Threads & Themes Grade 6, Unit 3, Investigation 1 Summative Assessment

Name: _____ **Date:** _____ **Class:** _____

PASSAGE 1

Racing to the Stars

(1) In the years following World War II, the United States government turned its attention to a new kind of competition. A government research agency called NACA had spent decades testing aircraft designs and studying the science of flight at its research center in Hampton, Virginia. By the early 1950s, the agency's engineers were already exploring what it would take to send objects, and eventually people, beyond the atmosphere. The work was difficult and expensive, but it was driven by a simple belief: the nation that led in flight would lead the world. At the time, few people outside the agency paid much attention to the calculations and experiments happening behind the walls of the research center.

(2) That belief became urgent on October 4, 1957, when the Soviet Union launched Sputnik, the first human-made object to orbit the Earth. Americans watched the small metal sphere pass overhead and realized that a rival nation had reached space first. Within a year, Congress transformed NACA into a new, more powerful agency called NASA. The goal shifted. It was no longer enough to study flight. The United States needed to put Americans into space and to do it before the Soviet Union could go further.

(3) NASA's first major program, Project Mercury, set out to prove that a human being could survive the dangers of space and return safely. Engineers designed a small capsule, barely large enough for one person, and built heat shields to protect it during the fiery return through the atmosphere. On February 20, 1962, astronaut John Glenn climbed into the Mercury capsule and orbited the Earth three times in under five hours. When he splashed down in the Atlantic Ocean, crowds cheered and newspapers printed his name in bold headlines. Glenn became a national hero overnight.

(4) But President John F. Kennedy had already set a far larger goal. In 1961, he told Congress that the United States should land a person on the moon before the end of the decade. The challenge seemed almost impossible. No rocket in existence was powerful enough to make the journey. The mathematics alone were staggering. Engineers had to calculate the exact path a spacecraft would follow across nearly 240,000 miles of empty space. They had to account for the pull of gravity from both the Earth and the moon and plan for a safe return. NASA spent years designing the Saturn V, a rocket taller than a thirty-story building. It produced enough force to lift more than six million pounds off the ground. Every part had to work perfectly because a single failure at any stage could end the mission or cost the crew their lives. At the height of the program, NASA estimates that nearly 400,000 individuals came together to make the goal of a moon landing a reality.

(5) On July 20, 1969, the Apollo 11 spacecraft reached the moon. Astronauts Neil Armstrong and Buzz Aldrin stepped onto the moon's surface while Michael Collins orbited above in the

command module. Armstrong spoke the words that millions of people around the world heard through their television sets: “One small step for man, one giant leap for mankind.” The landing fulfilled Kennedy’s promise and marked the high point of the American space program. In living rooms and town squares across the country, people who had followed the program for years had witnessed something no generation before them had seen.

(6) The Space Race lasted roughly twelve years, from Sputnik in 1957 to the moon landing in 1969. During that time, NASA grew from a small research agency into one of the largest scientific organizations in the world. Most people came to know the Space Race as a story of bold leaders, brave astronauts, and brilliant engineers. Textbooks celebrated the missions, the machines, and the names of the men who flew them. The photographs that appeared most often showed astronauts in silver suits, rockets lifting off in columns of fire, and mission control rooms filled with rows of men in white shirts. For decades, that version of the Space Race shaped how most Americans understood their country’s journey to the moon.

ITEMS — PASSAGE 1

Item 1

Based on paragraph 1 of “Racing to the Stars,” what was an original focus of the NACA research agency?

A) testing aircraft designs

B) building powerful rockets

C) sending astronauts into space

D) demonstrating experiments for the public

Item 2

How does paragraph 2 contribute to the development of ideas in “Racing to the Stars”?

A) It introduces the competition that changed the space program from a research project into a national mission.

B) It provides background about NACA’s early research on the science of flight.

C) It describes the technical challenges engineers faced when designing spacecraft.

D) It explains why John Glenn became a national hero after his flight.

Item 3

Read the sentence from paragraph 3 of “Racing to the Stars.”

> NASA’s first major program, Project Mercury, set out to prove that a human being could survive the dangers of space and return safely.

What is the meaning of the word “survive”?

A) test carefully

B) live through

C) find enjoyable

D) understand fully

Item 4

Match each detail from paragraph 4 of "Racing to the Stars" to the way it helps the reader understand the moon-landing challenge.

Details:

1. No rocket in existence was powerful enough to make the journey.

2. Engineers had to calculate the exact path a spacecraft would follow across nearly 240,000 miles of empty space.

3. NASA estimates that nearly 400,000 individuals came together to make the goal of a moon landing a reality.

Purposes:

A) Shows how modern and complex the equipment had to be.

B) Shows the scale of the project in human workers.

C) Shows how exact the planning had to be for the trip to work.

