Name: _____ Teacher: _____ School: _____
Grade 3: Lesson 9

Rise to the Challenge
By Dr. Rhea Seddon with Jess-Anna Bornemann

Part One: Preparation

1. Figure out what is wrong with the patient.
2. Decided which medical tools to use.
3. Take action!

As a young doctor working in emergency rooms across the South, I learned to perform these three steps within seconds. To save my patients' lives, I had to stay calm and think fast. But on April 13, 1985, I found myself in a new situation. I was aboard the space shuttle *Discovery,* 25,000 miles from home. My "patient" was a huge, broken machine. My tools were whatever items I could patch together with tape. I had finally reached my goal of becoming a doctor and an astronaut. But was I ready to deal with an emergency in space?

The odds of me going into space were quite slim. I was one of 6,000 people who applied to join NASA in 1977. For the first time, both men and women were being considered for jobs as astronauts. However, only thirty-five of us would make the cut. During my childhood in Murfreesboro, Tennessee, I had imagined becoming a doctor on a space station. At age thirty, I had earned my medical degree. I was halfway there! Now there was a chance, however small, to make the rest of my dream come true.

I got the phone call early in the morning on January 16, 1978. NASA's head of flight operations offered me the job. "Do you still want to join us?" Of course I did! I found out that twenty-nine men and six women had been chosen. I would be Tennessee's first female astronaut. What an honor…and what a challenge!

Before I would be allowed to soar above Earth, I had to graduate from a two-training program. We trained at Johnson Space Center (JSC) in Houston, Texas. Each day, my brain was packed with as much information as it could hold. In one class, I had a lesson from Neil Armstrong, the first person to walk on the moon.

My muscles were tested, too. I was taught how to fly a small jet and use a parachute. I did scuba training in a giant pool, as practice for a possible spacewalk. At five feet two, I was the shortest of my NASA classmates. Most of NASA's materials weren't designed for someone my size. In earlier years, all astronauts had to be at least five feet six. The orange suits that astronauts wear during launch and landing weigh nearly eighty pounds. Walking in my suit was almost like carrying around another person! Yet no matter how sore or tired I became, I never once thought of complaining. I wanted to prove that women and smaller people could become great astronauts. Each day of training brought me closer to a space voyage**.**

The hard work paid off quickly. NASA decided to end our training after only one year. I wanted to climb aboard a space shuttle right away, but it would be nearly six more years before my first trip. In the meantime, I was given project that would help other astronauts. Some of the projects drew on my background as a doctor. For example, I helped design medical kits that would be flown on shuttles.

Other work involved things that were completely new to me. I spent months testing the computers that fly space shuttles, and learning how science experiments are prepared for flight. I also worked with a team trying to improve astronauts' meals.

Many foods taken into space are powdery and dry, like the food you might take on a camping trip. At mealtime, astronauts add water to food. My task was to help find which foods would be healthy, tasty, and easy to prepare in space. We learned that strawberries worked well as a space food. Asparagus wasn't bad either, but you had to put the right amount of water in it. Who wants each crunchy, dry asparagus?

Before my first space trip, I married my NASA classmate Robert "Hoot" Gibson. Hoot and I had our first son, Paul, in 1982. The next year, my classmate Sally Ride became the first American woman in space. I was very proud of Sally, who had become a good friend. I was excited, too, because I knew my turn would come soon.

Part Two: Liftoff

My wait ended at last on April 12, 1985. I boarded the shuttle *Discovery* on a cloudy morning with six crewmates. None of us had packed much for our trip. NASA gave us our clothes and food.

If you ever go to a shuttle liftoff, I hope you remember you earplugs! The roar of the engines and rockets can be heard from miles away. To protect their ears, astronauts wear helmets. The helmets also have headsets, which are used to keep in touch with mission control in Houston. Mission control plays a major role during every spaceflight by tracking the shuttle as it moves.

Reaching space takes only about eight and half minutes. When the shuttle's two boosters fire and the three main engines light up, it is one amazing ride! After two minutes and thirty seconds, the *Discovery's* boosters popped off with a bang. During that time, I listened closely to mission control.

I had faith that the engines would hold together and work correctly. My biggest fear was failing in my work and letting NASA down.

Six minutes later, at 200 miles above Earth and going 17,500 miles per hour, the engines cut off. Our crew waited excitedly to feel weightlessness and hear our commander say, "Welcome to space!"

Part Three: The Mission

Our main job on this mission would be to launch two satellites**.** Satellites are machines that share information over thousands—even millions—of miles. They allow people on Earth to have television, radio, and the Internet. Like most machines, satellites have "on" and "off" switches. Our two satellites were supposed to flip on once we released them into space. Nothing to it, right?

Not exactly. When you're many miles above Earth, nothing is as simple as it might seem. One satellite worked. Unfortunately, the other wouldn't turn on. We couldn't leave the broken satellite without try to fix it. Now was the time to think like a doctor and put my surgery skills to use.

