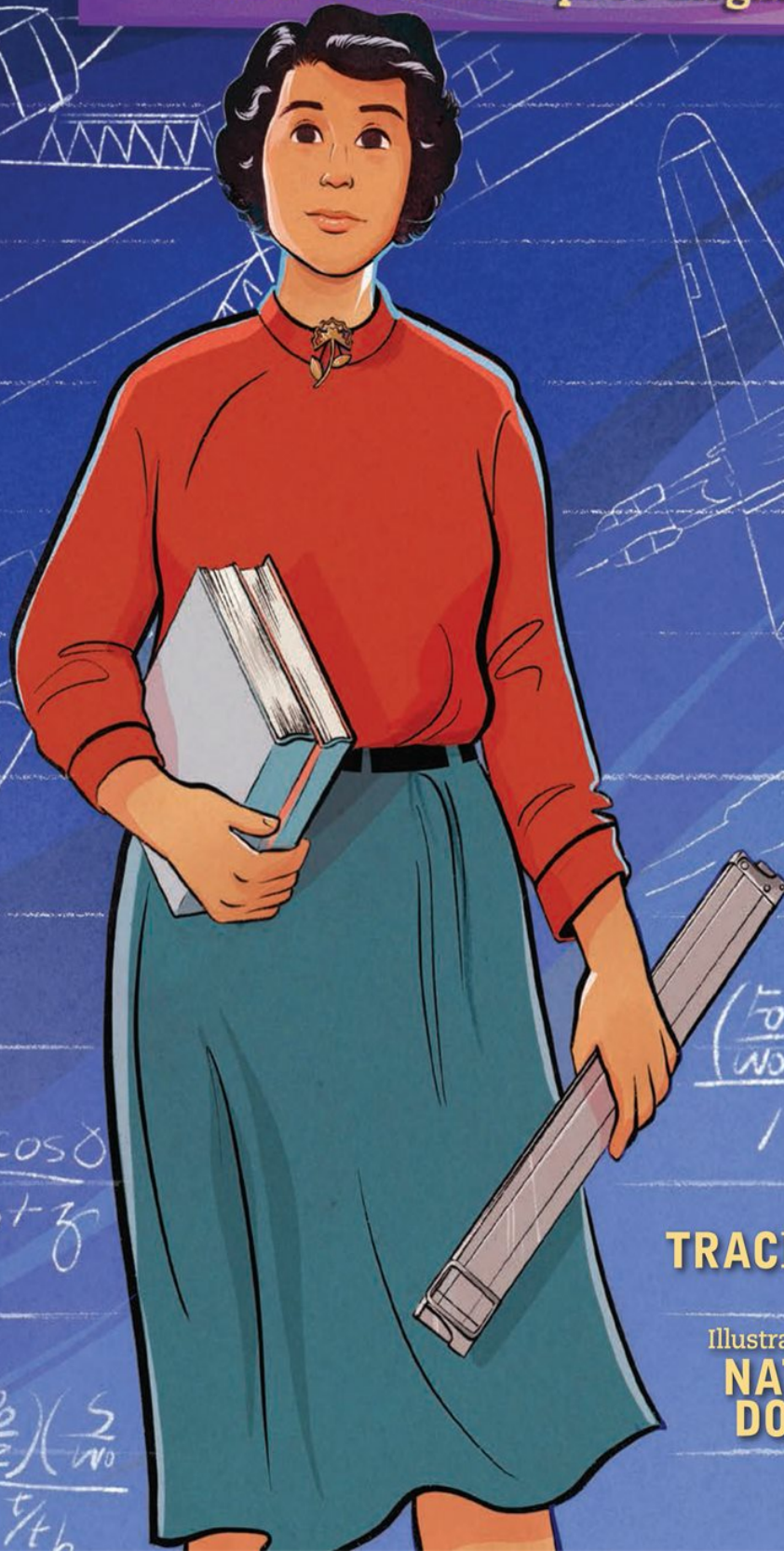


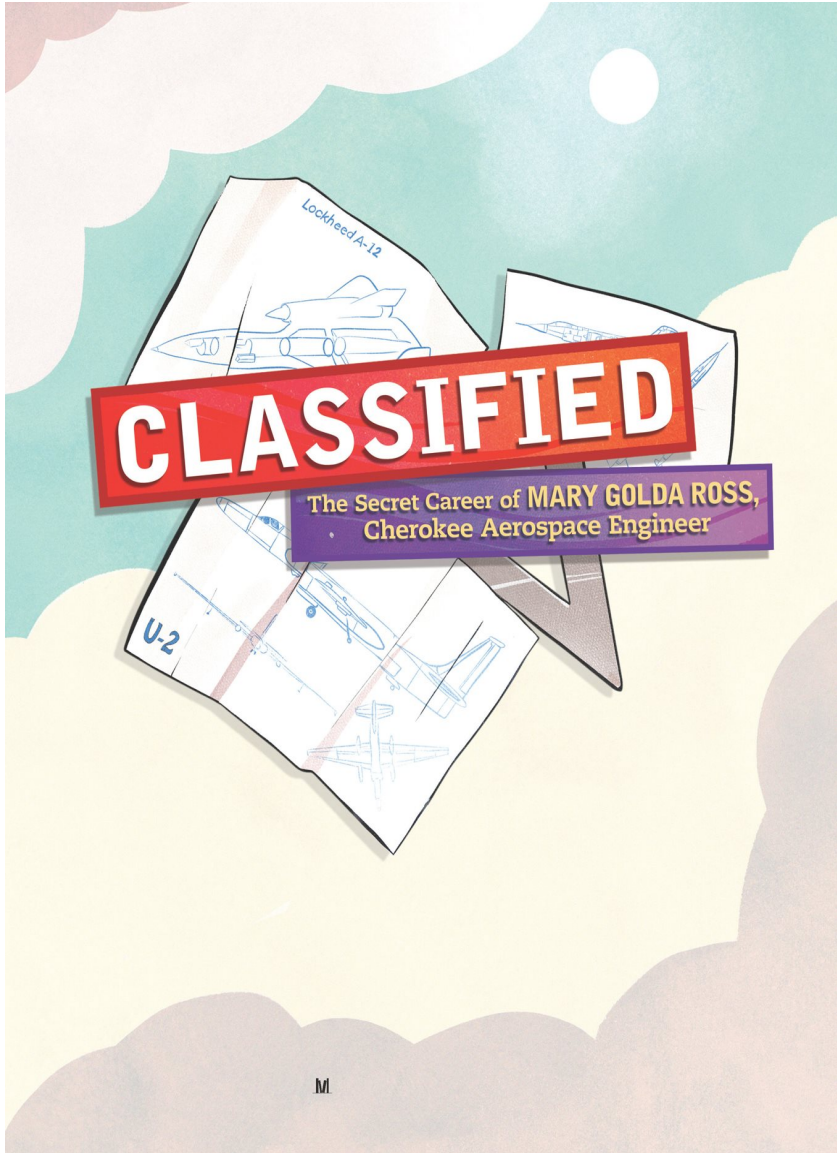
CLASSIFIED

The Secret Career of **MARY GOLDA ROSS**,
Cherokee Aerospace Engineer



TRACI SORELL

Illustrations by
**NATASHA
DONOVAN**



TRACI S
illustr
NATASHA

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A NOTE ON

While a written guide does not exist, important teachings by Cherokee are passed across the generations. Parents instilled these teachings in their children. Some of these include gaining skills within and outside the home cooperatively with others when others recognize their skills. We ensure equal education for all.