Item 5

Read this sentence from paragraph 6 of "Racing to the Stars."

> Most people came to know the Space Race as a story of bold leaders, brave astronauts, and brilliant engineers.

What do the words "bold," "brave," and "brilliant" in this sentence suggest?

A) The people who participated in the Space Race were admired and celebrated.

B) The people involved in the Space Race were reckless and overconfident.

C) The Space Race required more courage than intelligence.

D) The way the public viewed the Space Race was incorrect.

Item 6

Which statement BEST summarizes "Racing to the Stars"?

A) President Kennedy challenged the country to land on the moon, and NASA engineers designed the Saturn V rocket to make the journey possible.

B) The Space Race began when the Soviet Union orbited Earth and ended when astronaut John Glenn did the same in 1962.

C) NASA grew from a small research agency into a large scientific organization by hiring strong leaders and skilled engineers.

D) Based on a desire to lead the world, the United States created NASA and spent twelve years competing to reach the moon, a goal achieved by the Apollo 11 mission in 1969.

Item 7

What is the author's MOST LIKELY purpose in "Racing to the Stars"?

A) to persuade the reader that the United States deserved to win the Space Race

B) to present information about the Space Race and how it was understood by the public

C) to explain why John Glenn and Neil Armstrong became popular figures

D) to describe the scientific discoveries that resulted from the United States space program

PASSAGE 2

Behind the Countdown

(1) At NACA's research center in Hampton, Virginia, teams of mathematicians worked in large, open rooms filled with rows of desks and calculating machines. Known as "computers," these workers solved the equations that engineers needed to design safe, reliable aircraft. Many of the computers were women, hired during World War II when the demand for skilled mathematicians had outpaced the available workforce. Among them were teams of Black women who worked in a separate section of the facility under Virginia's laws requiring divided workplaces. The computers' calculations had to be flawless regardless of where they sat, as engineers across the agency depended on the accuracy of their results. A single error could mean a flawed aircraft design, a failed test flight, or worse. The mathematicians understood this, and their work reflected it.

(2) When the Soviet Union launched Sputnik in 1957, NACA became NASA, and the agency's mission expanded from testing aircraft to sending humans into space. For the mathematicians, this meant longer hours and far more complex problems. Every proposed flight required precise calculations: the speed needed to reach orbit, the exact angle for re-entering the atmosphere, and the timing of every engine firing along the way. The cost of a mathematical error was not an incorrect answer on paper. It was the potential loss of a human life.

(3) On February 20, 1962, astronaut John Glenn prepared to become the first American to orbit the Earth. What happened before his flight showed just how much the space program depended on these mathematicians. By then, NASA had begun using electronic computing machines to calculate flight paths. But Glenn was not fully confident in the new technology. Before he agreed to fly, he made a specific request: he wanted Katherine Johnson, a mathematician in the computing division, to check the numbers by hand. Johnson had already earned a reputation for the precision and thoroughness of her work. She ran the calculations and confirmed that the machine's output was correct, and Glenn flew the mission. He orbited Earth three times and returned safely.

(4) As electronic computers became more common at NASA, the role of the human computers shifted. Dorothy Vaughan had supervised the team of Black women mathematicians. She recognized that the new machines would eventually replace calculations done by hand. Rather than wait for that change to push her team aside, Vaughan taught herself FORTRAN, one of the earliest programming languages. She then trained the women she supervised to use it as well. Mary Jackson, another mathematician from the same group, pursued advanced engineering courses and became one of NASA's first Black female engineers. These women did not simply respond to change. They moved ahead of it, turning a moment that could have ended their careers into one that extended them.

(5) These mathematicians shaped every major mission in the space program. Their calculations guided the first crewed flights and the Apollo missions that reached the moon. For the Apollo 11 flight in July 1969, teams of mathematicians checked and rechecked the numbers that would guide the spacecraft from the Earth to the moon's surface and back. The work demanded extreme care because a difference of even a fraction of a degree in a flight path could send a spacecraft thousands of miles off course. When the mission succeeded and the world celebrated, the names most people heard belonged to the astronauts who made the journey, not the mathematicians who made the journey possible.

(6) It took decades for the full picture to emerge. In recent years, books, films, historical research, and even awards have brought the stories of these mathematicians into wider view. Their work had always been part of the Space Race, recorded in logbooks, technical reports, and agency records. What changed was not the history itself but who was included in the telling of it. The same missions that had always been described as triumphs of engineering and courage began to be understood as triumphs of mathematics and teamwork as well.

ITEMS — PASSAGE 2

Item 8

In paragraph 1 of "Behind the Countdown," how does the author develop the reader's understanding of the role of human computers?

