

# Unsung Heroes of Science

Suggested Grade Level(s): All Grade levels from 7-12

Estimated class time: These lessons can be taught in succession one after the other, each initial one building upon the next. The teacher can use one or all of the lessons over a time period of 1 day to 6 days. You can stop at any point between each successive lesson and move on to the next part of the unit if you'd like.

## Summary

Students will use resources such as the Internet to identify past scientists who are not well recognized in the field. They will create a T-square to identify the women scientists of the Harvard College Observatory; the students will also use the Internet to complete a product and give a presentation on one of these unfamiliar scientific “heroes” that they discovered in their research.

## Objectives

- The students will identify and describe unfamiliar scientist “heroes” that contributed to the field of science until the year 1929.

## National Standards

### National Science Standards

- NS.5-8.7 HISTORY AND NATURE OF SCIENCE  
As a result of activities in grades 5-8, all students should develop understanding of
  - Science as a human endeavor
  - Nature of science
  - History of science
- NS.9-12.7 HISTORY AND NATURE OF SCIENCE  
As a result of activities in grades 9-12, all students should develop understanding of
  - Science as a human endeavor
  - Nature of scientific knowledge
  - Historical perspectives

### National Language Arts Standards

(From the National Counsel of Teachers of English)

- NL-ENG.K-12.7 EVALUATING DATA  
Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

- NL-ENG.K-12.8 DEVELOPING RESEARCH SKILLS  
Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

### **Knowledge Prerequisite**

The students should be familiar with famous scientists who have contributed their works to the field. The students should be able to research a topic and report on that topic.

### **Teacher Background**

The teacher should be familiar with the obscure scientists especially around the time of the turn of the century. The teacher should be familiar with Edward Charles Pickering and the women that worked with him at the Harvard College Observatory for their contributions to astronomy.

### **Materials**

- scientific resources and Internet access
- paper for a T-square

### **Procedure:**

#### **I. Engagement**

Ask students to create a list of famous scientists/astronomers. They can review their Earth and Space Science/Science textbooks for notable figures in physics, biology, and chemistry. Who do they read about? Ask them to share some of these famous scientists with you. (2-4 minutes)

Use those names and others to mark index cards or post-it notes with the names of 5-10 well-known scientists/astronomers such as Albert Einstein, Edwin Hubble, Isaac Newton, Marie Curie, Harlow Shapley, Charles Darwin, and Thomas Edison. Make a second set of cards or notes with the names of 5-10 less-known scientists/astronomers such as Henrietta Swan Leavitt, Milton Humason, Annie Jump Cannon, Maria Mitchell, and John Goodricke.

#### **II. Exploration**

This activity stems from the introductory activity and is designed to introduce the students to a specific group of women scientists who are the “unsung heroes” of astronomy/astrophysics. (about one 45-minute class period)

Picture/Paragraph - “Pickering’s Harem”: Separate the students into groups of 4-5 and have them briefly research different web sources on the scientific women of Pickering’s Harvard College Observatory.

You can use the following web sources as well as any other credible sources:

<http://cfa-www.harvard.edu/~jshaw/pick.html>

<http://womeninscience.org/then20.htm>

[http://www.boston.com/news/globe/health\\_science/articles/2005/02/01/female\\_astronomers\\_connected\\_the\\_dots/](http://www.boston.com/news/globe/health_science/articles/2005/02/01/female_astronomers_connected_the_dots/)

<http://www.bookrags.com/browse/biography/>

[http://www.womanastronomer.com/women\\_astronomers.htm](http://www.womanastronomer.com/women_astronomers.htm)

### III. Explanation

Each group will complete a T-square on Pickering’s lady scientists of the Harvard College Observatory (a sample blank T-square for this activity is shown at the end of this lesson). The students use one piece of paper to create a large T. One side at the top is FACTS LEARNED and on the other side is BIG IDEAS OR CONTRIBUTIONS. Under each column, the students are to fill in the facts and the contributions to set up for their discussion.

The discussion should be based on the following key ideas:

1. Read and discuss the web pages and pictures out loud with your science class.
2. Discuss the role of the women at the College Harvard Observatory, including how they refer to each woman’s role at the observatory (many of the women are referred to as computers).
3. Discuss the role of the women as scientists in society at that time.

### IV. Elaboration

Activity: “Who’s Not in Your Textbook?” (four to five 45 minutes periods)

Students will select an “unsung scientific hero” who has made a contribution to astronomy/space science in some way but is not well-known throughout history. They should choose a scientist hero they believe deserves more credit or attention than has been given to them. They can use their T-squares as a basis for their project/presentation. Have students use the online resources listed below and others for their research.

[http://www.womanastronomer.com/women\\_astronomers.htm](http://www.womanastronomer.com/women_astronomers.htm)

<http://www.bookrags.com/browse/biography/>

<http://www.physics.ucla.edu/~cwp/>

Students can use the following list of suggested scientists to choose from or come up with one on their own pending approval from their teacher: Henrietta Swan Leavitt, Annie Jump Cannon, Caroline Herschel, John Goodricke, Milton Humason, Williamina Fleming, Cecilia Payne-Gaposchkin, Mary Somerville, Antonia Maury, Maria Mitchell, etc...

## **V. Evaluation**

Students could create the following: written reports; multimedia presentations using images, video, audio and Powerpoint; podcasts; blogs; or write skits or short stories based on that individual's experience and accomplishments. As part of their presentations, students should address how this person inspired them.

**Sample T-square**

<b>Facts Learned</b>	<b>Big Ideas or Contributions</b>