Women make up 45% of the workforce in the United States but only 16% of the science and engineering workforce.

(National Science Foundation, 1992)
Only 1/5 of advanced technology jobs are filled by females.
Though women receive over half of all bachelor's degrees awarded, they receive only one-fourth of the degrees awarded in natural sciences and engineering.

(American Association of University Women, 1992)
This shortage of women in mathematical, scientific, and technological fields presents a problem that we can no longer afford to ignore.

(AAUW, 1992)
Our workforce increasingly requires mathematical, scientific and technological proficiency, but women and minorities have not traditionally been attracted to these areas.
Research suggests that girls and women are systematically discouraged from courses of study in higher level mathematics and science.

(NSF, 1996)
Girls are underrepresented in general and advanced technology courses at every level.
To prepare females for an increasingly complex technological world, we must focus on recruiting and retaining women in mathematics, science, and technology, however,
retaining females in mathematics, science, and technology becomes a problem between middle grades in elementary school and high school.

(Sadker & Sadker, 1994)
Many girls lose interest in mathematics and science and also lose confidence in their ability to succeed in these areas.

(Sadker & Sadker, 1994)
In 1996 mean science scores on standardized test for male students were slightly higher than those for female students at ages 13 and 17, while there was no significant difference at age 9.

(NAEP, 1977)
• Females score lower on standardized tests such as the GMAT, LSAT, and MCAT.

• On the SAT, girls score 50 to 60 points lower than boys.
• On the ACT, girls score one point higher than boys in English, but lower in every other area.

• Girls also score lower than boys on the GRE; on the quantitative section, girls score 80 points lower than boys.
Only 17% of Computer Science AP exam takers are girls.

(girlstart, 2001)
In order to retain more females in mathematics, science, and technology, we must work to reduce this gap and encourage all students to persevere and succeed in mathematics and science.
Causes:

- Few role models - studies show that boys can simply hear about certain careers before they make decisions about their own careers.
Whereas, girls need to see females involved in certain fields before they can visualize themselves in the same roles.

Photo Credit: Remarkable Careers in Oceanography
Go to the site above.
View the pictures of doctors, nurses, paramedics, “x-ray technician,” “physics professor,” and “geology teacher.”
What messages could some students perceive?
• Girls are seen in only 1 in 7 textbook illustrations.

• Typically, girls receive about half as much teacher time and attention as do boys.
• Teachers and students usually attribute boys’ failure to lack of motivation, while girl’s failure is attributed to lack of ability.

• Gender defined toys

You & Me Doll and Action Man
Credits: Toys R Us.co.uk
Action: Do it now! Encourage young girls. They form ideas about science and technology as early as kindergarten.

(Kahle and Damnjanovic, 1997)

Photo Credit:
Nova Development Corporation, Art Explosion 525,000 Images, California, 1995-98
• Sponsor after school or weekend activities which focus on math, science, and technology.
• Provide hands-on tinkering activities.

(girlstart, 2001)

Photo credits Animation Central http://animation-central.com/
• Integrate computer use throughout the curriculum.

• Design your introductory courses to attract not "weed out."
Make the Grade in Fairness: Strategies for the Classroom

From Nightline: “Failing In Fairness”, Sadker, 1995 as summarized by girlstart, 2001
• Make a conscious effort to consider quantity and quality calling on female students.

• Ask girls as many *how* and *why* questions as you do boys.

• Videotape yourself!
Make sure students know procedures for managing themselves.

• Assign students to groups.
• Establish rules for participation.
• Rotate jobs within each group.
• Use gender-neutral language.
• Analyze curricular materials for bias and supplement as needed.
• Avoid stereotyping.  

Photo Credit: AAUW
Draw A Scientist

Optional Activity #2
Directions:

Take three to five minutes to make a drawing of a scientist.
Scoring:

Now examine your drawing. Assign One point for each characteristic. Remember, the higher the score, the higher the stereotype of a scientist. The lower the score, the less stereotypical the image.
Stereotypical Indicators of Science:

(0 to 6 points possible- low score is highest rating)

- eyeglasses
- facial hair
- male
- symbols of research- test tubes, flask, etc…
Stereotypical Indicators of Science, cont.’

Symbols of knowledge-books, filing cabinet

Pencils and pens in pocket protector

Un-kept appearance
The scientist has big square-shaped glasses and a big geeky nose with brown hair and blue eyes. I see a scientist working in a lab with a white lab coat... holding a beaker filled with solutions only he knows. Scientists are very interesting people who can figure out things we don't even know exist.


Student’s drawing and writing before being exposed to a variety of scientists
My picture of a scientist is completely different than what it used to be! The scientist I saw doesn’t wear a lab coat. . . . The scientists used good vocabulary and spoke like they knew what they were talking about.

Discuss your results with your colleagues.

• Are you surprised at your results?
• Would you use this activity with your students?
• What does this exercise measure?
• Could it be used as a pretest/post test?

Scoring criteria based on an activity from Dr. Gail Rathbun, San Jose State University, Course EDIT 196, Spring 2000
Using this activity with your students- If most student illustrations contain the following characteristics, you may want to make them aware of a broader range of science careers.

**sign of technology-solutions, machines**

Captions-”Eureka, I’ve got it!