A) by comparing their work to the work of the engineers they supported

B) by explaining how they were chosen and what educational backgrounds they had

C) by telling where their research center was located and how the laws impacted their workplace

D) by describing their responsibilities and the importance of their calculations

Item 9

Read this sentence from paragraph 1 of "Behind the Countdown."

> Many of the computers were women, hired during World War II when the demand for skilled mathematicians had outpaced the available workforce.

What is the meaning of "outpaced"?

A) grown larger than

B) closely matched

C) dropped far below

D) made unnecessary

Item 10

Which claim does paragraph 2 of "Behind the Countdown" support with evidence?

A) The mathematicians were given too little time to complete their calculations accurately.

B) The success of the space program depended on calculations that had to be exact.

C) Electronic computing machines should have been used earlier to reduce the risk of human error.

D) The mathematicians preferred working on space missions to working on aircraft design.

Item 11

Select the TWO details from "Behind the Countdown" that BEST support the idea that the mathematicians' work was critical to the safety of space missions.

A) "For the mathematicians, this meant longer hours and far more complex problems." (paragraph 2)

B) "By then, NASA had begun using electronic computing machines to calculate flight paths." (paragraph 3)

C) "Before he agreed to fly, he made a specific request: he wanted Katherine Johnson, a mathematician in the computing division, to check the numbers by hand." (paragraph 3)

D) "Johnson had already earned a reputation for the precision and thoroughness of her work." (paragraph 3)

E) "For the Apollo 11 flight in July 1969, teams of mathematicians checked and rechecked the numbers that would guide the spacecraft from the Earth to the moon's surface and back." (paragraph 5)

Item 12

Read this excerpt from paragraph 1 of "Behind the Countdown."

> The computers' calculations had to be flawless regardless of where they sat . . .

Think about the meaning of the suffix -less. Based on this suffix, what is the meaning of the word "regardless"?

A) one who considers

B) without considering

C) the act of considering

D) tending to consider

Item 13

How does the author of "Behind the Countdown" show that Vaughan and Jackson did more than simply adapt to change?

A) by explaining that they eventually received awards and recognition from NASA for their contributions

B) by noting that they worked longer hours than other mathematicians at the agency

C) by describing how each one took action to move into a new role before being forced out of the old one

D) by comparing their career paths to Katherine Johnson's career path at NASA

Item 14

Read the sentences about a person discussed in "Behind the Countdown."

> Katherine Johnson came to NACA after years spent as a teacher and as a stay-at-home mother. As part of ____ work at NACA, Johnson performed the calculations for Alan Shepard's space flight.

Which pronoun correctly completes the sentences?

A) her

B) she

C) our

D) hers

Item 15

What central idea does "Behind the Countdown" develop?

A) Electronic computers eventually replaced human mathematicians at NASA because machines were faster and more reliable.

B) Katherine Johnson was the most important mathematician at NASA because John Glenn trusted her calculations over the electronic computers.

C) The mathematicians whose calculations made the space program possible contributed essential work that went largely unrecognized for decades.

D) The Space Race succeeded mainly because NASA hired women who were willing to work long hours on difficult problems.

ITEMS — BOTH PASSAGES

Item 16

Both "Racing to the Stars" and "Behind the Countdown" describe John Glenn's 1962 orbit of Earth. How do the two authors present this event differently?

A) "Racing to the Stars" focuses on the danger of Glenn's flight, while "Behind the Countdown" focuses on the flight's scientific results.

B) "Racing to the Stars" celebrates Glenn as the first person in space, while "Behind the Countdown" explains that the Soviet Union reached space first.

C) "Racing to the Stars" questions whether Glenn's flight was worth the risk, while "Behind the Countdown" argues that Glenn knew the flight would be safe.

D) "Racing to the Stars" describes Glenn as a popular hero, while "Behind the Countdown" describes what others did to make flights like his possible.

Item 17

Select the TWO statements that BEST describe how the authors of "Racing to the Stars" and "Behind the Countdown" present the Space Race differently.

A) "Racing to the Stars" presents the Space Race as a competition between nations, while "Behind the Countdown" presents it as a story of individual mathematicians and their contributions.

B) "Racing to the Stars" argues the Space Race required too many resources, while "Behind the Countdown" argues it was necessary for scientific progress.

C) "Racing to the Stars" emphasizes the astronauts and engineers who were known to the public, while "Behind the Countdown" emphasizes the mathematicians whose work went unrecognized.

D) "Racing to the Stars" mainly describes events that happened to astronauts in space, while "Behind the Countdown" mainly describes events that happened to mathematicians on the ground.

E) "Racing to the Stars" presents events in a different chronological order than "Behind the Countdown."

SPELLING

Item 18

Write the spelling word you heard:

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Item 19

Write the spelling word you heard:

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Item 20

Write the spelling word you heard:

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Item 21

Write the spelling word you heard:

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Item 22

Write the spelling word you heard:

_____