**Lesson Plan: Unsung Heroes of Science**

**Learning Overview:** Throughout history, many scientific discoveries and developments have changed the way we view the world. In this activity, students will learn about some of these important scientific contributions and the lesser-known scientists responsible for them. Students will then choose one of these unsung heroes of science and create an artistic piece that celebrates them and their work and contributions to science. The artistic pieces representing lesser-known scientists will be displayed together in a commemoration open to the school.

**NGSS-DCI:** HS-LS4; HS-ESS3; HS-ETS1.

**Paired Article:**

*Science News:*“[Unsung Characters](https://www.sciencenews.org/century/connection/unsung-characters)”

**Directions**: Students will begin this activity by browsing through the stories and milestones in the *Science News* archive “[Unsung Characters](https://www.sciencenews.org/century/connection/unsung-characters)” and selecting a lesser-known scientist. Students will research that scientist’s personal life, scientific achievements and the historical period of their discovery or advancement. Students will then select an artistic medium to commemorate the scientist and present information about them. This artistic medium may include written works, art or a performance. Each artistic work will be accompanied by a short, written piece that provides an overview of the scientist and explains the thought process behind the creation of the commemorative piece. The final products will then be presented together in a gallery.

In preparation for this activity, gather any materials that students may need to create their artistic commemorations. Partnering with an art teacher for this activity is highly recommended. The art teacher may already have the supplies needed for this activity and can guide students in the creation of their work. While some supplies are suggested, please provide students with additional materials for this project if possible. Materials such as clay, wire, paper for papier-mâché, and magazines for collages will allow students to create a more diverse selection of artistic commemorations.

At the end of this activity, a gallery of the artistic commemorations of the scientists will be displayed for the class and the school. It is recommended to invite faculty, staff, and other classes to attend this event to share about the scientists and their scientific discoveries and advancements.

 **Supplies:**

* Projector
* Computers
* Printer
* Student Worksheets
* Glue
* Pencils
* Video cameras/Camcorders
* Paper/Canvas
* Scissors
* Paint
* Paint Brushes/Paint Pens
* Crayons/Pastels/Color Pencils/Markers

**Choosing an Unsung Hero**

Introduce the activity to students as an interdisciplinary assignment that uses art to represent recent and historically significant scientists and their fields of study. Students will need to choose a scientist to commemorate and an artistic medium, such as a painting, poem or play. Instruct students to explore the *Science News* archive “[Unsung Characters](https://www.sciencenews.org/century/connection/unsung-characters).” Each student will navigate the archive to answer the following questions. Please note that student answers will vary from the sample responses provided below.

1. What does it mean to be an “unsung” scientist?

*“Unsung” scientists are individuals who are not well known despite their scientific achievements.*

2. What circumstances could lead to a scientist becoming an “unsung” scientist?

*The scientist’s work may be overshadowed by other scientific discoveries or events occurring at the time, or the scientist may have been overlooked or deliberately discriminated against.*

3. What scientific subjects are included within this archive?

*The scientists included within the archive studied virology, astronomy, engineering, biology, chemistry, geology, or physics, among other subjects.*

4. Navigate to the “Unsung characters Milestones” section at the bottom of the page. Read through the timeline. What scientists and discoveries surprised you? Why?

*I was the most surprised by Grace Hopper, who was responsible for a key innovation in the computer programming field in 1952. I was surprised because programming is a relatively male-dominated field despite being built upon the advancements of Grace Hopper, a female scientist.*

5. Continue to explore the archive. Identify an individual that you would like to focus on for the remainder of this activity. If desired, you may extend your search beyond the archive, but if you do, be prepared to explain how your selected scientist is “unsung.”

*I plan to focus on Grace Hopper.*

**Meeting an Unsung Hero**

Prior to starting this section of the activity, let students know that there may be multiple students studying the same scientist. If students are studying the same scientist, they may work together to research their chosen scientist. However, each student studying the same scientist must use a distinct artistic medium for their final product. Make sure that there are no more than 4-5 students researching the same scientist. While these students may work together in a group, all students are responsible for filling out and completing their own student worksheets.

In this section of the activity, students will learn more about their scientist’s life history and achievements. Before students start their search for information, make sure students know how to identify and use reputable and reliable resources, such as [*Britannica*](https://www.britannica.com/) or the [*Smithsonian Institution*](https://www.si.edu/). To help guide students in their search, provide students with the following questions and ensure that students answer each question to the best of their abilities. However, student answers may vary, and students may be unable to fully answer some questions if there is little publicly available information about the scientist they selected. All sample responses are based on the scientist Grace Hopper.

