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# WHERE ARE THE WOMEN IN MATH AND SCIENCE?

Word Generation - Unit 1.02

## Focus Words

context | indicate | variable | create | benefit

## Weekly Passage

The former president of Harvard University upset many people when he explained why he thought there were fewer women than men in math and science jobs. He suggested that women may have less natural talent in these areas. He also argued that women spend more time with their families and fewer hours at their jobs than men do.

Why are women who enter careers in science and math more likely to leave than men? Many people argue that ability and family commitment have nothing to do with it. They think that the educational context in which students learn math and science plays an important role. For example, women in science, math, and engineering programs reported on a survey that their professors favored male students and preferred men's learning styles. Other studies show that in a typical science or math classroom, teachers call on male students more often.

Research indicates that men also respond to questions more confidently, quickly, and aggressively. Women say that, if called on at all, they are interrupted more often than men. Might social conditions like these create a context that

drives women away from careers in the math and science fields? Some think that the most important variable affecting math performance is expectations. Both girls and boys benefit from teachers who believe in their math abilities and expect them to do well.

Why do you think there are more male scientists and engineers than female? Should something be done to promote gender equality in these fields? If so, what?

### TEACHER

#### Reading Comprehension/Discussion Questions:

- ▶ What reasons did the president of Harvard University indicate as possible explanations why there are fewer women in math and science jobs? How did people react?
- ▶ What sometimes happens in the context of math and science classrooms to encourage boys and discourage girls?
- ▶ How might parent and teacher expectations benefit both girls and boys in math and science classes?
- ▶ What are some of the variables that might affect whether or not girls pursue careers in science?

## Unit 1.02

# Where are the women in math and science?

## Focus Word Chart

Word	Meaning	Forms			Related Words
		Inflectional	Basic Word Classes	Prefixes/ Suffixes	
benefit	(v.) - to gain, to be helped	benefits benefiting benefited benefit (n.)		beneficial unbeneficial beneficent benefactor	
context	(n.) - situation; environment	contexts (pl.)		contextual contextualize recontextualize decontextualize	text
create	(v.) - to make; to build	creates creating created		creation recreate creator creative creativity	
indicate	(v.) - to show; to demonstrate	indicates indicating indicated		indicative indication index indican indicatory contraindicate	predicate
variable	(n.) - factor, quality that changes or varies	variables (pl.)	vary	invariably variable (adj.) variability variably	variant variation variety invariant

# Where are the women in math and science?

## Problem of the Week



**Option 1:** Different students learn better in different educational **contexts**. One **variable** that affects the educational context is a teacher's gender. Some studies say female students **benefit** from having female teachers. However, in middle schools and high schools, many math and science teachers are male. In colleges, many math and science departments are made up of mostly male professors. For example, only 2 of the 26 senior professors in the Harvard University math department are women.

**Part 1:** What fraction of Harvard's senior math professors are women? **Indicate** your answer below.

A)  $\frac{3}{13}$

B)  $\frac{2}{13}$

C)  $\frac{1}{13}$

D)  $\frac{3}{26}$

**Part 2:** There are many fractions equal to the fraction you chose in Option 1. **Create** a list of these fractions. Could a larger department with many more professors have an equal fraction of women?

Answer: Yes

**Option 2:** If math and science departments hire more female teachers, will these traditionally male **contexts** become more supportive of female students? Or are the **benefits** unclear? This is a complicated question about social relationships in education. Mathematically, we know that the percentage of women in any group depends partly on the number of women, and partly on the number of men. For example, a math department with two women and two men would be 50% female, while a math department with two women and eight men would be 20% female.

**Create** an algebraic equation that **indicates** the relationship between the number of women in a group, the number of men in the group, and the percentage of women in the group. Use the following three **variables**: Let  $w$  = the number of women in a group,  $m$  = the number of men in the group, and  $p$  = the percentage of women in the group.

Answer: 
$$\frac{w}{w + m} = p$$

**Math Discussion Question:** Lawrence Summers, the former president of Harvard University, suggested that math and science ability is partly determined by natural talent. A few studies have **indicated** that, while most men and women have equal math and science talent, men are more **variable** – they are more likely to be very bad or very good in these areas. Summers said he suspected that, based on natural talent, the top scientists and mathematicians would always be men. Later, he said his remarks were taken out of **context**. He said he supported the **creation** of special **benefits** to encourage women in math and science. He was just, he said, posing good scientific questions. What do you think about these remarks? Is it okay for a university president to suggest that most of the best scientists and mathematicians will always be men? Why or why not?

# Where are the women in math and science?

**Debating the Issue:** Why are there fewer women than men in these fields?



# GO!

Be a strong participant by using phrases like these.

## 1. Get ready...

Pick one of these positions (or create your own).

**A** The most important variable affecting whether someone goes into a career in math or science is interest, and boys are generally more interested in these subjects than girls.

**B** There are fewer women than men in math and science careers because girls do not have the benefit of high expectations and encouragement from teachers that boys have.

**C** The way girls are treated in math and science classes helps to create a context that discourages girls from pursuing scientific careers.

**D** There are fewer women than men in science and engineering careers because the way these subjects are taught does not highlight how using math can benefit people, which is something that girls often indicate is important to them.

