reader will need to draw together all the supporting details and infer a main idea. In this book, I believe the author has given us the main idea in a sentence. The first sentence of the second paragraph presents the topic of the book with a broad application that can be developed with supporting details: the latest printing technology, three-dimensional printing, makes models out of almost anything. As I read, I will infer the main idea of each section and see if these details support this sentence as the main idea of the book.
- Write the main idea on the board. Have students preview the table of contents with a partner. Explain to students that since the table of contents provides clues about the content of a book, it may suggest details that support the main idea. Have students work with a partner to predict details from the book that will support the main idea on the basis of the table of contents. Invite volunteers to share a detail with the rest of the class.
- Encourage students to focus on the main idea and details of one section at a time as they read, and to think about how these main ideas integrate with the main idea of the book once they have finished reading.

Introduce the Reading Strategy: **Summarize**

- Review with students that engaged readers summarize as they read. Remind students that a summary is a concise description of the most important information in a book or section. Explain to students that finding the main idea and most important supporting details is a great first step toward summarizing because these details represent the key points of a text.

- Model summarizing the introduction while referring to the main idea recorded on the board. **Think-aloud:** *In creating a summary, I determine what information from the book is the most important to convey the main points. I organize this information in my mind and describe it in my own words. Since nonfiction books organize information with main ideas and details, I will base my summary on them. To summarize the introduction, I would write the following: The latest printing technology, three-dimensional printing, makes models out of almost anything. Although the results of a 3D printer are different from those of a conventional printer, both kinds of printers use the concept of layering to create a product.*
- Ask students to discuss with a partner whether they heard a main idea and details in your summary. Invite volunteers to share what they heard with the rest of the class. Point out that the summary begins with the main idea.
- Discuss with the class how your summary compares to the introduction in the book. Have students identify with a partner details that were left out of your summary, and invite volunteers to explain to the rest of the class why those details were not included. Discuss with students the difference between a summary and a retelling.
- Point out that the summary was told in your own words and involved only the most important details. Remind students that each summary will be different because it will be given in the reader's own words.
- Have students work with a partner to summarize the introduction in their own words.
- As students read, encourage them to use other reading strategies in addition to the targeted strategy presented in this section.

Introduce the Vocabulary

- While previewing the book, reinforce the vocabulary words students will encounter. For example, while looking at the picture on page 14, you might say: *Do you think this house is innovative? Remember, innovative means "new and original."*
- Remind students of the strategies they can use to sound out words they don't know. For example, they can use what they know about letter and sound correspondence to figure out the word. They can look for words within words, and prefixes and suffixes. They can use the context to work out the meanings of unfamiliar words.
- Introduce the story-critical vocabulary words listed in the vocabulary section of this lesson. Review the correct pronunciation for the words *stereolithography* and *prototypes*.
- Have students divide a sheet of paper into four rectangles. Ask students to write the word *customized* in the first rectangle. Have students work with a partner to find the word in the book and use the context to determine its meaning. Invite volunteers to share their definition with the rest of the class.
- Have students turn to the glossary on page 16. Ask students to point to the word *customized*. Invite a volunteer to read its definition aloud. Discuss with students how the glossary definition compares with the definitions determined by context.
- Have students write a definition for the word *customized* in their own words in the second rectangle. Have students draw a picture for the word and write a sentence containing the word in the third and fourth rectangles, respectively.
- Repeat this process for the remaining vocabulary words.
- Invite volunteers to share with the rest of the class their picture and sentence for a word of their choice.


Set the Purpose


- Have students read to find out more about three-dimensional printing. Encourage students to discern the main ideas and details of each section and to use that information to summarize what they read.

