ENGINEERING: A CAREER FOR ALL

In this week's Teacher's Corner, students learn about the work of women in engineering and math. Encouraging more girls and young women to join these professions begins in the classroom by challenging negative stereotypes of the role of women in science.

LEVEL

Intermediate

LANGUAGE FOCUS

Reading, speaking (primary focus); listening (secondary focus).

GOALS

During this activity students will do the following:

- Practice reading skills through a reading activity

- Develop presentation and speaking skills through a poster presentation

MATERIALS

- Teacher: whiteboard/chalkboard, markers/chalk, colored pencils or markers, large sheets of paper (optional)

- Students: pencils or pens, notebooks or writing paper

PREPARATION

1. Read through all the materials carefully.

2. Print out copies of "From Computers to Leaders: Women in Science" in Appendix 1. Print one copy for each student in the class.

ACTIVITY PART ONE: READING FOR CONTEXT

1. Begin the activity by giving each student a copy of the reading "From Computers to Leaders: Women in Science" in Appendix 1.

2. Have the students read the information on their own for 2-3 minutes. As students read, encourage them to be active readers by underlining or circling any words or ideas they do not understand.

3. After the students have had a chance to read the information, check their understanding by asking the following questions:

    a. Who are the main persons of focus in this reading? (Answer: *Katherine Johnson and Limor Fried*)

    b. Where did Katherine Johnson work? (Answer: *NASA*)

    c. From what school did Limor Fried graduate? (Answer: *Massachusetts Institute of Technology (MIT)*)

    d. What is the most interesting information you learned in the reading?

4. After checking the students' understanding, have them form pairs.

5. Next, have the pairs write down each of the words in **bold** from the reading and write a definition for each of the words. Encourage the students to use the context of the reading to write the definitions of the words.

6. After the pairs have written their definitions, have them join with another pair. In this larger group, have them compare their definitions to see how similar or different they are.

7. Review the definitions of the words as a class.

    a. **Note:** The definitions in Appendix 2: Reading Activity Definitions should be taken as guidelines since students' definitions may vary in wording depending on their level.

8. Finish this part of the activity by having students write sentences using the word they just defined. Have the students work in their pairs to write new sentences about the reading using these new words. Make sure to remind students that they can use the sentences from the

reading to help them, but that they must write their own original sentences to show that they understand well.

9. For extra speaking practice, have the pairs share their new sentences with the class.

ACTIVITY PART TWO: ENGINEERING POWER

1. After reviewing the new sentences with the students, you could ask the class one or more of these questions:

    a. Do you know any engineers? What can you tell us about their jobs?

    b. Would you like to be an engineer like Katherine Johnson and Limor Fried?

2. Have the students list the types of careers that are possible by studying engineering and math.

3. Have students work in groups to discuss the following questions:

    a. What skills are necessary for engineers?

    b. How can each of us develop our skills in this area?

    c. In our community, do we typically see men in this career or women? Why do we think that is the case?

    d. What do you think could be done so that more women and men pursue careers in this field?

4. As a class, discuss students' answers to these questions.

5. Finally, have the pairs take out a clean sheet of paper.

    a. **Note:** If possible, provide the pairs with large sheets of poster paper.

6. Have the students choose one of the ideas they brainstormed and draw a picture representing it on the sheet of paper.

    a. For example students could draw posters of women working in laboratories, programming computers, or as astronauts on the moon!

7. Once all the pairs have created their poster, have them share their posters with the class for additional speaking practice.

For more information on bringing engineering into the English classroom, check out Teaching English for Science and Technology: An Approach for Reading with Engineering English. For more on women in the sciences, check out Grace Hopper and the First Computer Language. Finally, for more on critical reading in the classroom, check out Encouraging Critical Reading in the EFL Classroom.

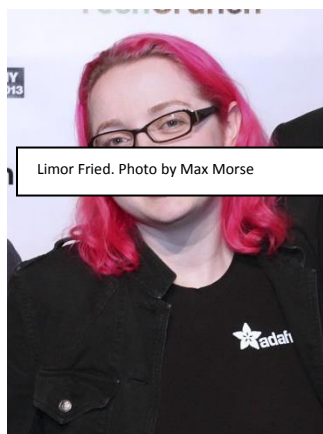**Appendix 1: From Computers to Leaders: Women in Science**

Directions: Read the information below. After reading the information, work with a partner to define the words highlighted in **bold**.

When we think of computers, we think of machines. However, the word computer means something that **calculates**. In the past the word computer was used as a name for people who did math, often using pen and paper. Many of these people were women.

Katherine Johnson, NASA employee, mathematician and physicist, in 1966 ©NASA

One of the most important early computers was Katherine Johnson. Johnson worked for the National Aeronautics and Space Administration, or NASA, where she calculated spacecraft flight paths. At first she was kept from doing engineering work because many people believed that women could not do scientific work. When some people at NASA saw her talents in math and physics, they asked her to help the flight teams preparing to send **astronauts** to space. In fact the first American in space, Alan Shepard, said he would not travel to space until Johnson had checked the math calculations. Katherine Johnson was a **pioneering** woman working in mathematics and engineering and encouraged opportunities for more women in engineering.

Limor Fried. Photo by Max Morse

A modern example of a woman who does **innovative** work in math and engineering is Limor Fried. Fried graduated with a degree in electrical engineering from the Massachusetts Institute of Technology. As a student she started her own electronics company where people can buy electronic and computer parts and learn how to build their own digital tools. She creates **do-it-yourself**, or DIY, projects so that anyone, especially girls and young women, can learn how to create and control technology. While most people today no longer do calculations on pen and paper, they are actively working to create the computers of tomorrow.

Appendix 2: Reading Activity Definitions

1. Calculate (verb) – To determine the amount or number of something using mathematics

2. Astronaut (noun) - A person trained to command, pilot, or serve as a crew member of a vehicle that travels to space

3. Pioneering (adjective) – Working that involves new ideas or methods

4. Innovative (adjective) - Featuring new methods that are original

5. Do-It-Yourself (adjective)– This describes work that is done at home or by non-professionals