Joseph, saying to Sandra: "Girls don't do science. That's man's work. Sandra replies, "So little you know. Have you never heard of Madame Curie, who won two Nobel Prizes, in two different areas of science?"

In their own way, both Joseph and Sandra are right. Sandra is right in that girls do become scientists, even very famous scientists. You are about to read about one of them who is famous and still working today. But Joseph is right in that historically there have not been many female scientists. The reason is that human culture in the past did not encourage females to work outside the home—in any field of endeavor. A huge change occurred during World War II in the United States, where the war required so many men to fight the war that without women in the workforce there would be nobody to run the businesses and factories. You can read about this interesting stage in history on a web site about a typical female factory worker, "Rosie the Riveter." After the war, everybody had discovered the great value of women in the workforce, and now it is common for women to work outside the home, including working as a scientist.

Meet the Scientist,

Jane Goodall

1934-to the present

Jane was born in London, England in 1934, and has a younger sister. Her father was an engineer, and her mother was a successful novelist. Jane's interest in and love for chimpanzees began when she was two years old. Her mother had given her a stuffed toy chimpanzee, and Jane still has it to this day. All throughout her childhood, she had a special interest in being outdoors and learning about animals. Once she spent five hours in a hen-house so she could see how a hen lays an egg. By the time she was ten or eleven, she had a dream of going to Africa to live among its animals. Her mother encouraged Goodall's dream, and Jane eventually made the dream come true.

Figure 1 Jane Goodall in 2019

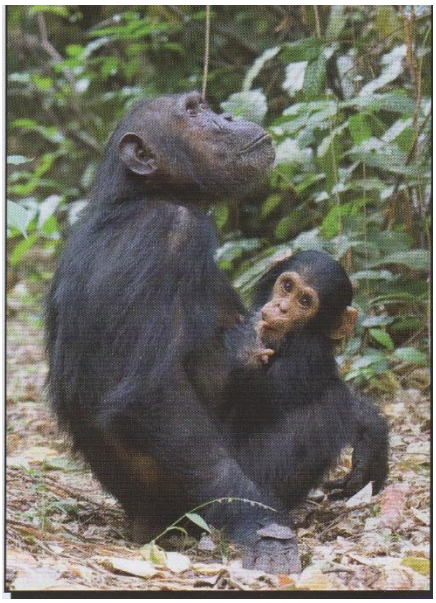

Figure 2. Mother chimp and infant.

Jane knew that her dream required some financial support. How could she get paid to live with and study wild animals? Her first steps after graduating from what we call high school were to work in England in such jobs as a secretary, an assistant editor in a film studio, and as a waitress, trying to save enough money to make her first trip to Africa. By the time she was 23, she had enough money for the trip. Once in Africa, she made it a point to meet the famous anthropologist, Louis Leakey. At that time, Leakey and his wife, Mary, had become famous for discovering what were then the oldest known pre-human remains.

Leakey shared Jane's interest in primates like apes, chimpanzees and orangutans, because as the closest relatives to humans, their behavior might help him to understand the social life and behavior of early humans. Leakey hired Jane to study chimps. At the age of 26, she began her career at the Gombe National Park in southeastern Africa to begin a study of the chimpanzees that lived in the forests along the shores of Lake Tanganyika.

At the time, she had no college training. Her assets were her passion for chimps, her kindness toward them, her patience in gaining their trust, and her observational and interpretation skills. Leakey originally hired her as his secretary and invited her to participate in a dig at a famous site with many fossil remains of prehistoric humans at the famous Olduvai Gorge. Leakey liked her work and her temperament, but knew that her research would benefit from formal training. So, he arranged in 1962 for her to work on a doctorate in animal behavior (ethology) at Cambridge in England. At the time, she was only one of eight people ever to receive a PhD from Cambridge without an undergraduate college degree. Years later, based on her research, Cambridge awarded her an honorary Ph.D.

Figure 3. Country where her jungle studies were done.

She developed now-accepted techniques for studying animals in the wild. She was patient and non-threatening, gaining the trust of chimps. In the process, they allowed her to see them, individually and socially, as they really were in their natural habitat.

Her first attempts to study chimps failed, because wild chimps are afraid of humans. The first chimp tribe she tried to study wouldn't let her get nearer than 500 yards. Imagine how difficult it would be to study individual chimp behavior if you were at one end of a football field and the chimps were almost two football fields away. She sought out another tribe, and this time was careful to present a non-threatening pattern of observation at their feeding time in the morning. Within a year, these chimps would let her get as close as thirty feet, and in fact often came to her to beg for bananas. She mimicked their behavior, ate what they ate, even got up in the trees with them. Eventually, she gained their trust, becoming almost an adopted member of the tribe.

In her work with chimpanzees, it was important for her to learn how to recognize each individual in the tribe so she could recognize their personality and social interactions. She was handicapped in this task because she had the mental disability of prosopagnosia, which makes it difficult to recognize familiar faces.

Among the things she discovered was that chimps:

- Had a language of about 20 distinct sound.
- Touch and embrace each other to provide comfort.
- Have a dominant male leading the tribe, with others socially ranked in a caste system.
- Develop family bonds.
- Stalk, kill and eat large insects, birds and some bigger animals, including baby baboons and bushbacks (small antelopes), which they eat upon capture.
- Make tools.
- Use stones as weapons.

In her years of living with chimps, she realized how fragile their existence was because they were so dependent on their habitat. They were utterly dependent on trees for shelter and protection against predators and on various plants for food. They are threatened by humans who destroy their habitat and some even kill them to eat. They capture them for medical research and for display in zoos.

Figure 4 Jane teaching U.S. students about wetland ecology. By William Waterway - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=18457292

Her passion for chimps led her to create the Jane Goodall Institute Foundation to protect chimpanzees and their habitats. The foundation has offices in 19 countries, all raising funds for nature conservation programs in Africa. She also supports a youth ecological education program that now has over 10,000 groups in over 100 countries.

Goodall outlined the moral dilemma of keeping chimpanzees captive in her 1990 book, *Through a Window* and led movements to prevent their use in medical research. While use of chimps in research has been greatly reduced, they are still needed in small numbers because their biology is so closely the same as

our own species. Our DNA differs only by about one percent from that of chimps.

Some critics of her research claim that she was not objective, because she was insufficiently detached emotionally from her subjects. They accuse her of anthropomorphism, which means ascribing human characteristics to nonhuman animals. But just how nonhuman are chimpanzees?

Figure 5 Jane with Hungarian students in her conservation program. Photo credit: By Csigabi - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=8335139

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