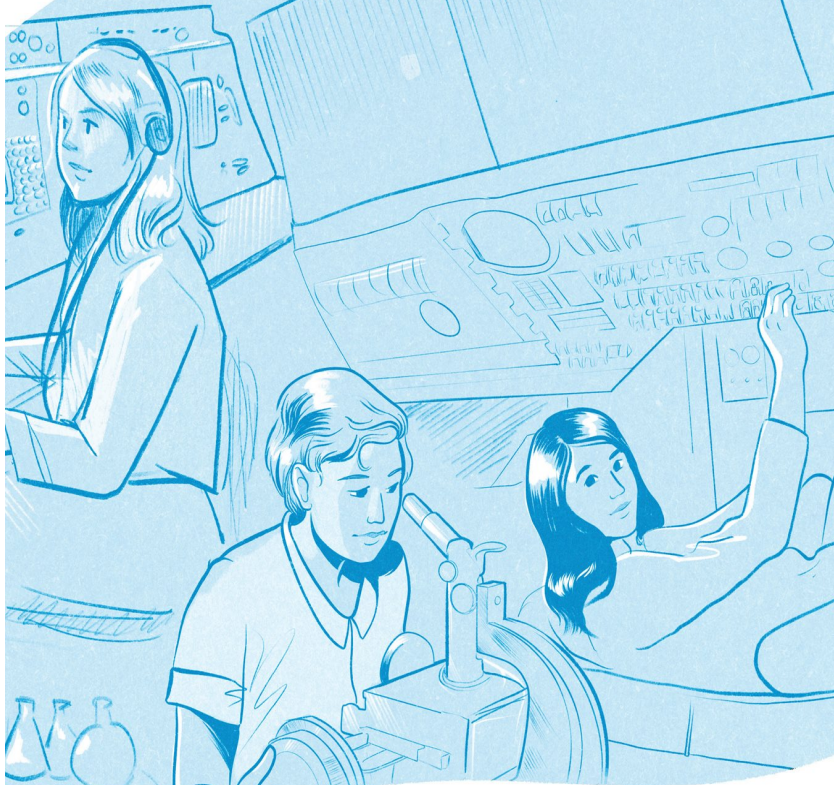
Do the best you can and search out available knowledge and build on it. I started with a firm foundation in mathematics and quality education that came down to me from my mother's Indian heritage.

— Mary Goll

Young Mary Golda Ross pushed her pencil across the page. Puzzling out math equations made her happy. Teenage girls in the 1920s weren't expected to enjoy or excel in math or science.



$$\int \cos \delta \, d\delta$$



$$\vec{v} = \int_{t_1}^{t_2} \vec{v} \left(\frac{t_2}{\cos \theta} \right) dt$$

questions (13) and (15)

Since $\delta = \delta_2$

**But Mary
blazed
a trail for**

In the hills of northeastern Oklahoma, Mary's Choctaw provided education for everyone. Her great-great grandfather, Ross, had served as Principal Chief of the Cherokee Nation and helped create a school that later became a state university, which Mary began attending at the age of sixteen.



When the boys refused to sit next to the only girl
Mary felt motivated to get better grades than the



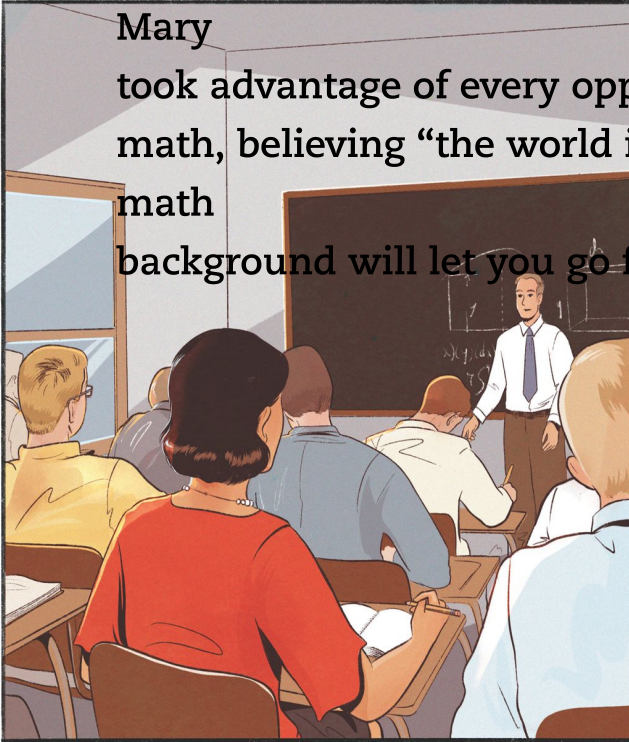
Holding true to her tribe's belief about gaining life skill:

Mary

took advantage of every opportunity to learn. In college math, believing "the world is so technical, if you plan to

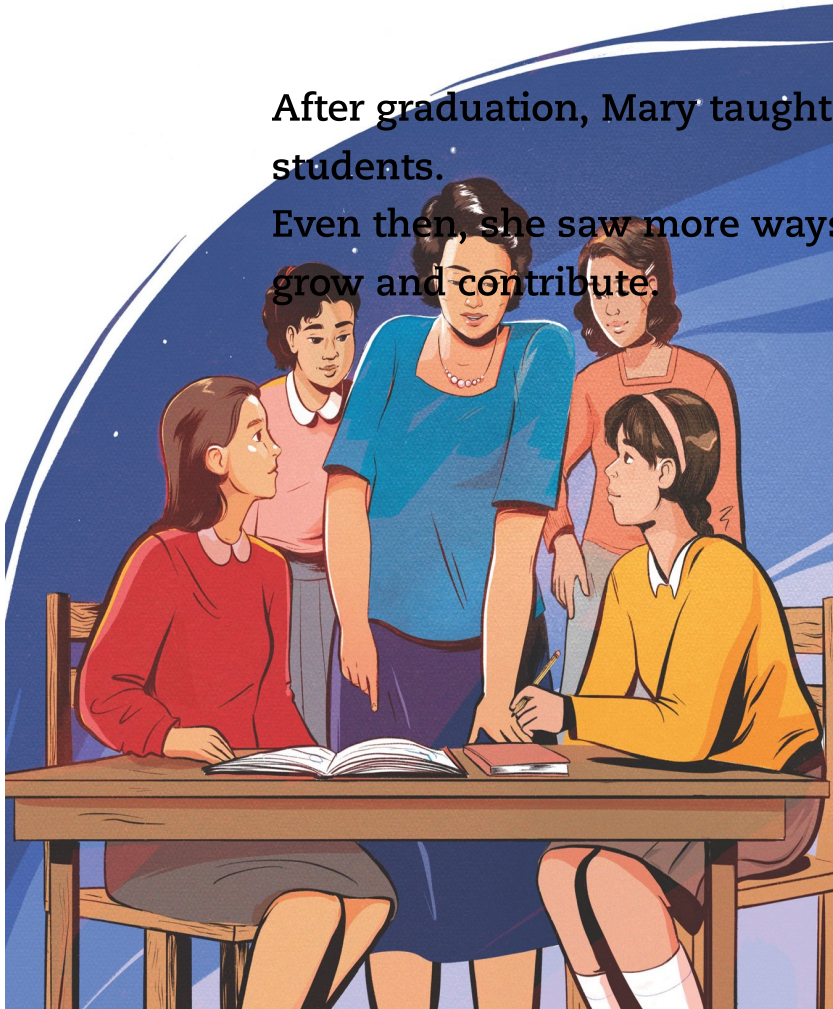
math

background will let you go farther and faster."