To move the "on" switch on the side of the satellite, we would need a hand. This wouldn't be a human hand, but a set of tools. First these tools would be attached to a long, robotic arm. I could control the

arm from inside the shuttle and use the hand to knock the switch into the "on" position. In the 1980s, mission control was not yet able to send videos and pictures to astronauts. They could only send words through a special printer on the shuttle. Using the letters of the alphabet to create shapes, they drew a rough picture of the tools we needed. One piece looked like a stick with a pouch. The other was kind of like a flyswatter. We already had the first pieces, but it was up to us to put together the space flyswatter. Time for a scavenger hunt….

In the front of the shuttle, we kept a thin, metal tube, useful for pressing switches when we were in our seats. It might work as the flyswatter's handle. What about the "swatting" piece? Plastic book covers had the right shape. I started sewing the covers together, using the needle that we kept to fix space suits. I'd stitched up plenty of patients after surgery. How much harder could this sewing job be?

Making our flyswatter was the first part of the puzzle. Next we needed to fasten our tools to the end of the arm. It had not been NASA's plan for anyone to go outside of the shuttle on this trip, but we didn't have much choice. My crewmates David Griggs and Jeff Hoffman, who had trained a great deal for space walks, went out into the darkness. Carefully, they strapped the hand to the end of the arm. Once they had safely returned, I began operating the arm.

Bo Bobko, our commander, and pilot Don Williams flew close to the broken satellite. After a few heavy swats, we could see that the switch was in the "on" position. Success! We waited for the machine to buzz into action, but…nothing happened. Nobody wanted to give up. Yet we knew we had other important jobs to do. Mission control said we had to move on. On a later shuttle trip, the satellite would be retrieved by another crew, rewired, and sent on its way.

With our satellite work over, we could start playing around with the many experiments we'd brought on board. I do mean "playing"! A museum in Houston had given us a bunch of toys to bring along so we could see how they acted in space. Each crew member got to test a couple of toys. I picked a metal spring toy and jacks. On Earth, a metal spring toy will arch when it's stretched. In space, it stayed perfectly straight. Without gravity's help, the metal spring toy couldn't "spring." The jacks didn't behave normally either. When I opened my hand to drop them, they flew everywhere!

Other experiments were on the more serious side. Using a machine like an X-ray, we took pictures of our hearts. From these images, we could see how blood pumps in space. My crewmate Senator Jake Garn, the first politician in space, did tests to help understand why space travelers sometimes get motion sickness. Charlie Walker, an engineer, looked at how some chemicals act differently than other in weightlessness.

The *Discovery's* trip was supposed to last only five days, but NASA gave us a full week to finish our experiments and relax a little. On a typical morning, we all awoke from our sleeping bags, which were tied to the walls of the shuttle. Sleeping was never too difficult, since I was usually worn out by the end of the day. Our biggest obstacle to a good night's sleep was the noisy space toilet! Next came breakfast. Eating was always an adventure. Often we had mealtime perched on the ceiling instead of the floor. When you're floating, who's to say what's "up" or "down"? I liked to toss chocolate candies across the shuttle and gobble them up in a row. Once we had eaten, we began our work for the day.

Part Four: Landing

On April 19, our commander and pilot fired our onboard engines, and we headed back to Earth. As we sped back into the atmosphere**,** the rush of air against the shuttle created enormous heat. Through the window, I could see giant flashes of light. No Fourth of July fireworks show could possibly match this display. In total awe**,** I watched for as long as I could. Finally our commander asked everyone to strap into his or her seat.

We flew halfway around the world before we touched down in Florida. As the *Discovery's* tires hit the runway, we all heard a loud bang. "What was that?" we asked one another. Was it just the sound of the brakes releasing? Had something broken? Any small error could send us splashing into the water surrounding the runway. We found that the shuttle had blown a tire, but we were not in any danger. I had made it home, where my family was waiting to greet me.

Back at Johnson Space Center, other astronauts asked if my crewmates and I were upset about the broken satellite. I told them no—I was already county the days until my next flight.

Epilogue

Dr. Seddon spent nineteen years at NASA. In 1986, she had joined a team of astronauts to find out what caused the shuttle *Challenger* to explode. This deadly accident had killed all seven of the shuttle's crew members. In 1991, she made her second shuttle mission aboard the *Columbia.* On that mission, she helped research how astronauts could travel to Mars. On her last space journey in 1993, Dr. Seddon studied how rats adapt to weightlessness. In total, Dr. Seddon spent more than 722 hours in space.

Dr. Seddon and Hoot Gibson have four children. They now live in Murfreesboro, Tennessee.

Guided Practice: Key Details Chart

The first two lines have main events from the lesson before today's lesson.

Key Details Chart:
Rhea Seddon got her medical degree when she was thirty years old. She was preparing for her dream to be a doctor on the space shuttle.
Then in 1978 she was offered a job as an astronaut for NASA. First she had to go to training school to prepare to be an astronaut and take a voyage into space.

Independent Practice:

Directions: Using your Key Details chart, write a summary of the main events in our story about Dr. Rhea Seddon. Please add the vocabulary words mission control, satellite, booster, retrieve/retrieved, and makeshift as you write. Also, add how our memoir author responded to the main events.