**E** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*I believe that...*

*I agree with you because. . .*

*You make a good point, but have you considered...*

*Can you show me evidence in the text that supports what you said?*

## 2. Get set...

Be ready to provide evidence to back up your position during your class discussion or debate. Jot down a few quick notes:

\_\_\_\_\_  
\_\_\_\_\_

### TEACHER

Whatever the debate format, ask students to use academically productive talk when arguing their positions. In particular, students should provide reasons and evidence to back up their assertions. It may be helpful to read these sample positions to illustrate some possibilities, but students should be encouraged to take their own positions about the issue at hand.

## Unit 1.02

# Where are the women in math and science?

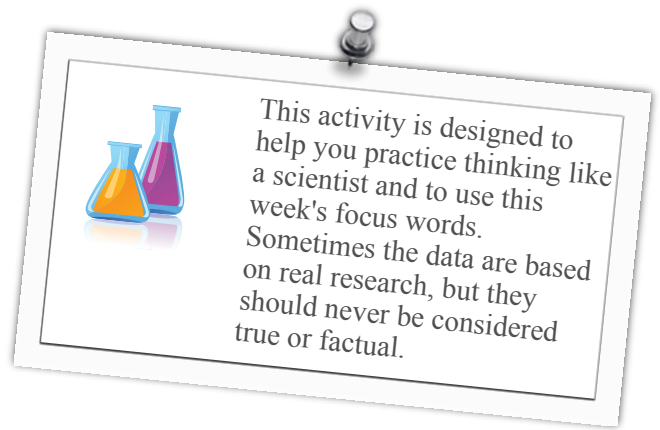
### Science Activity

Professor Kahn overhears the eighth grade English teacher in the hallway. "The boys in my class are such poor writers," she sighs. "Males are just worse than females at communicating their ideas."

"What?" Professor Kahn interrupts. "High expectations **benefit** students, but low expectations **create** a negative environment. No wonder your male students do poorly in that **context**!"

"But men are not as good at expressing themselves. It's a fact!" says the English teacher. "I just read the book *The Female Brain*. It **indicates** that women use 20,000 words a day, while men use only 7,000."

Professor Kahn wonders if this idea is right. The number of words that people use per day is a **variable** that she can measure by doing her own experiment.



#### Question:

Do women use more words per day than men?

#### Hypothesis:

Women and men use about the same number of words per day.

#### Materials:

- ▶ 100 females
- ▶ 100 males

#### TEACHER

##### Real Research

-This article, by linguist Mark Liberman, addresses The Female Brain's claim that men use 7,000 words a day compared to women's 20,000. Liberman can find no evidence to support this claim. He notes that other authors have made similar (and similarly unsupported) claims about women talking far more than men to illustrate some perceived difference between the genders. Liberman says that there aren't any reliable studies on the difference between the number of words men and women use in a day, but that most studies of word volume show either that men and women use the same number of words, or that men use slightly more words than women. Liberman predicts that a careful study of the number of words people use in a day would show that the difference between men and women is very small.

Liberman, M. (2006, September 24). Sex on the brain. The Boston Globe. Retrieved on November 4, 2009 from

[http://www.boston.com/news/globe/ideas/articles/2006/09/24/sex\\_on\\_the\\_brain/](http://www.boston.com/news/globe/ideas/articles/2006/09/24/sex_on_the_brain/)

**Procedure:**

1. For one week, ask all 200 subjects to record themselves and then count the number of words they use each day.
2. Calculate the average number of words that males and females used per day.

**Data:**

	Average Number of Words Per Day
Males	12,700
Females	12,650

**Conclusion:**

Is the hypothesis supported or not by the data?

Supported

What evidence supports your conclusion?

The average number of words is about the same. (The difference of 50 words is less than 1% of the total number of words.)

How would you make this a better experiment?

Encourage students to consider sample size, number of trials, control of variables, whether the procedure is a true measure of the question, whether the experiment can be repeated by other scientists, data collection and recording systems, and other potential explanations for the outcome. Students should understand that these simple experiments represent the beginning of an exploration, not the end. If time permits, have students suggest how the experiment could be strengthened, emphasizing the use of the target words in the discussion.



## Writing Prompt:

Should there be more women in math and science? Why are there fewer women than men in these fields?

Support your position with clear reasons and specific examples. Try to use relevant words from the Word Generation list in your response.

### Focus Words

context | indicate | variable | create | benefit

### A tool to help you think about your own writing!

Remember you can use focus words from any of the WG Units.

Check off what you accomplished:

#### Good Start

- ☐ Stated my own position
- ☐ Included 1 focus word

#### Pretty Good

- ☐ Stated my own position clearly
- ☐ Included 1-2 arguments
- ☐ Included 1-2 focus words

#### Exemplary

- ☐ Stated my own position clearly
- ☐ Included 1-2 arguments
- ☐ Included 1 counterargument
- ☐ Used 2-5 focus words

### TEACHER

Ask students to write a response in which they argue a position on the weekly topic.

Put the writing prompt on the overhead projector (or the board) so that everyone can see it. Remind students to refer to the word lists in their Word Generation notebooks as needed.

[illegible]