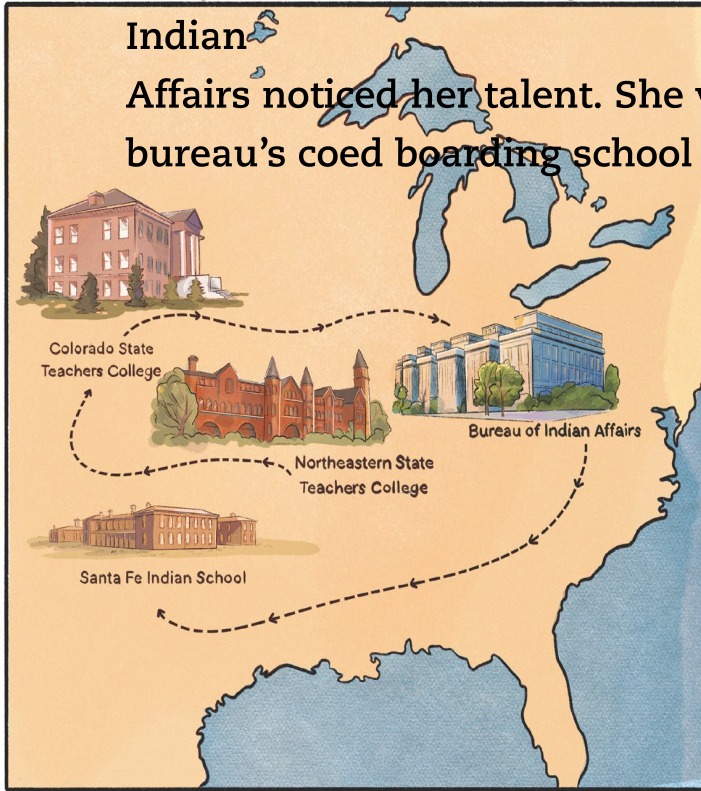


After graduation, Mary taught math and science to her students.

Even then, she saw more ways to grow and contribute.



Mary moved to Washington, DC, where a supervisor at the Indian Affairs noticed her talent. She was then hired to be the general manager of the bureau's coed boarding school in Santa Fe, New Mexico.



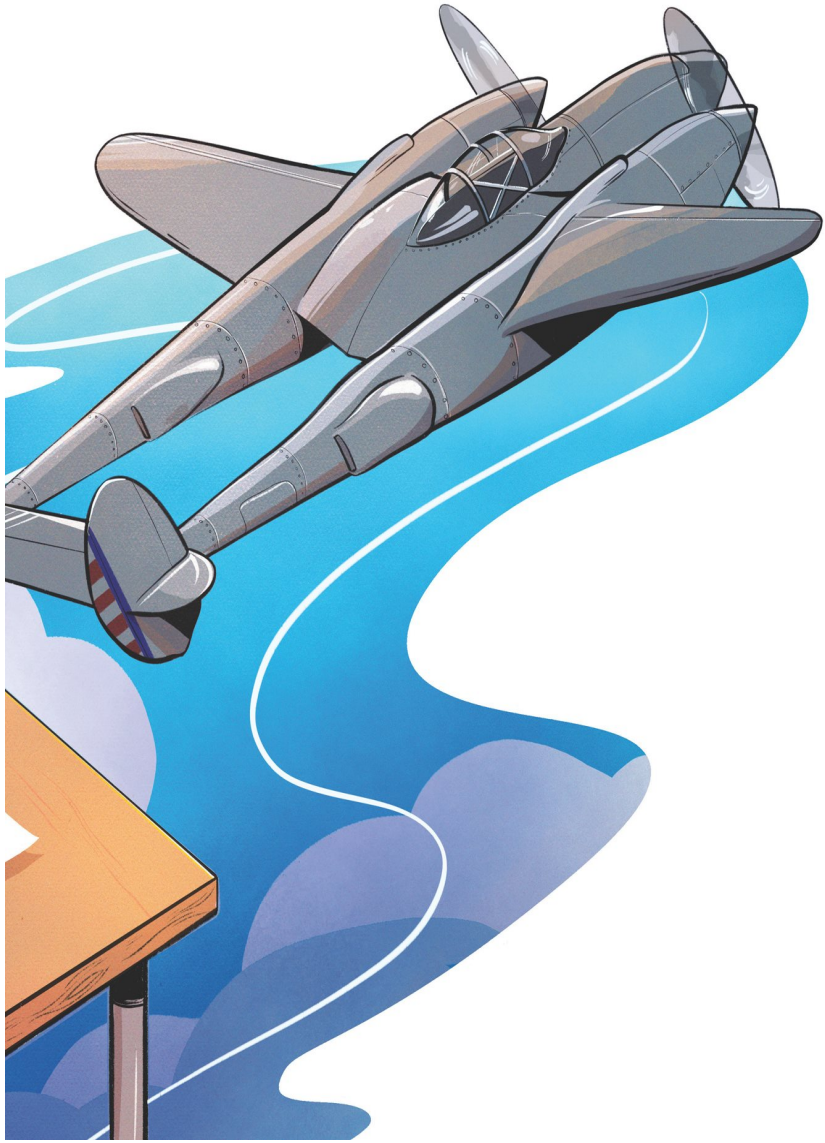
The Cherokee value of instructing in a gentle, thoughtful
she
encouraged the next generation of Pueblo and Navajo gir



Mary soon
outside the
her
math and :

