



STEAM Subject: Photography

Lab: Cyanotype Printing

Grades: 4-8

Learning objective:

Students will practice photography techniques, make observations of their environment (home or outdoor), and produce a cyanotype print.

ENGAGE:

Ask students the following questions:

- How did scientists and architects first share images of their work?
- Have you ever wondered how humans capture images before film cameras and digital cameras?
- Did you know that the first photographers were scientists and inventors?

An Interdisciplinary Invention

- In 1725, Johann Heinrich Shulze a German physician and anatomy professor, discovered by accident, that a mixture of nitric acid, chalk and silver darken when exposed to the sunlight.
- In 1790s, Thomas Wedgwood, an English inventor and photographer, used the chemicals to copy images, he was the first to have attempted to photograph the image formed in a camera obscura.
- In 1839, (other sources said 1841), John Herschel, an English chemist, astronomer, and photographer invented the cyanotype, photographic printing process, that led to the invention of the blueprints.
- In 1843, Anna Atkins, an English botanist and photographer, documented botanical specimens with cyanotypes. First person to publish a photographically printed and illustrated book.

EXPLORE:

Inspire students with the possibilities by showing some cyanotypes examples.



Left Image: A cyanotype dead leaves example from EIS Photography instructor, Carla Reyes.
Right image: A cyanotype photogram made by Atkins which was part of her 1843 book, *Photographs of British Algae: Cyanotype Impressions*
https://upload.wikimedia.org/wikipedia/commons/c/c4/Anna_Atkins_algae_cyanotype.jpg

Directions:

- Each student will collect random objects, flowers, or leaves. When collecting, it is important to make observations about the shape, size and if the specimens or objects are translucent or not. Students may cut out shapes and designs from regular paper.
- Students will select a few to create their design.
- Slide the paper on a 5x7 easel and place the design on the paper.
- Expose the paper to the sun for the length of time indicated on the instructions. If necessary, place the glass or Plexiglas on top of the easel to prevent the objects from moving.
- Remove the design and rinse the paper in the 16x20 tray until the water is clear.
- Toning- to change the color from yellow prints to sepia, soak it in the 8x10 tray with brewed black tea and rinse on clear water briefly.
- Glue the print on the card stock paper, cut edges if desired and decorate the card.

Materials needed per student:

- 1 5x7 Cyanotype print paper (You can find SunPrint Paper Kit (2-Pack) on Amazon)
- Various objects (flowers, leaves, paper shapes, or other)
- 5x7 Easel
- 5x7 or bigger piece of glass or translucent plexiglass
- 1 10x7 card stock paper folded in half

- 1 5x7 envelope
- Color markers, pens and pencils
- Glue stick
- Scissors

Dark room Materials:

- 16x20 photographic tray (or any tray not for food) with running water.
- 8x10 photographic tray
- 5-6 bags brewed black tea.

EXPLAIN:

Review Vocabulary:

- **Cyanotype:** Oldest non-silver photographic print. The photo sensitive paper or material has been treated with a chemical solution of potassium ferricyanide and ferric ammonium. A negative is created when the photo sensitive material and/or paper is exposed to the sun. The objects will block the light completely or partially depending on the transparency of the objects. The parts expose to the sun will darken the color while the areas cover by the objects would be lighter. The word *cyan* comes from the Greek, meaning dark blue substance.
- **Photogram:** is a photograph made without a camera by placing objects directly onto a photographic paper
- **Toning:** is the process used to change the color of the iron in the print cyanotype
- **Translucent:** allowing light to pass through but not completely clear

How Do Cyanotypes Work?

The paper is covered with a chemical that darkens when exposed to the sunlight. To create an image, objects are placed between the sun and the paper blocking all or part of the light.

Herschel developed the cyanotype process that started with a drawing on semi-transparent paper, weighted down on top of a sheet of paper. The paper was coated with a photosensitive chemical mixture of **potassium ferricyanogen** and **ferric ammonium citrate** (a hazardous chemical formula). Once the drawing was exposed to light, the exposed parts turned blue, while the drawing lines blocked the coated paper from exposure and remained white.

Watch a Video from the Virginia Museum of Fine Arts. “Art in Action: Cyanotype Science” <https://youtu.be/-keQ2nDm-os>. Learn more about the chemistry and art of cyanotypes.

ELABORATE:

Read the book about the first woman photographer and botanist “The Bluest of Blues: Anna Atkins and the First Book of Photographs”.

Fascinated with the plant life around her, Anna became a botanist. She recorded all her findings in detailed illustrations and engravings, until the invention of cyanotype photography in 1842. Anna used this new technology in order to catalogue plant specimens. This is a great example of using photography in science.

In 1843, Anna published the book “Photographs of British Algae: Cyanotype Impressions” with handwritten text and cyanotype photographs. It is considered the **first book of photographs** ever published!

“The Bluest of Blues” could inspire young readers to learn more about Science and Art.

EVALUATE:

Ask the students about their experience creating cyanotypes:

- What objects, flowers, or leaves work best? Why?
- What would you do different next time?
- What was your favorite and least favorite part of process?

Sources:

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<https://www.oncenter.com/blog/article/transitioning-to-the-digital-age>

<https://www.britannica.com/biography/John-Herschel>

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