During Reading

- **Guide the reading:** Have students read from page 4 to the end of page 7. Encourage those who finish early to go back and reread.
- Model discerning important details in the text.
Think-aloud: *When I look for the main idea and details in a section, I focus on the most important details that support the big topic. In the section "From Stamps to Lasers," I learned about the origins of printing. I read that marks are made by applying a layer of ink onto a surface. I discovered that two thousand years ago, people in Asia used a process called woodblock printing. In woodblock printing, people draw an image, carve out the area around the image, and coat the raised image with ink to leave an imprint on a surface. This method of printing takes a long time to fill one page. I learned, though, that Johannes Gutenberg invented the printing press in 1450. The printing press is a machine that prints many images at the same time. I chose those details as the most important information from the page. I decided against other details that seemed less essential. For example, I chose to leave out the name of woodblock printing, which is xylography. I didn't include the first sentence of the page, which is used to grab the interest of the reader. I condensed the description of how xylography works to a basic description. The other details are necessary for the book to flow smoothly and be complete and accurate, but I only need the most important details to understand the main point of the page.*
- Record these details on the board. Invite students to share whether they agree or disagree that these are the most important details from page 5. Encourage students to share additional details they consider necessary. Add or erase details as the class discussion dictates.
- Have students work with a partner to review the information on pages 6 and 7 and underline the most important details. Call on random students to share a detail they considered important with the rest of the class, and record it on the board. Discuss the accumulated details with the class, and adjust the details on the board until the class reaches a consensus that they have identified the most important details from those pages.
- Have students work in groups to discuss the details on the board for pages 5 through 7 and infer a main idea for the section. Ask each group to share their main idea with the rest of the class. Guide students to a consensus on the main idea for this section of the book.
- Ask students to write the section title on a separate sheet of paper and to record the main idea for that section beneath the title.
- Review how to create a summary using the main idea and details. Point out to students that the summary should begin with the main idea, whether it is one the author directly gave or one the reader inferred, and follow with important supporting details.
- Assign students to groups, and have them create a summary for the section "From Stamps to Lasers." Have students in each group discuss the details they underlined in the books and the main idea recorded on their separate sheet of paper. Ask groups to write their summary, with each student in the group contributing to the writing. Have groups read their summary to the rest of the class.
- Discuss with students how some of the summaries compare. Remind students that summaries should always be in their own words.
- **Check for understanding:** Have students read pages 8 through 11. Remind students to underline important details as they read.
- Invite volunteers to share with the rest of the class details they underlined for the section "2D to 3D" and record them on the board. Repeat for the section "A New Technology Takes Off." Break students into groups, and have groups infer the main idea for each section on the basis of the important details.
- Have students discuss with their group whether the author presented these main ideas in a sentence toward the beginning of the section or whether the author expected the reader to infer the main idea from the details presented. Invite volunteers to share with the rest of the class sentences from the book that expressed the main idea of its section.

- Ask students to write the new section titles on their separate sheet of paper and record the main idea for each section beneath its corresponding title.
- Have students work with a partner to create an oral summary of the section “2D to 3D.” Remind them to refer to the main idea and details on the board and to put the summary in their own words. Invite volunteers to share their summary with the rest of the class. Discuss with students how their summaries compare to the information in the book.

 Have students read the remainder of the book. Remind them to look for the most important details of the last three sections, underline them, and then use those details to determine the main idea of each section. Encourage students to summarize each section in their mind after determining its main idea and details.

 Have students make a question mark in their book beside any word they do not understand or cannot pronounce. Encourage them to use the strategies they have learned to read each word and figure out its meaning.

After Reading

- Ask students what words, if any, they marked in their book. Use this opportunity to model how they can read these words using decoding strategies and context clues.

Reflect on the Comprehension Skill

- **Discussion:** Review with students main ideas and important details recorded on the board and on their separate sheet of paper. Have students discuss with a partner how discerning important details and determining main ideas helped them understand what they read, and invite volunteers to share their thoughts with the rest of the class.
- Invite students to share the details they underlined for the last three sections of the book. Reinforce with students that they just need the details that convey the big topic of each section. Have students work with a partner to determine the main idea of the last sections of the book, on the basis of the important details. Ask them to write these main ideas on their separate sheet of paper.
- **Independent practice:** Introduce, explain, and have students complete the [main-idea-and-details worksheet](#). Remind students to refer to the details underlined in the book and the main ideas written on their separate sheet of paper. Have students work with a partner to complete the worksheet.
- Review the main idea recorded on the board: the latest printing technology, three-dimensional printing, makes models out of almost anything. Discuss with students how the main ideas of each section support the main idea of the entire book. Point out that the main ideas of the smaller sections are also the important details that support the main idea of the entire book.

Reflect on the Reading Strategy

- **Think-aloud:** *The last page of the book is the conclusion. The title of the conclusion is “Future,” which led me to believe the information in this section will focus on the future of three-dimensional printing. After discerning the main idea and important supporting details of this section, I am ready to summarize it. The future of three-dimensional printing offers endless possibilities. People can print objects that are useful to everyday life, as well as more exotic objects. For example, one day astronauts may be able to use 3D printing to create parts for their ship while they are in space, enabling them to stay in space longer and explore further. Three-dimensional printing could even become a tool used to help humans survive with its innovative technology.*
- Have students discuss with a partner how they would summarize the section “A Home Like No Other.” Have students write their summary on a separate sheet of paper. Invite volunteers to share their summary with the rest of the class.

