

About the Book

Text Type: Nonfiction/Biography Page Count: 24 Word Count: 2,310

Book Summary

Rosalind Franklin's Beautiful Twist tells the story of a brilliant but relatively unknown scientist, Rosalind Franklin. The book chronicles Rosalind's life and her work to discover the makeup and purpose of DNA, a blueprint for the building blocks of all living things. Because she was a woman in a male-dominated institution, male scientists took credit for her research and findings. Read about this fascinating woman and her now-known contributions to science. Photographs of her life and research support the text.

About the Lesson

Targeted Reading Strategy

- Summarize

Objectives

- Use the reading strategy of summarizing to understand text
- Sequence events in a biographical text
- Identify and use commas for a variety of purposes
- Identify syllable patterns

Materials

Green text indicates resources available on the website

- Book—*Rosalind Franklin's Beautiful Twist* (copy for each student)
- Chalkboard or dry erase board
- Summarize, sequence events, commas worksheets
- Discussion cards



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

Vocabulary

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

- Content words:

Story critical: **acknowledge** (v.), **complex** (adj.), **double helix** (n.), **molecule** (n.), **persevered** (v.), **theories** (n.)

Enrichment: **atoms** (n.), **cancer** (n.), **cells** (n.), **chemistry** (n.), **conservative** (adj.), **determination** (n.), **DNA** (n.), **double standard** (n.), **equality** (n.), **gender discrimination** (n.), **genes** (n.), **inadequate** (adj.), **industry** (n.), **lecture** (v.), **pranks** (n.), **resented** (v.), **scholarship** (n.), **viruses** (n.)

Before Reading

Build Background

- Show students a picture of DNA's double helix and ask them if they have ever seen this before. Tell students that this material, which is called DNA, is a blueprint for the building blocks of their body as well as the bodies of all living things. Explain that it takes a very powerful microscope to see this material.

- Explain that the book they are going to read is about one of the scientists who helped discover and study DNA. Ask students if they have ever been in a situation where they felt they were treated unfairly or didn't get an opportunity because of a physical attribute. Use examples such as getting to play on a certain sports team to facilitate student understanding.
- Tell students that the scientist in the book was a woman. Explain that during her lifetime, women did not have the same rights or opportunities, including in education and jobs, as men.

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, fiction or nonfiction, 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).
- Preview the table of contents on page 3. Remind students that the table of contents provides an overview of the book. Ask students what they expect to read about in the book, on the basis of what they see in the table of contents. (Accept all answers that students can justify.)

Introduce the Reading Strategy: **Summarize**

- Explain to students that one way to understand and remember information in a book is to write a summary, or a brief overview of the most important information in a section. Point out that a summary often answers the questions *who*, *what*, *when*, *where*, and *why*.
- Create a chart on the board with the headings *Who*, *What*, *When*, *Where*, and *Why*, or project a copy of the [summarize worksheet](#). Read page 4 aloud to students and model summarizing.
Think-aloud: To summarize, I need to decide which information is most important to remember in a section. To do this, I can consider who and what the section was about, what happened, and when and why it happened. Then I can organize that information into a few sentences. This page is mostly about a shape called a double helix, which is the shape of DNA. Since this page does not mention any people, I will leave the heading "Who" blank. Under the heading "What," I will write: double helix is shape of DNA; DNA is blueprint for the form and workings of living things. Under the "Where" heading, I will write: inside all living things—dogs, cats, apple trees, and so on. When I organize all this information, a summary of this first page might be: DNA is the blueprint for the building blocks of all living things, including you, me, dogs, cats, and apple trees! DNA has a shape to it, which is called a double helix.
- As students read, encourage them to use other reading strategies in addition to the targeted strategy presented in this section.

Introduce the Comprehension Skill: **Sequence events**

- Draw a long line on the board. Write the year you were born at the left end and the current year at the right. Explain to students that a timeline is a tool for organizing dates and events in sequential order.
- Model sequencing the main events of your life. Write key words about each event in order on the timeline on the board as you describe them to students.
Think-aloud: If I want to tell the story of my life, I need to include certain events in order to tell it correctly. The first event that happened is that I was born. Next, I started school. Then, I moved to a new town. (Continue telling events as applicable to your life.)
- Review or explain that events from history or about a person's life are told in order from beginning to end. A timeline can help organize many dates and events, and can also help to summarize text in the correct sequential order.
- Distribute and explain the [sequence events worksheet](#). Tell students that they will be using it to keep track of dates and events they read about in the text.

Introduce the Vocabulary

- As students preview the book, ask them to talk about what they see in the photographs and illustrations. Reinforce the vocabulary words they will encounter in the text.
- Have students find the bold phrase *gender discrimination* on page 8. Have them look for clues to the phrase's meaning in the sentence containing the phrase *gender discrimination*. Read the sentence aloud and have students tell you what they think the phrase means. Explain that clues are not always present in the same sentence but that other information in the paragraph often explains the unfamiliar word or phrase.
- Explain to students that sometimes they will not find any context clues that define an unfamiliar word or phrase. Model how students can use the glossary or a dictionary to locate a word's meaning. Have a volunteer read the definition for *gender discrimination* in the glossary. Have students follow along on page 8 as you read the sentence in which the phrase *gender discrimination* is found to confirm the meaning of the word. Repeat the exercise with the remaining vocabulary words.


