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CLASS _____

NATIVE AMERICAN HERITAGE MONTH

Mary Golda Ross

Classified: The Cherokee Engineer of the Space Age

Working in Secret

Mary Golda Ross was born in 1908 in Park Hill, Oklahoma, a citizen of the **Cherokee Nation** and the great-granddaughter of Principal Chief John Ross. She finished a mathematics degree at Northeastern State Teachers' College in 1928, taught math and science in rural Oklahoma schools, and later earned a master's degree in mathematics in 1938.

In 1942, as World War II increased demand for technical workers, Lockheed hired her as a mathematician. She worked on problems the P-38 Lightning, a very fast fighter plane, encountered in high-speed dives. Lockheed kept her on after the war and supported her while she took engineering courses through UCLA to earn a professional engineering certification.

In 1952 she joined the **Skunk Works**, Lockheed's secret advanced-projects group, as the only woman among its original team of about 40 engineers. Her work turned to **orbital mechanics** — the math of how objects move around planets. She contributed to requirements for the Agena rocket, which later served as a docking target for NASA's Gemini astronauts, and helped write parts of NASA's Planetary Flight Handbook about travel to Mars and Venus.

Because so much of her work was **classified**, she rarely spoke about it publicly. After retiring from Lockheed in 1973, she encouraged girls and Native students to study engineering, supporting the Society of Women Engineers and the American Indian Science and Engineering Society. In 2019 she was honored on the U.S. Mint's Native American \$1 coin.

Part 1 • Reading Comprehension

1. List three things Mary Golda Ross did before she became an engineer.

2. What was the Skunk Works, and what was unusual about Ross's place on its original team?

3. What is orbital mechanics, and how did Ross's work connect to NASA's Gemini program?

4. Why is it hard for historians to describe all of Ross's accomplishments?

Part 2 • Critical Thinking

Much of Ross's most important work was classified, so for decades few people knew what she had done. Is it fair that secret work can keep someone's achievements hidden? What could be done to recognize people like her?

Part 3 • STEM Challenge

Flight Time in Orbit

A satellite in low Earth orbit about 300 km up circles the planet once every 90 minutes. Its orbit is a circle with a radius of about 6,671 km (Earth's radius plus 300 km). Use $\pi \approx 3.14$ and show your work.

1 How many orbits does the satellite complete in one day (24 hours)?

2 How many orbits does it complete in one week?

3 Find the distance of one orbit using circumference = $2 \times \pi \times r$. Round to the nearest thousand km.

4 The satellite covers one orbit in 90 minutes (1.5 hours). What is its speed in km per hour? How many times faster is that than a car driving 100 km/h?