- Review with students the main idea and details from each section of the book. Remind students of the main idea for the entire book. Discuss with students how they would create a summary for the whole book. Point out that the summary should begin with the main idea of the entire book, followed by the main idea of a section and its supporting details, repeated for each section.
- Have students work in groups to create a summary of the entire book. Encourage students to focus on one section at a time. Have students discuss with their group how they would summarize each section, and then have each student write their own summary, before proceeding to the next section. Invite volunteers to read their summary to the rest of the class, and discuss with students how their summaries compare to the information in the book.
- **Enduring understanding:** In this book, you learned about the history and the modern application of three-dimensional printing. Do you have ideas of useful or creative ways to use three-dimensional printing? What other examples of modern technology do you know about that are creating big changes?

Build Skills

Grammar and Mechanics: Inflectional ending *-ing*

- Write the following sentence on the board: *I am using a 3D printer to make a shoe.* Read the sentence aloud with students. Have students point to the two verbs in the sentence.
- Write the words *use* and *using* on the board. Have students discuss with a partner the meaning of the two words, and invite volunteers to share their definitions with the rest of the class. Point out to students that *using* is just another form of the verb *use*. Have students discuss with a partner how they would change *use* to *using*.
- Point out to students that the word *using* has an added ending, the letters *-ing*. Explain to students that *inflectional endings* are word parts added to the end of a base word that modify the meaning of the original word.
- Remind students that when they describe themselves as using an item, they mean they are in the process of using it at that moment. Explain to students that adding the inflectional ending *-ing* to a verb changes the verb to mean that the action described is in the process of happening.
- Ask students to discuss with a partner what happened to the letter *e* in the word *use*. Write the nonsense word *useing* on the board, and have students nod their head if it looks right, and shake their head if it does not. Explain to students that when a verb ends in the letter *e*, they drop the *e* before adding *ing*.
- Write the words *play* and *change* on the board. Have students write the words on a separate sheet of paper and add the inflectional ending *-ing* to each one. Remind students to drop the letter *e* before adding *ing*. Have students work with a partner to use the words in oral sentences. Discuss with students how the meaning of each verb changed after they added the inflectional ending *-ing*.
- Point out to students that in the phrase *printing press*, the word *printing* is used as an adjective. Remind students that verbs can be used as adjectives if the verb is used to modify a noun. Reinforce to students that the word *printing* originated as a verb with the inflectional ending *-ing* to indicate an object in the process of printing.
- **Check for understanding:** Write several verbs on the board, such as the following: *walk, sing, dance, learn, and make*. Have students add the ending *-ing* to each verb and write a sentence containing the new verb. Invite volunteers to read a sentence to the rest of the class, and have other students give a thumbs-up signal if the sentence makes sense.
- **Independent practice:** Introduce, explain, and have students complete the **inflectional ending *-ing* worksheet**. If time allows, discuss their answers aloud.

