ScienceNews

Activity Guide for Students: Diversity in Science

Directions:
The focus of this activity is diversity and what it means in STEM. Your teacher will assign you two *Science News* articles to read. Then, you will evaluate your class textbook to determine its level of diversity, discuss the research of two Nobel Prize winners and how the researchers' work might be described in future textbooks. For the final task, you will do research on an early woman in STEM and give a presentation about her to your class.

Class discussion about diversity
Discuss these four questions as a class.

1. What is the problem highlighted in the online *Science News* article "College biology textbooks still portray a world of white scientists," and what is a proposed solution?

2. How do you define diversity in general and in STEM fields?

3. How diverse do you think STEM fields are, now compared with the past and how is that diversity presently being represented?

4. Name one factor that would encourage you to pursue a STEM career.

Analyzing diversity in science textbooks
With a partner or small group, review one chapter of your science textbook. Look for the names of scientists in the text and for people depicted in the illustrations. Take care to check every scientist mentioned because science textbooks often mention only last names for major discoveries. For example, the Hershey-Chase experiment, which confirmed that DNA carried genetic information, was conducted by Alfred Hershey and Martha Chase.

Make a tally of how many men and women are listed, and how many of the scientists are white and how many are scientists of color. Record your group's results in the table. Use the numbers in the table to calculate the percentages for each category. You will need to know the total number of scientists mentioned in the chapter to calculate percentages. This information will be shared with the class.

Your group's data and the data from the other groups can then be combined to calculate representation in the whole textbook. Your class can then determine how the findings compare with those reported in the online *Science News* article "College biology textbooks still portray a world of white scientists." A version of the story, "Biology textbooks don't reflect the field's diversity," appears in the September 26, 2020 issue of *Science News*.

Small group data

	White scientists	Scientists of color	Combined totals
Male scientists			
Female scientists			
Combined totals			

From your tallies in the table, calculate and record the representation percentages for

Scientists of color:

White scientists:

Male scientists:

Female scientists:

Female scientists of color:

Male scientists of color:

White female scientists:

White male scientists:

Class data

	White scientists	Scientists of color	Combined totals
Male scientists			
Female scientists			
Combined totals			

From your tallies in the class table, calculate your entire textbook's representation percentages for

Scientists of color:

White scientists:

Male scientists:

Female scientists:

Female scientists of color:

Male scientists of color:

White female scientists:

White male scientists:

Class discussion about the winners of the 2020 Nobel Prize in chemistry
After you read the online *Science News* article "Gene-editing tool CRISPR wins the chemistry Nobel," your class will discuss the broader role of women in STEM, as well as how the important work done by researchers Jennifer Doudna and Emmanuelle Charpentier may be described in future textbooks. Be prepared to answer the following questions during the discussion. A version of the story, "2020 Nobel laureates announced," appears in the November 7, 2020 issue of *Science News*.

1. Two women make up the team that discovered CRISPR. When do you think women started playing a major role in STEM and why?

2. How do you think future textbooks will describe CRISPR? How will that treatment compare with the discussions of other accomplishments in your textbook?

3. How do you expect future textbooks and news organizations to represent diversity in STEM?

Research and report on women in STEM

Review the list of early women in science-related fields. You will be assigned an era and asked to research a woman listed from that period. If you cannot find enough information about one woman, you may present on two different women from the same era. You also may choose another suitable person who is not listed with your teacher's permission. Research this person and prepare a presentation that answers the following questions.

1. Who is your person, when and where did she live, and what did she do?

2. What resources helped her succeed?

3. What challenges did she face in both her work and in communicating her results?

4. In what ways was she typical of other scientists of her era?

5. Why do you think you may not have heard of this person before? For example, was her contribution overlooked; did authorities object to her work; did another person receive the credit?

6. How do you think her career might have progressed if she were active in her field now?

7. The first Nobel Prize was awarded in 1901. If the Nobel Prize had existed when this scientist was alive, do you think her work would have been recognized? Why or why not?