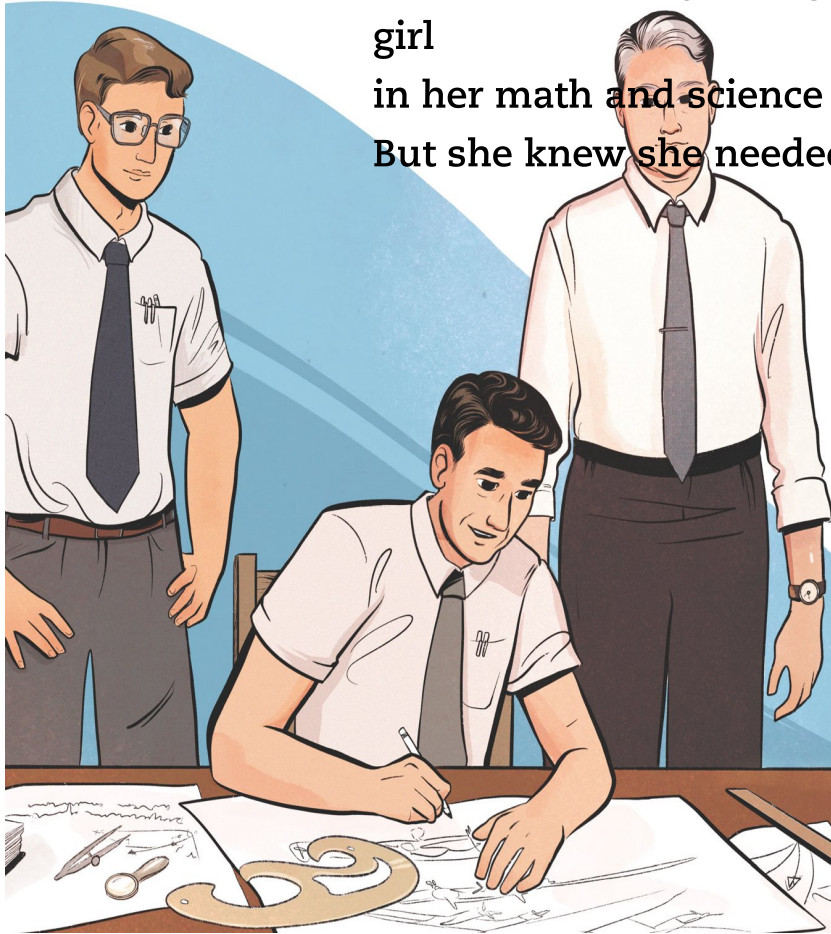
After the United States entered World War II in 1941, Mary left her teaching career and moved once again, this time to Los Angeles, California. Mary got a job as mathematician for the Lockheed Aircraft Corporation. She helped solve a design problem affecting the safe operation of the P-38 Lightning fighter, one of Lockheed's fast-flying planes, and she enjoyed the research.





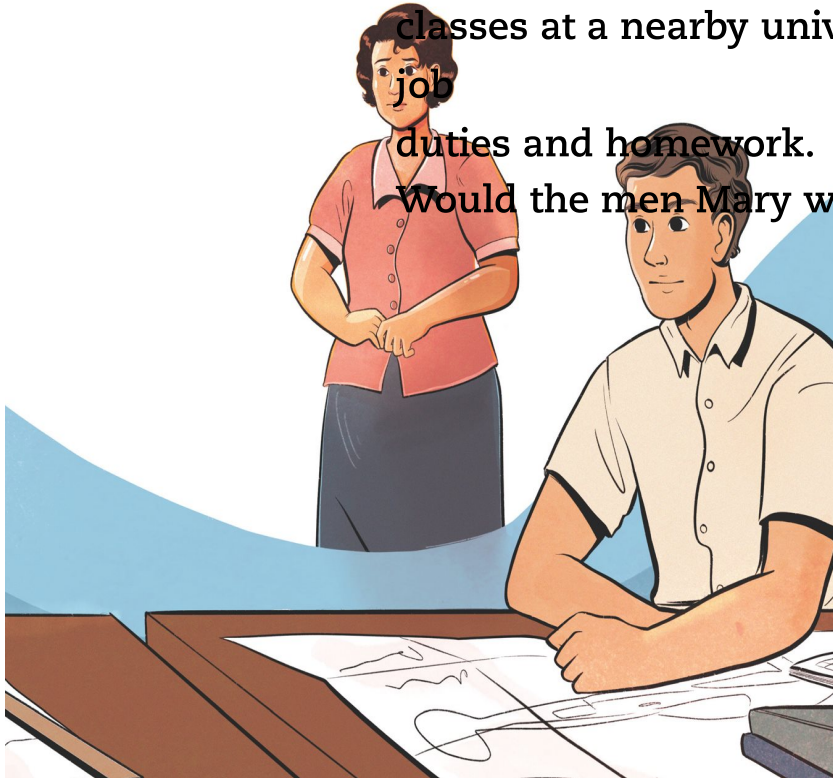
Now she
build air
an engine

At that time, only men served as engineers in t
corporation. Mary thought back to when she w
girl
in her math and science classes. She wasn't in
But she knew she needed more training.



Mary focused. The company helped her take classes at a nearby university. She had to balance job duties and homework.

Would the men Mary worked with accept her

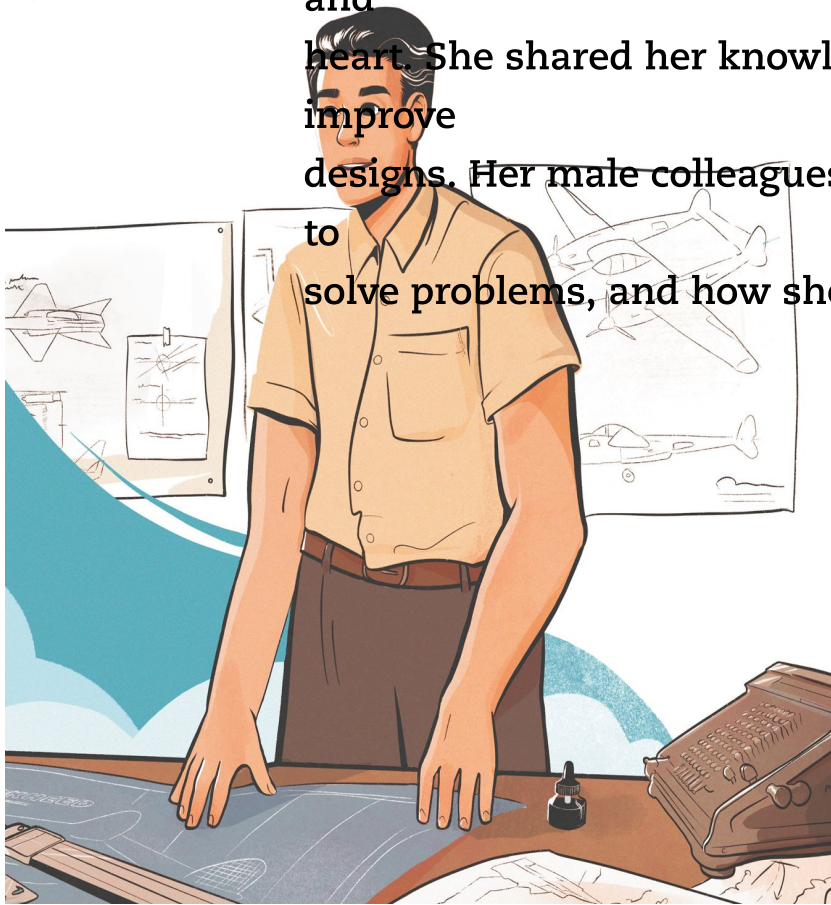


They did! Mary became Lockheed's first female engineer and helped other women join the field.



