

## Nonfiction Reading Comprehension Test 7

### Kevlar

**Directions:** Read the following passage and answer the questions that follow. Refer to the text to check your answers when appropriate.

Did you know that there is a fiber that is as flexible and lightweight as nylon yet five times stronger than steel? Did you know that this fabric is resistant to temperatures higher than 500 degrees Fahrenheit? Did you know that a woman invented this fiber? This miraculous fabric is called Kevlar and it is used to make everything from body armor to musical instruments.

The year was 1964. There were gasoline shortages due to conflict in the Middle East. A Polish-American chemist named Stephanie Louise Kwolek was working for DuPont, an American chemical company. She and her group were trying to make a lightweight, yet durable fiber to be used in tires. Lighter tires would allow vehicles to get better gas mileage, but the tires had to be strong enough to resist the wear and tear of the road. They had been working on the problem for some time and had little success, until Kwolek had a breakthrough.

Kwolek and her group were synthesizing or creating fibers to test. During one of the steps in the process, Kwolek created a milky white solution by mixing two chemicals that were often used in the process. This solution was usually thrown away, but Kwolek convinced one of the technicians to help her test it. They were amazed to discover that the fabric that Kwolek had created was not only more durable than nylon, it was more durable than steel. Kwolek had invented Kevlar.

Kevlar is a remarkable fabric known for its strength and durability. Since its invention it has found its way into a wide variety of products. Kevlar is used in sporting equipment like bike tires, bowstrings, and tennis racquets. It is used in musical instruments like drum heads, reeds, and speaker cones. And it is used in protective gear like motorcycle safety jackets, gloves, and shoes. However, Kevlar is best known for its ability to stop bullets.

Richard Armellino created the first Kevlar bulletproof vest in 1975. It contained 15 layers of Kevlar, which could stop handgun and shotgun bullets. The vest also had a steel plate over the heart, which made the vest strong enough to stop rifle rounds. Vests like Armellino's were quickly picked up by police forces and it is estimated that by 1990, half of all police officers in America wore bulletproof vests daily. By 2006 there were over 2,000 documented police vest "saves," or instances where officers were protected from deadly wounds by wearing bulletproof vests.

Kevlar is an amazing fabric not only for its hardness and durability, but also for its heat resistance. Because of this it has been used to replace asbestos. Asbestos is a naturally occurring material that is known for its ability to resist fire. Asbestos can resist temperatures over 1000 degrees Fahrenheit. For this reason it was used in roofs, electrical cables, and brake pads, until people discovered that it causes cancer and other serious health problems. Kevlar poses no such risks. It is lightweight, flexible, and resistant to fire. Therefore, it has proven to be a good replacement for asbestos in many cases.

Since its invention in 1964, Kevlar has won its way into our lives. From musical instruments and brake pads to protective equipment and sporting gear, Kevlar is everywhere. Every day of your life you are exposed to something that was made better by Kevlar. Who'd have known?

1. Which of the following is **not** a product that has been made with Kevlar?

- a. Tennis racquets
- b. Bungee jumping cords
- c. Brake pads
- d. Body armor

2. When was the first bulletproof vest invented?

- a. 1964
- b. 1975
- c. 1990
- d. 2006

3. For which of the following characteristics is Kevlar known?

- a. Heat resistance
- b. Strength
- c. Durability
- d. All of the above

4. Who is credited with inventing Kevlar?

- a. Robert Kevlar
- b. Richard Armellino
- c. Stephanie Kwolek
- d. None of the above

5. Which of the following caused the search for a fabric like Kevlar?

- a. A shortage in the gasoline supply
- b. A desire to protect police officers
- c. The need to replace asbestos
- d. The want of better musical instruments

6. A vest made of 15 layers of Kevlar with **no** steel plates could stop **all but which** of the following rounds?

- a. Handgun rounds
- b. Shotgun pellets
- c. Rifle rounds
- d. It could stop all of the above

7. Why did people begin using asbestos in buildings?

- a. It was extremely durable
- b. It was very heavy
- c. It was poisonous to insects
- d. It was resistant to fire

8. According to the article, how many American police officers are estimated to wear bulletproof vests daily?

- a. 1,000
- b. 2,000
- c. Over half
- d. Almost all of them

9. How much stronger is Kevlar than steel?

- a. Half as strong
- b. As strong
- c. Five times as strong
- d. 200 times as strong

10. What product was Kwolek trying to improve when she invented Kevlar?

- a. Tires
- b. Milk
- c. Brake pads
- d. Armor