Word Work: Hyphenated compound words

- Review with students that a compound word is a word or term formed by the combination of two smaller words. Have students work in groups to brainstorm to create examples of compound words. Invite volunteers to come to the board and write one example, and ensure each word is an accurate compound.
- Write the following sentence on the board and have students read it aloud: *New technology allows printers to create three-dimensional objects.* Have students point to the word with a hyphen, and invite a volunteer to come to the board and circle the word *three-dimensional*. Remind students that a hyphen is a short line that connects two words. Have students trace a hyphen in the air.
- Ask students to nod their head if *three-dimensional* is a compound, and shake their head if it is not. Point out that two smaller words create a new term with a different definition, so it is a compound word.
- Write the compound *headache* beside the compound *three-dimensional*. Have students discuss with a partner the difference between the two compound words. Call on a student to explain the difference to the rest of the class. Point out that *three-dimensional* is a hyphenated compound word.
- Explain to students that *hyphenated compound words* are *compounds that insert a hyphen between the two joined words*. Point out that these words operate like other compounds in that they join two words to create a new word with a meaning built upon the original words. Emphasize that the only difference is the hyphen used to join the two original words.
- Have students work with a partner to define the words *three* and *dimension*. Invite volunteers to share the definitions with the rest of the class. Discuss with students how the definitions of these two words influence the definition of the word *three-dimensional*.
- Write the following word pairs on the board: *drive/thru*, *sun/flower*, *all/around*, and *water/melon*. Point out that each pair can be joined together to create a compound word, and explain to students that some of these compound words are closed and some are hyphenated. Have students work with a partner to write the words on a separate sheet of paper and determine which of the word pairs should be hyphenated. Invite volunteers to share with the rest of the class the hyphenated words. Have students come to the board and write the accurate compound word beneath each word pair.
- Explain to students that the English language has no clear rule for when compound words are hyphenated, joined together with a space but no hyphen, or joined together with no space between the words. Point out that hyphens are typically used when three or more words are joined together, such as in *mother-in-law*, and when the compound word is used as an adjective. However, other hyphenated compound words just need to be memorized. Encourage students to familiarize themselves with compound words, as more experience will help them memorize these differences.
- **Check for understanding:** Write the following hyphenated compound words on the board: *off-campus*, *walk-through*, *drop-out*, and *tight-fisted*. Point to each word and have students call out the two component words that create the larger compound. Have students work with a partner to look up each smaller word in the dictionary and then use the definitions of the two words to determine the meaning of the compound word. Have students create oral sentences with their partner that accurately use each compound word.
- **Independent practice:** Introduce, explain, and have students complete the [hyphenated-compound-words worksheet](#). If time allows, have students discuss their answers aloud.

Build Fluency

- Allow students to read their book independently. Additionally, partners can take turns reading parts of the book to each other.

Home Connection

- Give students their book to take home to read with parents, caregivers, siblings, or friends. Have students demonstrate how a reader summarizes while reading to someone at home.

Extend the Reading

Informational Writing and Art Connection

Discuss with students recent changes in technology that have made a big impact on the way we live. Topics could include computers, the Internet, touch-pad screens, artificial intelligence, digital films and photographs, and smartphones. Ask students to choose a topic for research. Have students choose a topic and write everything they already know about the subject. Then ask students to form groups with others who have chosen the same topic. Review with students their research methods, and provide students with a graphic organizer for notes on their topic. Have students work with their group to research their topic, focusing on the following areas: the history of the technology, changes that have taken place in it over the years, how the technology affects and improves their lives, and future changes they envision. Have students write a report on their topic. Remind them to use at least five paragraphs and to include information on all of the four areas they researched. Have students create an illustrated cover page for their report. Have students work in their groups to peer edit their reports before writing a final draft.

Visit WritingA-Z.com for a lesson and leveled materials on informational writing.

Math Connection

Review with students familiar two-dimensional shapes. Present to the class objects with three-dimensional shapes, such as balls, cubes, pyramids, cylinders (tubes), and so on. Have students work in groups to name the objects and identify which of the two-dimensional shapes are related to them. Record on the board the mathematical term for each object. The list of shapes could include sphere, cube, cylinder, cone, and pyramid. Discuss with students how the two-dimensional shapes are connected to their three-dimensional counterparts. Set aside the circle, cylinders, and spheres, and write the word *polyhedra* on the board. Explain to students that the rest of the shapes are polyhedra. Define polyhedra for the class, and explain the identifying characteristics of faces, edges, and vertices. Assign students to groups. Have groups create several different polyhedra using toothpicks and gumdrops. Point out that the toothpicks are the edges and the gumdrops are the vertices. For each shape they make, have students draw a picture of the polyhedra and record the number of faces, edges, and vertices. Discuss the results as a class.

Skill Review

Discussion cards covering comprehension skills and strategies not explicitly taught with the book are provided as an extension activity. The following is a list of some ways these cards can be used with students:

- Use as discussion starters for literature circles.
- Have students choose one or more cards and write a response, either as an essay or as a journal entry.
- Distribute before reading the book and have students use one of the questions as a purpose for reading.
- Conduct a class discussion as a review before the book quiz.

Assessment**Monitor students to determine if they can**

- accurately discern main idea and details in text, during discussion, and on a worksheet;
- consistently use the strategy of summarizing to comprehend the text during discussion;
- correctly use inflectional ending *-ing* during discussion and on a worksheet;
- accurately define and use hyphenated compound words during discussion and on a worksheet.

Comprehension Checks

- [Book Quiz](#)
- [Retelling Rubric](#)