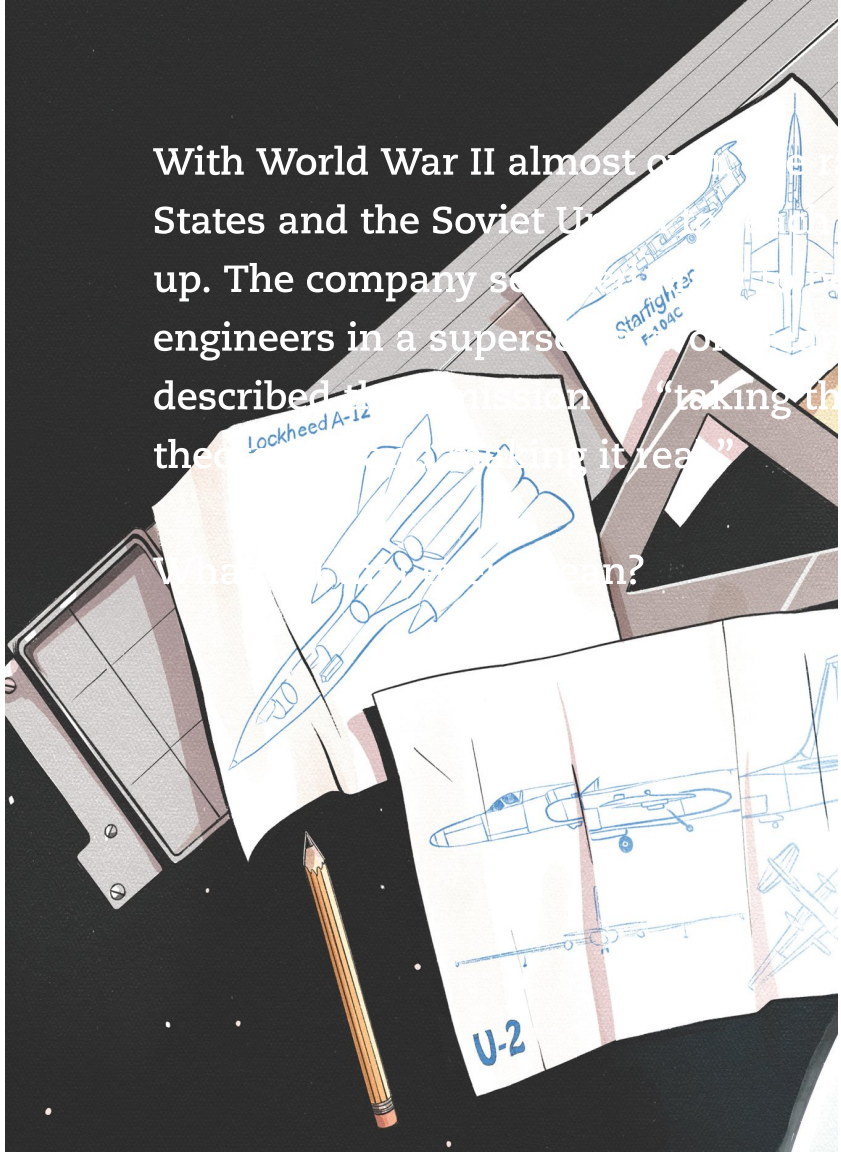
She modeled the Cherokee value of working together and with a heart. She shared her knowledge and asked questions to improve designs. Her male colleagues respected her intelligence to solve problems, and how she worked in the team.