1. What lesser-known scientist are you focusing on for this activity? Explain in detail why you selected this scientist.

*I selected Grace Hopper for this activity because I was surprised by the monumental impact she had on computer programming. When I think of computer programming, I think of people like Bill Gates, who are well known, have recognizable names, and are prominent in the programming industry. I had never heard of Grace Hopper despite the fact that she created the foundation for modern computer programming.*

2. When and where was this scientist born? If applicable, when and where did this scientist die?

*Grace Hopper was born on December 9, 2016, in New York City. She died on January 1, 1992, in Arlington, Virginia.*

3. What was the race, nationality, ethnicity, religion, and gender of this scientist?

*Grace Hopper was a white, female United States citizen of European descent. As a child, she attended a Protestant church with her family. Little information is available about her religion as an adult.*

4. What was this scientist’s upbringing like?

*Little information is available about Grace Hopper’s upbringing. However, we do know that she attended a preparatory school in New Jersey, and as a child, she liked to disassemble and reassemble objects to entertain herself.*

5. What were this scientist’s degrees and qualifications?

*Grace Hopper had a master’s and PhD in mathematics from Yale University.*

6. How did this scientist enter their field of study?

*Grace Hopper was a math professor until she entered the US Navy, where she worked on the Mark I computer as part of the Bureau of Ordnance’s Computation Project.*

7. What were this scientist’s achievements or discoveries?

*In the Navy, she wrote the first computer manual for the Mark I computer. This manual included information about how to program the Mark I. She later became a mathematician with Eckert-Mauchly Computer Corp. There, she helped program several new computers and developed a new computer programming language, COBOL, which translated instructions into computer code. She developed one of the first compilers, which utilized COBOL, and pushed for the standardization of programming language across computers.*

8. How did this scientist have a lasting impact on their field of study? How are they viewed today?

*Grace Hopper’s development of the first programming language, COBOL, and push for standardizing computer programming languages created the foundation on which modern computer programming was built. She was also the first person to use the term “bug” to describe a computer error. Today, Grace Hopper is lauded as a pioneer of computer programming.*

9. What else is notable about this scientist’s life?

*Grace Hopper was named the first computer science Man of the Year by the Data Processing Management Association in 1969, received the National Medal of Technology in 1991, and was awarded the Presidential Medal of Freedom in 2016. Grace Hopper also returned to the Navy in 1967 before finally retiring in 1986 at the age of 79. Despite her retirement from the Navy, she continued to work in the computer industry before passing away in 1992. Shortly after her death, the Navy named a ship the USS Hopper. As of 2023, the USS Hopper is still active.*

10. What artistic medium will you use to celebrate this scientist and why? You may create written works, artworks or acted works. Make sure to specify the exact medium you will be using (for example: poetry, paintings, sculptures, or monologues, among others) and make sure that you are using a different medium than other students studying the same scientist. For example, if two students are researching the same scientist, one could create a drawing while the other could create a painting. Get creative! You will also write a 200-to-300-word description of your piece that explains how your work commemorates the scientist.

*I will be creating a sculpture out of recycled computer parts to represent Grace Hopper and her foundational role in the field of computer programming.*

**Celebrating an Unsung Hero**

If working with an art teacher for this activity, students may complete the remainder of the activity and create their artistic commemoration in an art class. Partnering with an art teacher for this assignment is highly recommended.

Ask students to report which scientist they selected and what medium they will be using for their final product. Check student responses to ensure that all students intend to complete their own individual work for their selected scientist.

Students may now begin working on their final product. While student works may vary in nature, ensure that students are aiming to create objective works that focus on the scientist’s accomplishments. For example, written and acted works should be careful not to make assumptions about the scientist’s feelings or perspective (unless the scientist is quoted as having experienced these feelings or perspectives) and should focus on events in the scientist’s life. All acted works, from songs to monologues, must be filmed so that they may be projected in the gallery of artistic commemorations.

Make sure to provide as many resources and materials as possible for students. While a list of supplies for this activity is suggested, providing additional materials is highly beneficial and will create a more diverse range of final products.

While this section of the activity may be completed either in class or with an art teacher during their class period, students may also choose to take their artistic commemorations home for additional work time. The amount of class time dedicated to this portion of the activity may vary depending on class schedules.

Students must also provide a description to accompany their artistic commemoration. The header for this description must include the student’s name, the year the piece was created and a title. The body of the description must provide a synopsis of the selected scientist’s life, including all notable accomplishments; describe how the student chose a medium to represent the scientist; and explain how the commemorative piece represents the selected scientist and their achievements. All descriptions should be approximately the same length, between 200 and 300 words.

Once students have completed their artistic commemorations, create a gallery by displaying each physical or written commemorative piece with its associated description and project each video of an acted commemoration in a visible location. Have the descriptions for all projected commemorations posted near the projection site and provide seating for individuals who may be watching the projections. Each video should be prefaced with a title screen that includes the student’s name and the title of the work. This gallery of artistic commemorations may be held in a classroom or any other available space. While the artistic commemoration should be viewed by your class upon completion, other classes and school faculty may be invited to attend this event.