**symbols of research- test tubes, flask, etc…**
symbols of knowledge-books, filing cabinet

lab coat Signs/labeling- Fire, Danger, Poison
Discussion Guide for Gender Equity in the Classroom

Optional Activity #3
Procedure:

1. View video cassette, *Gender Equity in the Classroom*.
   To order video, see Resources.

2. Use the following discussion notes for a guided discussion.
Three Areas of Gender Bias in the Classroom:

• Student/Teacher Interaction
• Lesson planning/ Classroom Management
• Curriculum
Student Teacher Interaction

- Wait 3 to 5 seconds before calling on students
- Hold higher expectations for all students
- Use quality, precise feedback, distribute it fairly
- Analyze interactions with students
- Videotape a lesson
Lesson Planning and Classroom Management

• Allow students to learn task
• Assign students to group
• Establish rules for participation
• Rotate jobs within each group
• Apply classroom rules fairly
• Create a safe classroom environment
Curriculum Content

• Use gender inclusive language.
• Encourage students to take higher level courses (Middle and High school.)
• Analyze curricular materials for bias and supplement as needed.
• Diversify classroom resources to include female and diverse races.
Would You Like a Boy’s or a Girl’s Toy With That?

Optional Activity #4
Procedure:

Compare gender specific toys that are featured in children’s meals from fast food restaurants.
1. Divide participants into small groups of five to seven people. Give each person one or more toys (depending on the number and type of toys available.) You may want to try discussion groups arranged in any of but not limited to the listed combinations:
• One toy per group. The group decides if this toy is to be played with by boys, by girls, or either sex.
• Two toys per group. One from two of the categories of boys, girls, or gender neutral.
• Three toys per group. One from each of the categories of boys, girls, or gender neutral.
• Any number of toys per group. If the collection is large enough, one or two toys for each participant.
2. Discussion groups determine the “purpose” of the toys.

Photo credit www.mcdonalds.com
In general, the boys’ toys provide boys the opportunity to explore action play, mechanical abilities, spatial sense, mechanical energy, and other concepts of physics.

Photo credit www.mcdonalds.com
3. With these purposes determined, discuss implications for us as parents, teachers, and other adults who are responsible for the socialization of children.
Who determines the toys with which children play? In other words, what are parents’ answers to the “Would you like a boy’s toy or girl’s toy?

As teachers what kinds of learning experiences do you provide for your students?
What specific math or science lessons allow your students the opportunity to be actively involved using the hands-on approach?

Which toys or manipulatives can you use to demonstrate math or science concepts?
The following is a list of recent Happy Meal Toys where the customer had a choice of more than one type of toy:
<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>08-04-00</td>
<td>Hello Kitty Beauty Accessories or Beast Machines Transformer Toys</td>
</tr>
<tr>
<td>12-31-99</td>
<td>Barbie Dolls or Hot Wheels Cars</td>
</tr>
<tr>
<td>08-13-99</td>
<td>Barbie and Hot Wheel Cars from Mattel</td>
</tr>
</tbody>
</table>
Fast food restaurants are not responsible for the types of toys we choose for our children.
Fast food restaurants offer novel, fun, interesting toys for all children-girls or boys, young or old, including us grown up ones.
It is the responsibility of those of us who are influential in the lives of children to provide our children with toys, which provide real world science and math experiences.
Gender equitable toys may include, but are not limited to the following:

- LEGOos, Duplo Blocks, or Brio Builders
- Lincoln Logs
- Jigsaw puzzles
- Smartees
- soap bubbles
- baseballs and bats
- chemistry sets
- Matchbox or Hotwheels Cars
- paper and remote model airplanes
Connex  Construx
construction tool kits  Easy Bake Ovens
mechanical toys  Marbles
Zoob  architectural element blocks
Erector Sets  Froebel blocks
Take a Minute

Optional Activity #5
Procedure:

1. Take one or two minutes and list on a sheet of paper as many famous people as you know. They may be alive or dead.

2. Your list may not include athletes or entertainers.

Photo credit: http://www.clipartguide.com/clipart_misc/misc_page7.html
Discussion:

Share your list with others in your group.

Are the majority of the persons listed male or female?

How does socialization effect the content of the lists?

Could you use this activity in your classroom?

When would you use it? Could it be used as a pretest/posttest?
Does your list include people who look like these people?

Ellen Ochoa
Engineer, Inventor, Astronaut
Mission Specialist with the Discovery Crew and first female Hispanic to be named as an astronaut.

Photo credits National Women’s History Project
Maya Lin
Artist, Architect and designer of The Civil Rights Memorial and The Vietnam Veterans' Memorial

Shirley Jackson
Physicist and first female African-American to earn a doctorate degree from MIT

Photos credits National Women’s History Project
How to Order a Video Tape:

To order Gender Equity in the Classroom and Viewing Guide, call GPN at 1-800-228-4630, fax 1-800-306-2330, or email gpn@unl.edu.

Ask for order number 760.

Cost is $69.95

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Viewing Guide written by: Phyllis Lerner and David Sadker


National Women’s History Project
http://www.nwhp.org/whm/themes/themes.html

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Animation Central http://animation-central.com/


Studievereniging GEWIS - Clipart Library: Index http://www.gewis.win.tue.nl/general/clipart/