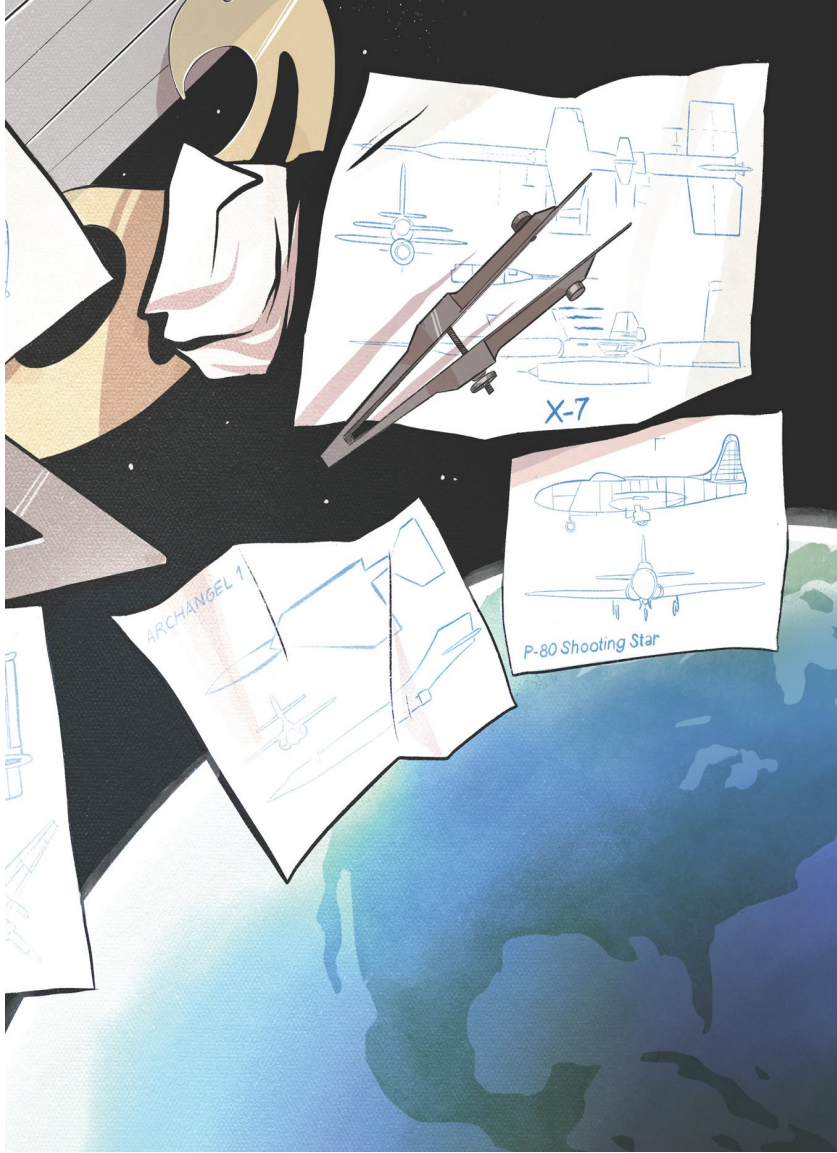
None of these
what would



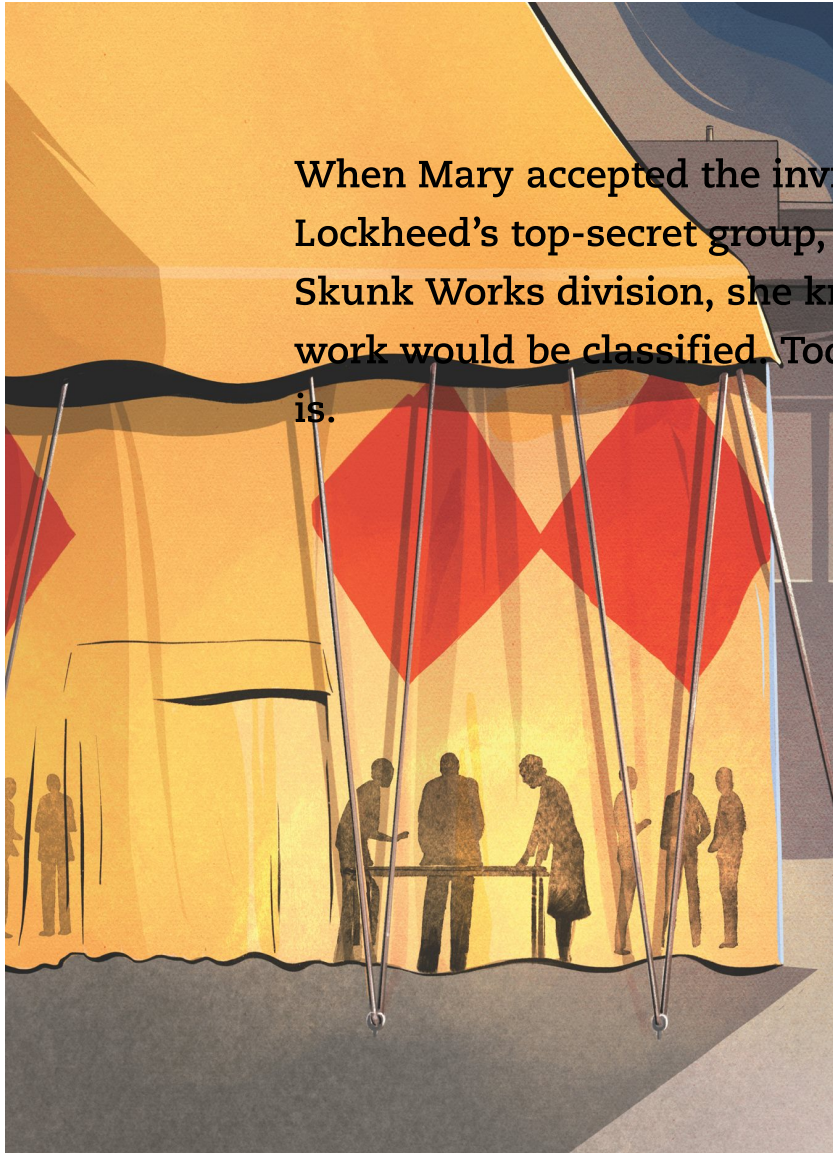
With World War II almost over, the United States and the Soviet Union were racing to get ahead. The company sought out the best engineers in a super-secret program. One of them described it as a mission of "taking the threat from the drawing board and making it real."

What was the team's goal?

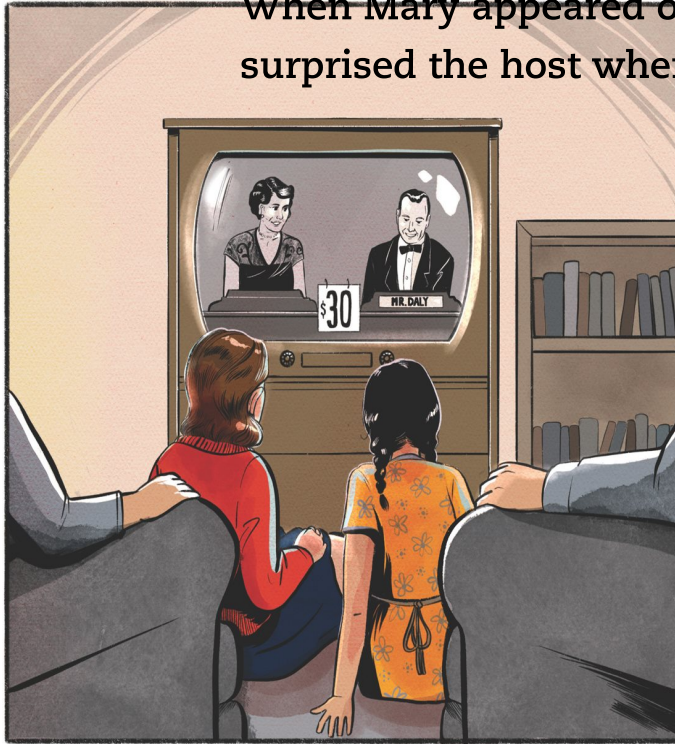




When Mary accepted the invitation to join Lockheed's top-secret group, known as the Skunk Works division, she knew most of her work would be classified. Today a lot of it still is.



When Mary appeared on a “guess my job” TV game surprised the host when her line of work was finally

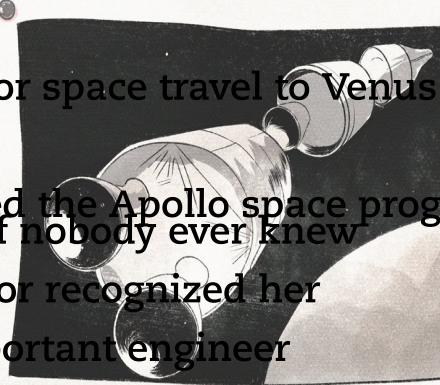


Even though Mary worked on world-changing projects, she never sought the spotlight.

Along with her colleagues, Mary researched orbiting satellites that monitor weather patterns and send signals to television. She designed concepts for space travel to Venus and Mars. Her critical spacecraft

later helped the Apollo space program send astronauts to the moon. But what if nobody ever knew

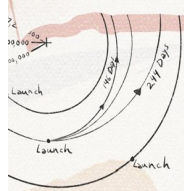
her name or recognized her as the important engineer she was?