Early women in STEM

Before 900 CE
Peseshet, physician
Tapputi, chemist
Theano of Crotone, mathematician
Aglaonice of Thessaly, astronomer
Mary the Prophetess, alchemist and chemist
Hypatia, astronomer and mathematician
Cleopatra the Alchemist, chemist
Aspasia the Physician, physician

901 to 1500 CE
Hildegard of Bingen, natural historian
Zulema L'Astròloga, astronomer
Guillemette du Luys, surgeon
Peretta Peronne, surgeon
Keng Hsien-Seng, alchemist
Mariam al-Asturlabi, astronomer
Dobrodeia of Kiev, physician
Trota of Salerno, physician
Adelle of the Saracens, physician

1501 to 1600 CE
Isabella Cortese, alchemist
Loredana Marcello, botanist
Caterina Vitale, pharmacist and chemist
Sophia Brahe, horticulturalist, astronomer and chemist
Catherine de Parthenay, mathematician
Agatha Streicher, physician
Tan Yunxian, physician

1601 to 1700 CE
Louise Boursier, midwife
Martine Bertereau, mineralogist
Maria Cunitz, astronomer
Marie Meurdrac, chemist and alchemist
Margaret Cavendish, scientist
Marguerite de la Sablière, mathematician
Jeanne Dumée, astronomer
Elisabeth Hevelius, astronomer
Maria Clara Eimmart, astronomer
Maria Sibylla Merian, naturalist and entomologist
Agnes Block, horticulturalist
Elisabeth of the Palatinate, mathematician
Eleanor Glanville, entomologist
Mary Somerset, botanist
Justine Siegemund, physician
Jane Sharp, midwife
Marie Crous, mathematician

1701 to 1800 CE
Wang Zhenyi, astronomer
Maria Margaretha Kirch, astronomer
Laura Bassi, physicist
Émilie du Châtelet, mathematician and physicist
Eva Ekeblad, agronomist
Jane Colden, botanist
Anna Morandi Manzolini, anatomist
Nicole-Reine Lepaute, astronomer
Geneviève Thiroux d'Arconville, anatomist
Claudine Picardet, chemist, mineralogist and meteorologist
Marie-Anne Paulze Lavoisier, chemist
Elizabeth Fulhame, chemist
Caroline Herschel, astronomer
Margaret Bryan, natural philosopher

1801 to 1850 CE
Orra White Hitchcock, botanist and scientific illustrator
Huang Lü, astronomer
Lady Hester Stanhope, archaeologist
Sophie Germain, mathematician and physicist
Mary Anning, paleontologist
Elisabetta Fiorini Mazzanti, botanist
Jeanne Villepreux-Power, marine biologist
Mary Somerville, mathematician, astronomer and science writer
Etheldred Benett, geologist and paleontologist
Ada Lovelace, mathematician and computer scientist
Maria Mitchell, astronomer
Margaretta Morris, entomologist
Almira Hart Lincoln Phelps, science educator
Marie-Anne Libert, botanist

1851 to 1900 CE
Kadambini Ganguly, physician
Rupa Bai Furdoonji, physician and anesthetist
Marie Durocher, obstetrician
Rebecca Lee Crumpler, physician
Rebecca Cole, physician
Josephine Silone Yates, chemist
Florence Nightingale, statistician and nurse
Thereza Dillwyn Llewelyn, astronomer
Katharine Murray Lyell, botanist
Ellen Swallow Richards, environmental chemist and industrial engineer
Julia Lermontova, chemist
Mary Treat, naturalist
Agnes Pockels, chemist
Mary Emilie Holmes, geologist
Dorothea Klumpke, astronomer
Christine Ladd-Franklin, psychologist, logician and mathematician
Florence Bascom, geologist

Margaretta Palmer, astronomer
Marion Bidder, physiologist
Katharine Foot, cytologist and zoologist
Marcia Keith, physicist
Edith Anne Stoney, medical physicist