Set the Purpose

- Have students read to find out more about Rosalind Franklin and her work. Remind them to stop after every few pages to summarize what they have read and to record any important dates on their sequence events worksheet.


During Reading


Student Reading

- **Guide the reading:** Have students read to the end of page 7. Encourage those who finish early to go back and reread.
- Model summarizing important information in the book.
Think-aloud: *I made sure to stop reading after the end of this section of the book to summarize what I'd read so far. First, I thought about the information that answered the questions Who, What, When, Where, and Why. Then, in my mind, I organized the important information into a few sentences. In this section, I read that we know about the double helix because of a brilliant woman named Rosalind Franklin. She was born in England in 1920. Even at an early age, she was very smart in math, but in the 1920s many people thought it was a waste of time for girls to study and go to school. Rosalind loved playing sports, too. Her favorite activity was mountain climbing. Rosalind did not like listening to people when she knew they were wrong. When she was young, she often argued and debated with her father.*
- Invite students to assist you in filling in this information on the chart. Have them decide which facts go in the various boxes of the chart. Point out that sometimes not all of the questions (*who, what, when, where, and why*) are answered in every section.
- Create a summary with students for this section, based on the information on the chart (Rosalind Franklin was born in England in 1920. From a very early age, she was very smart and good at sports. She loved math and mountain climbing. But in 1920s England, many people thought it was a waste of time for girls to go to school and study. Rosalind didn't like listening to people she disagreed with. She often argued and debated with her father).
- Ask students to recall the year Rosalind Franklin was born (1920). Explain or review that, when chronicling a person's life on a timeline, it naturally begins with the date when the person was born. Have students record "1920: Rosalind Franklin is born" on their timeline. Ask students if they have read any other dates yet in this section (no). Explain to students that the author uses references to Rosalind's age rather than dates, so the reader has to determine which year to record on the timeline (for example, Rosalind did well in school at age 6; $1920 + 6 = 1926$). Have students record 1926 as their next entry on their timeline.

 **Check for understanding:** Have students read to the end of page 8, underlining any dates or references to Rosalind's age. When students have finished reading page 8, have them work with a partner to identify the important information (*Who*: Rosalind Franklin; *What*: Decided she wanted to be a scientist, went to Cambridge University and became an expert in X-ray crystallography, even though she had to put up with gender discrimination; *When*: 1938; *Where*: Cambridge, England; *Why*: She was very smart and determined, won a scholarship).

- Have students work together on a separate piece of paper to create a summary of page 8.
- Ask students to record any dates or references to age that they should include on their timeline (1938: Rosalind attends Cambridge University).

 Have students read the remainder of the book. Encourage them to underline any dates or references to Rosalind's age and to stop after each section to think about the questions *Who*, *What*, *When*, *Where*, and *Why*.

 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 Reading Strategy

- Divide students into small groups. Assign each group one of the following sections from the book: "The Secrets of Life," "Watson and Crick's Big Idea," or "Happier Days." Have each group discuss the important information in their section. Have them use the information to write a group summary of the section, making sure to include *Who*, *What*, *When*, *Where*, and *Why*.
- **Independent practice:** Distribute the summarize worksheet to students and have them complete it on their own using the final section of the book, "Rosalind Remembered." Invite volunteers to read their summary if time allows.
- **Think-aloud:** *I know that summarizing keeps me actively involved in what I'm reading and helps me remember what I've read. I know that I will remember more about Rosalind Franklin because I summarized as I read the book.*

Reflect on the Comprehension Skill

- **Discussion:** Discuss the fact that although a timeline does not summarize all of the information in the text, it highlights in sequential order the important events in Rosalind's life.
- **Independent practice:** Have students review the text and have them add remaining dates and age references to their timeline. Check their timelines for completeness and accuracy in converting Rosalind's age to actual years.
- **Enduring understanding:** In this story, you read about a woman who endured discrimination and many hardships to follow her dreams. Rosalind Franklin never stopped pursuing her dreams and living the life she wanted to live. Thinking of your own dreams, talents, and goals, what steps can you take to ensure that you are successful without changing who you are as a person?

Build Skills

Grammar and Mechanics: Commas

- Remind students that commas can be used in many different ways. Three specific ways are with: *introductory words*, *words in a series*, and *compound or complex sentences*.