Braced for the liftoff

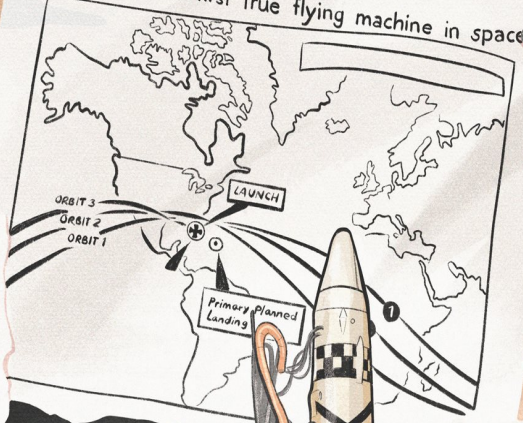


Millions living better thanks to moonwalk



INTERPLANETARY

Gemini called first true flying machine in space



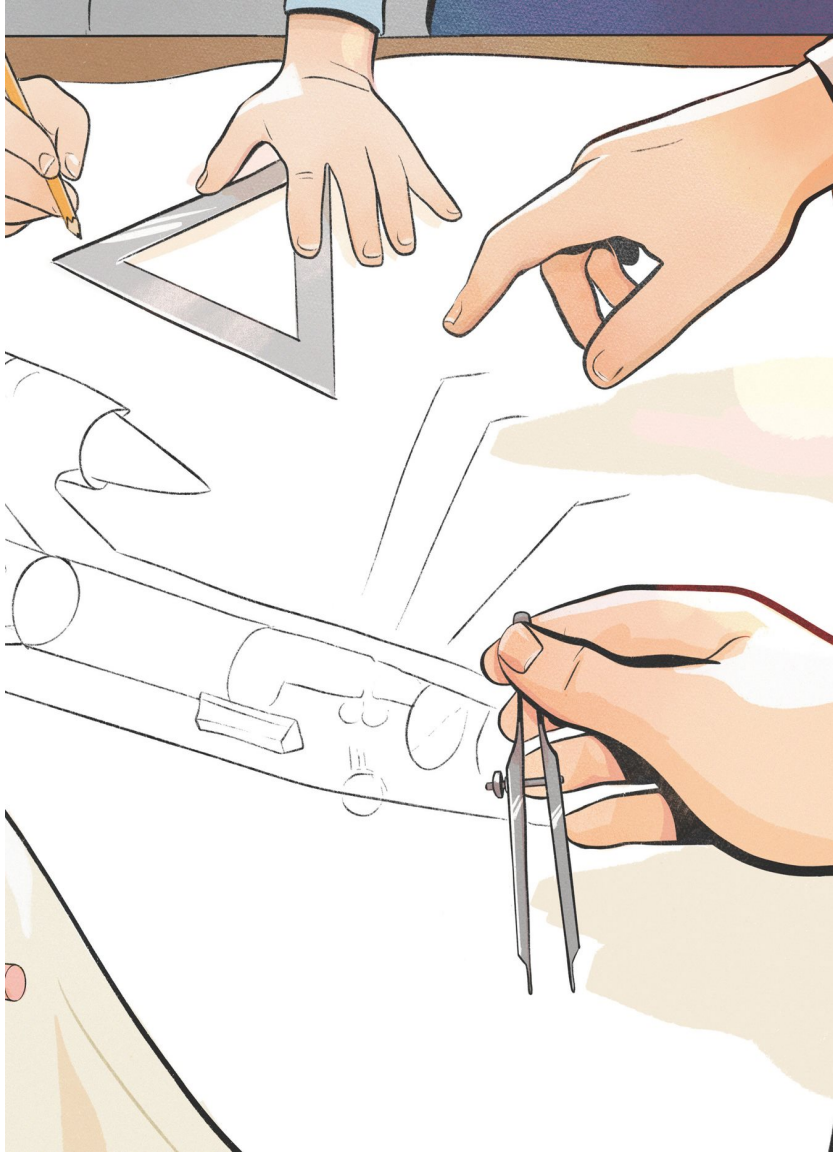
Suited up for space



Walking 100 miles above Earth



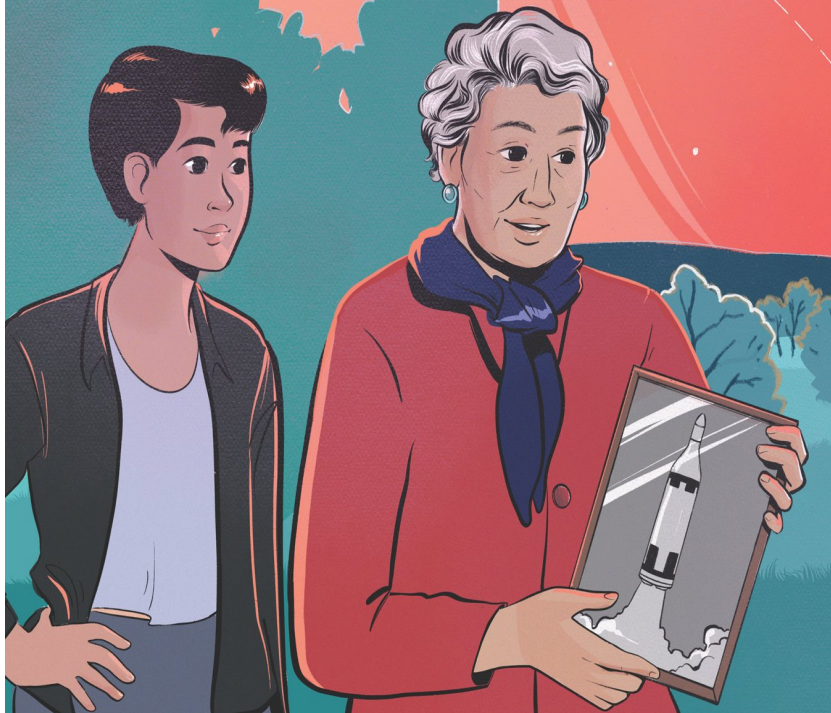





That didn't matter to Mary. Her life reflected another Cherokee value—humility. Mary never

bragged or drew attention to her skills. Her work, including helping to put a man on the moon, spoke for itself. Whenever Mary received awards, she always thanked her colleagues because she knew no one person deserved credit for what everyone had done together.

In her quiet, steadfast way,
Mary kept right on blazing a
trail for others to follow for
the rest of her life.





Although her work was classified, Mary still had much to share. She never stopped recruiting American Indians and young women to study math and science and helping support them to become engineers.



Mary's work and her legal service have helped many become engineers too.

MARY GOLDWASSER
A Secret Star

TIM

AUGUST 9, 1908: Mary Golda Ross (known as Gold to her family) is born in Parkdale, Oklahoma, to Cherokee Nation citizens William Wallace Ross Jr. and Mary J. Ross. She is the second of their five children.

MAY 18, 1925: Graduates from high school at the age of sixteen.

JULY 19, 1928: Graduates from college at the age of twenty.

1927–1935: Begins teaching while still in college and continues for nearly a decade in rural public high schools in White Oak (1927–28), and Barnsdall, Oklahoma (1930–1935), also principal 1929–1930).

1932–1934 & 1937–1938: Takes graduate courses at Colorado State Teachers College (now Colorado State University) in Greeley in the summers, including every astronomy course offered.

1935–1937: Briefly works as a statistical clerk at the Bureau of Indian Affairs.

1937–1942: The BIA's Education Department sends her to New Mexico to teach at their boarding school. Earns a master's degree in math from Colorado State University in August 1938.

JULY 7, 1942: After visiting friends in Los Angeles and encouraged by her friend, she is recruited by the large Lockheed Aircraft Corporation as a mathematician. When the United States had entered World War II the previous year, an urgent need for skilled workers with her mathematical background. She assists in solving a design problem with the P-38 Lightning fighter plane that Lockheed was testing and other pilots in combat.

1949: Receives her certification in mechanical engineering from the University of Southern California at Los Angeles. Also studies aeronautics and missile and celestial mechanics through 1952.

1950: Officially becomes Lockheed's first woman engineer.

1953: Selected to serve as one of forty engineers, and the only woman, in Lockheed's top-secret Skunk Works group. With no room inside Lockheed's buildings, the group worked in a rented circus tent next to a smelly manufacturing plant. Their name and later registered trademark derived from that.

1953: Cofounds and serves as a charter member of the Los Angeles Chapter of the National Aeronautics and Space Administration.

Angeles section of the Society of Women Engineers. She serves the organization on a national level for decades, working to make the engineering field more inclusive.

1957: Classified work is propelled forward when the Soviet Union launches Sputnik, the world's first satellite. The United States does not want to fall behind in the space race and rushes to catch up.

1958: She appears on *What's My Line?*—a TV show in which celebrities describe their occupation. The studio and home-viewing audience see her describe her occupation as “Designs Rocket Missiles and Satellites (Lockheed Aircraft Division).”

JULY 20, 1969: Describes that she felt a quiet pride knowing “a Cherokee from Oklahoma, helped put a man on the moon” when astronaut James A. Lovell Jr. was the first human to walk on the moon’s surface.

1970: Coauthors NASA’s Planetary Flight Handbook Volume 3 and 4, covering Mars and Venus.

AUGUST 31, 1973: Retires from Lockheed as a Senior Advanced Systems Staff Engineer.

1973: The Santa Clara Valley section of the Society of Women Engineers awards a scholarship in her name. Continues her work to open up the field of engineering to Native American Indians to enter the fields of math and engineering.



1984: Receives an honorary life membership from the American Society of Mechanical Engineers.

