Survival Math

Suggested Application: Math, Vietnam War

OBJECTIVES
Students will:
• understand the relationship of the legs and hypotenuse of triangles and find the hypotenuse and measurement of the legs
• calculate the angles of a triangle given the missing angle, and/or length of the legs of a triangle
• use volume and algebraic equations to find missing variables
• connect these skills to real life and to Medal of Honor values

Medal of Honor Focus: Leo Thorsness, U.S. Air Force, Vietnam War

Teacher Preparation:
Students should understand how to find the angles of acute, obtuse, and right angles, square roots, and algebraic equations. This lesson can be used to introduce algebraic equations, how to find the legs and angles of a triangle, or as an extension of either lesson.

Introductory Activity:
Review the concept of different triangles, how to find the length of sides, angles, and algebraic equations. Students should be able to identify the different triangles and how to label the angles and legs as well as how to solve basic algebraic equations.

Whole Group Activity:
Read the Portrait of Valor of Leo Thorsness then watch his Living History Video. After the video, have students do a think-pair-share on the math concepts he would have needed to know in order to do his job. How might his skills have given him the courage to carry out his missions?

Small Group/Individual Activity: Finding a hypotenuse
Give the students either the height (A), ground distance (B), total distance glided (C), or the angles and have students find out the others. Change the lengths/ distance needed to glide for more practice. Why was the ability to calculate a hypotenuse crucial to Thorsness' survival?

Small Group/Individual Activity: Finding Angles
Using different angles, have students figure out the angle Leo Thorsness would have needed to be at to glide, height needed to be at, angle to land, etc. Change the angles for more practice.

Small Group/Individual Activity: Solving Algebraic Equations and Finding Missing Variables
Have students use algebraic equations to figure out how many ounces of fuel someone would need to go different distances. Adjust the distances needed to travel, the amount of fuel available, and the distance each ounce of fuel can propel a plane forward.
Concluding Activity:
How can math give you courage? Review student answers and discuss why math was so important to Leo Thorsness’ survival. Then have students brainstorm ways in which math is needed for other jobs. Think about how skills can create the confidence to handle challenging situations. Have students write a reflection.

Assessment:
Math equations, reflection

Resources:
Leo Thorsness’ Living History video and Portrait of Valor

Extended Activities:
Students should talk with their parents about when they use math in their daily lives and look into the ways that math will be needed and useful in their future.
Students should research a career they are considering to discover how math is used in that field. Based on their findings, they should each write a report, including a list of the math classes they would need to succeed in that field.
Leo Thorsness enlisted in the Air Force in 1952 at the age of nineteen, largely because he had a brother serving in Korea. Though he didn’t make it to Korea himself, he stayed in the military, becoming an officer and a fighter pilot. In 1966, he went to Vietnam as part of a squadron of F-105s. The “Wild Weasel” was a specially modified two-seat F-105 and had the job of finding and destroying surface-to-air missile (SAM) sites. The Weasels were capable of lingering in target areas longer than other fighters, and as a result suffered a high loss ratio; not many Weasel pilots completed their hundred-mission tours.

On April 19, 1967, Thorsness was on a mission deep in North Vietnam. He and his wingman took out an enemy SAM site with missiles, then destroyed a second site with bombs. In the second attack, the wingman radioed that his plane, hit by intense antiaircraft fire, was going down. “Turn toward the mountains and I’ll keep you in sight,” Thorsness told him. As the pilot and his backseater ejected from the damaged aircraft, Thorsness circled above to keep them in sight. Suddenly, he saw an enemy MiG-17 fighter setting up a gunnery pass on the parachutes. Although the Weasel was not designed for dogfights, Thorsness attacked the MiG and destroyed it with bursts from his gatling gun.

Dangerously low on fuel, Thorsness quickly air-refueled from a tanker and returned to the MiG-infested area to protect the downed crew from North Vietnamese soldiers. When his rear-seat weapons officer spotted four more MiGs in the area, he turned back through a barrage of North Vietnamese SAMs to engage them. He hit another one (although he never got credit for the kill because his gun camera had run out of film) and drove the remaining enemy planes away.

Heading for Udorn Royal Thai Air Base, the closest U.S. airfield, Thorsness climbed to thirty-five thousand feet. Seventy miles from base, with his fuel tanks on empty, he pulled the throttle to idle, knowing he could glide two miles for each thousand feet he fell. Just as he was landing, the F-105’s engine ran out of fuel and shut down.

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Two weeks later, he was shot down over North Vietnam on his ninety-third mission. He bailed out and was captured, and wound up a prisoner of war in the “Hanoi Hilton,” where he ran into the two F-105 crew members he had tried to rescue. After two years of unremitting torture, he learned, through a secret “tap code” among the prisoners, that his name had been submitted for the Medal of Honor. (The officer in charge of writing Thorsness’ citation had been shot down himself and brought to the same prison.)

When the war ended in 1973, Thorsness was released and sent home. He had knee injuries, sustained when he had bailed out of his plane at six hundred knots, and back injuries as a result of torture. He received the Medal of Honor on October 15, 1973, from President Richard Nixon. “We’ve been waiting for you for six years,” Nixon told him. “Welcome home.”

After retiring from the Air Force as a colonel, Thorsness was an executive with Litton Industries and later served the people of Washington as a state senator. In 2002, he started speaking on his personal mantra, “Do what’s right—help others.”