Lesson Plan *(continued)*

Rosalind Franklin's Beautiful Twist

- Write the following sentence on the board: *In 1920 Rosalind Franklin was born.* Select a student to read the sentence aloud. Then circle the words *In 1920* and explain that they are an example of introductory words. Explain that introductory words are often used to tell how or when and that they are a lead-in to the rest of the sentence. Inform students that a comma is often used after an introductory word or words. Place a comma after *1920* and have the student read the sentence again. Point out that *In 1920* tells when Rosalind was born.
- Write the following sentence on the board: *Josh Kristy and Sam were in my group.* Ask a volunteer to read the sentence aloud as it is written, without pauses. Ask students to tell what is missing from the sentence to make it read more smoothly (commas). Explain that the names in this sentence represent a list, or a series of words, and that commas are used to separate the words in a series. Add commas to the sentence: *Josh, Kristy, and Sam were in my group.* Have the volunteer read the sentence using the proper pauses.
- Write the following sentence on the board: *Even as a little girl she was remarkably smart.* Have a student read the sentence aloud. Underline *Even as a little girl* and circle *she was remarkably smart.* Explain that a complex sentence contains an independent clause (a complete phrase or sentence) and a dependent clause (an incomplete phrase or sentence). If the dependent clause comes at the beginning of a sentence, a comma follows the clause. Add a comma after the word *girl* and reread the sentence. Ask: *What is the dependent clause?* (*Even as a little girl*)
- Explain to students that a compound sentence consists of two independent clauses, or sentences, that are combined with a comma and a conjunction such as *and*, *but*, *or*, and so on. Write the following sentence on the board: *Rosalind loved school, but she wasn't a bookworm.* Underline the two independent clauses, and circle the word *but*. Point out that each clause could stand alone as a sentence, but they have been joined by the comma and the conjunction *but*.



Check for understanding: Have students turn to page 8. Have a volunteer read the first sentence aloud (*At the age of twelve, Rosalind decided to become a scientist*). Instruct students to circle the comma. Ask them to determine how the comma is being used in this sentence (to set off introductory words). Have students find the second sentence on page 6 (*At her school, girls played hockey, cricket, and tennis...*). Instruct them to circle the commas. Ask them how the commas are used in this sentence (to separate words in a series).

- **Independent practice:** Introduce, explain, and have students complete the [commas worksheet](#). Discuss their answers aloud after students finish.

Word Work: Syllable patterns

- Review with students that a *syllable* is a unit of sound in a word. A syllable contains a vowel and possibly one or more consonants. For example, point out to students that the word *shape* contains one syllable, the word *helix* contains two syllables, and the word *molecule* contains three syllables. Explain that many words have multiple syllables, like the words *determination* and *conservative*. Tell students that knowing how to break words into syllables can help them read and spell longer or unfamiliar words.
- Write the word *complex* on the board. Say the word aloud, stressing the syllables, and put a dot over each of the vowels in the word. Then draw a line to divide the word into its two syllables. Say: *Notice that the vowel o is in the middle of the syllable com, and it is closed in by the consonants c and m on either side. The vowel sound is short in the syllable com. We call this a closed syllable. Often, vowels in closed syllables are short vowels. I can use this strategy when I am trying to sound out unfamiliar words.*
- Repeat the process above with the word *helix*. Demonstrate that the syllable break comes after the vowel, so the first syllable is an open *syllable*—there is no consonant closing it in at the end. Explain that vowels in open syllables are often long.

Lesson Plan *(continued)*

Rosalind Franklin's Beautiful Twist

- **Check for understanding:** Write several more words from the book on the board (*favor, letters, and so on*), making sure to include some three- and four-syllable words. Ask student volunteers to come to the board and divide each word into syllables and then explain whether the first syllable is open or closed. If students are ready, have them identify whether the second and/or third syllable is open or closed.
- **Independent practice:** Assign each student a page from the book. Ask them to write ten words from the page on a separate piece of paper. Then have them divide the words into syllables and put a dot above the vowel in each syllable. Next to each word, have them write whether each syllable is open or closed. If time allows, discuss their responses.

Build Fluency

Independent Reading

- 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 share their completed timeline of Rosalind Franklin's life with someone at home.

Extend the Reading

Informational Writing and Art Connection

Provide print and Internet sources for students to find out more about the Nobel Prize. Have them look for information to answer such questions as who has received the prize and why it is so prestigious. Instruct students to write a report on their findings. Require that they have at least three sections, including an introduction and a conclusion. Encourage them to add illustrations or photographs to their report. Require an error-free copy with a front and back cover.

Visit [Writing A-Z](#) for a lesson and leveled materials on expository writing.

Science Connection

Supply books and links to Internet websites for students to learn more about Rosalind Franklin and her scientific contributions. Provide index cards on which students can record their notes as they research. Ask them to find out more about the discrimination she faced and about how male scientists took credit for her work. Facilitate a round-table discussion in which students can share and further discuss their findings. Encourage them to share their opinions.

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.
- Cut apart and use the cards as game cards with a board game.
- Conduct a class discussion as a review before the book quiz.

Assessment

Monitor students to determine if they can:

- consistently use the strategy of summarizing to comprehend the text during discussion and on a worksheet
- accurately sequence events in the text during discussion; create a timeline on a worksheet
- recognize three major uses of commas during discussion and identify their use on a worksheet
- correctly recognize and understand the use of syllable patterns within words during discussion and in an activity

Comprehension Checks

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