1985: Is awarded the Council of Energy Resource Tribes’ Achievement Award, which is then renamed as the Mary G. Ross Award for future recipients.

1992: Is inducted into the Silicon Valley Engineering Council Hall of Fame as the second woman to receive that honor. A scholarship is established in her name by the Society of Women Engineers.

1993: Is awarded the University of Northern Iowa’s Alumni Association’s Trailblazer Award.

1994: Is named Outstanding Alumna by Northeastern State University’s Alumni Association.

SEPTEMBER 21, 2004: At the age of ninety-six, she attends the launch of the National Museum of the American Indian (NMAI) in Washington, DC. She participates in the Native Nations Procession and attends NMAI’s Opening Ceremony on the National Mall.

Mary (left) presents / from the Society of V

- APRIL 29, 2008:** Dies in Los Altos, California, just three months shy of his 110th birthday.
- AUGUST 9, 2018:** Is commemorated by Google with a Google Doodle on his 110th birthday.
- 2019:** Is selected as an honoree of a design for a United States coin with the theme "American Indians in the Space Program".

As a child, I loved reading biographies from my school library. Slim volumes s: important work, and struggles of men and women—nearly all of them white. Cherokee Nation had many citizens serving others and succeeding in their pr stories remained untold.

Mary Golda Ross is one of those Cherokee citizens, remaining true to her t while contributing her intellect and skills to the greater world. To write this st her cousin, Bruce Ross, who shared that I should visit the archives at her alm: State University to complement the research I had already done. Being able to rule, read through notebooks she'd filled with equations, and thumb through as she worked gave me an even greater appreciation of Mary's vision, research Her story deserves to be shared.

Along with Mary Golda Ross, my mother and I participated in the Native N the National Museum of the American Indian's opening day in 2004. I only wi: was one of the elders there within our large Cherokee Nation delegation. I reg visit with her in person that day and thank her for being a trailblazer for so m

Mary drew on her status as the first known Native American female engir those coming after her would be welcome in math and engineering. She stro: American Indian Science and Engineering Society with vocal and financial ba talks to high school and college students encouraging young women and Nati a firm foundation in math and train for technical careers.

She lived the Cherokee values she had been raised with, benefiting us all i

SYLLABARY: ӨhbӨR 0°N~V& hSi TEӨSӨ Ө EO~T

TRANSLITERATION: nanisinasv unequotsehv nigav igvnadena na gvnvi

PRONUNCIATION: nah-NEE-see-NAH-suh oo-neh-KWOH-jay-huh nee-gah-uh ee-guh-NUH-ee

ENGLISH: gaining skills in all areas of life

SYLLABARY: ьӨPөSөөE Sh~QөөLө & Dh~T E~J

TRANSLITERATION: danalisdeligsv dunilvwisdanehv anisoi gvdi

PRONUNCIATION: dah-nah-LEEs-day-LEEs-guh duh-nee-LUH-wees-duh-NEH-huh

ENGLISH: working cooperatively with others

SYLLABARY: 0°ӨPZAB ӨP~V°ӨӨ ӨGZ Dh~T ƒ~KƒV& GSV&RA ƒ~RT

TRANSLITERATION: unalinohiyv nutlvquodvna nayuno anisoi getsolitsehv tsagad

SOUR

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• For future engineers, mathematicians, and scientists
you can” as Mary would say. I’m rooting for you.
—T.S.

For Mrs. Barbara Sunday and all the teachers at Sent
who encouraged me to follow an unusual path—with
—N.D.

Acknowledgments

This book would not have been possible without: Bruce Ross and the archives staff at Northeastern State University—Brenda Kaye Bradford, director, and Blain McLain, special assistant—for helping me access primary sources about Mary’s life and career; aerospace engineer Dr. Joseph Connolly, mechanical engineer Dr. Powtawche Valerino, and wind tunnel manager Richard F. Bozak at NASA for their review of the technical information shared in the art; and John Ross and Wade Blevins for their assistance with the Cherokee language featured.

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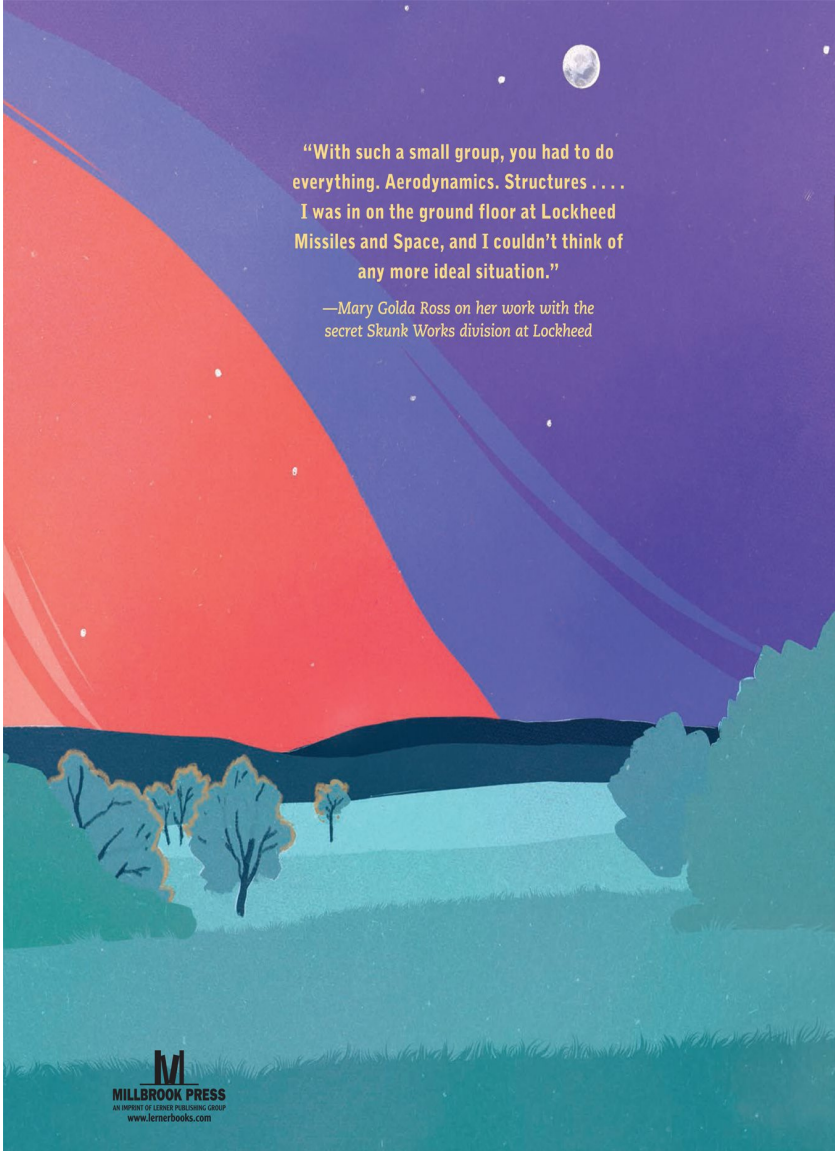
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“With such a small group, you had to do everything. Aerodynamics. Structures . . . I was in on the ground floor at Lockheed Missiles and Space, and I couldn't think of any more ideal situation.”

—Mary Golda Ross on her work with the secret Skunk Works division at Lockheed

