Maria Sibylla Merian
Butterfly- Line by Line

Note to parents: All lessons include suggested art materials; a book to read to student artists to further their understanding of the artist and their work; information about the artist; discussion questions; and step-by-step instructions for completing the artwork. Whenever possible, ideas for changing the lessons to make them age appropriate for student artists are suggested. These lessons should be educational, fun, and offer a chance to spend some time using their brains in a different way. We suggest turning on some classical music while they (and you!) create.

Lesson: Artists will paint a butterfly using the illustrations of Maria Sibylla Merian as inspiration. The technique outlined in this lesson will allow student artists to easily create sophisticated symmetry.

All adults should create a sample first with the art materials on hand. Be creative with available materials. If you are unsure if a product will work, please try it out before using with lesson. Use timelines, maps, internet images and cross curricular connections to the famous artist studied.

Art Supplies

- Watercolor paints (recommended: Prang 16 color, OVAL, Semi-moist, NOT washable. Amazon: approximately $10 with shipping)
- Paintbrush (watercolors come with a brush that is not the best (too small) but workable)
- White paper measuring approximately 12” x 14” (lightweight watercolor paper, cover stock, paper that will hold up to water)
- Some sort of painter’s tape to tape the paper and be removed without tearing the paper.
- Water container
- Paper towel or clean cloth
- Q tips are an optional tool to blot up excess paint as needed

Books: These are picture books published about the artist. A read aloud text is included in lesson plan.

- The Girl Who Drew Butterflies by Joyce Sidman
- Summer Birds by Margarita Engle
Famous Art and Artist Discussion (read aloud to artists)

Maria was interested in nature from the time she was a little girl. She looked at insects, frogs and birds and wondered: Where did they come from? How did they grow? What did they eat?

She asked questions. Most everyone in Germany believed bugs came from mud.

Maria was sure this was incorrect.

She wanted answers about the life cycle of bugs, particularly butterflies. But how could she find out? And there was just one little problem. The grown-ups thought questioning beliefs was witchcraft and dangerous, especially for a 13-year-old girl in 1660.

But Maria just had to know and was willing to risk punishment to find out. When she found caterpillars on her walks, she hid them in her pockets and baskets. She took them home and kept them alive.

Right away she noticed the caterpillars were not alike. They looked different. She remembered she found caterpillars on different plants. Caterpillars, she observed, were picky about the leaves they ate. Some would die rather than eat something else.

Maria used the scientific method before the scientific method was even known...

There are five steps to the scientific method and Maria did them all! She also included feedback.

Make an observation.
Ask a question.
Form a hypothesis, or testable explanation.
Make a prediction based on the hypothesis.
Test the prediction.
Feedback: Use the results to make new hypotheses or predictions.¹

Silkworms taught her a lot. She observed they came from eggs which were on mulberry leaves. They only ate the mulberry leaves, and if they had enough food, they grew quickly into fat

¹ Kahn Academy [www.kahnacademy.org](http://www.kahnacademy.org) (read more about the scientific method!)
caterpillars. The caterpillars spun threads round their bodies. Magically, an entirely different bug, a moth, emerged from the chrysalis.

Her stepfather, Jacob Marrel, was an artist. He allowed Maria to observe his art classes. She cleaned his studio, set up supplies for his students and most importantly, she paid attention. Learning to draw is a process that takes patience and PRACTICE! Maria practiced drawing caterpillars. Women were not allowed to use oil paint and so she turned to watercolor and engraving. By the time she was 28 her first caterpillar book of drawings was published. In the title of her book she used the scientific name that describes transformation: *metamorphosis*.

Maria got married, had two daughters, moved to Amsterdam, gave art lessons, and supported herself and her daughters by selling paintings of flowers after she divorced.

BUT then her life got interesting. At the age of 52, Maria and her youngest daughter Dorothea raised money to go to a remote country in South America. Funding your own scientific art trip was rare. Traveling without male escorts was shocking. And spending a month-long journey aboard a rocking and rolling ship to go to the other side of the planet in long skirts and corsets had to be miserable.

The country was Suriname.

When Maria and Dorothea arrived in Suriname, the European residents were obsessed with raising sugar cane to export. They used slaves, harmful farming practices and ignored the rest of the country. No one cared about the native people living there or the wonderous plants and wildlife. Maria and Dorothea collected, studied and illustrated the animals and insects. It is no surprise Maria became ill after 21 months of hard work. Mother and daughter returned to Amsterdam but not before exploring jungles, discovering new creatures and tasting new fruits and vegetables, including the marvelous one called pineapple.

When she returned, Maria published a book about the insects she encountered in Suriname. Some of the insects are now extinct but because of her drawings we know of their existence. Maria’s ability to carefully observe colors and details and draw what she saw has made her illustrations important scientific documents. (Photography was not invented for another 100 years.)

Maria was contemplating the food chain – what living things need to survive – more than three hundred years ago. She not only illustrated life cycles of insects and animals, she also included the specific plants needed for their survival. Her curiosity and desire to understand
the smallest and seemingly insignificant creatures has echoed over the centuries. By the time she died in 1717, Maria had changed the way art and science worked together.

Both of Maria’s daughters lived extraordinary lives as artists, teachers and naturalists. Dorothea lived and worked in St. Petersburg as a scientific illustrator at the invitation of the Tsar until she died. She was appointed to the St. Peterburg Academy of Sciences, and was the first women to be employed by the Russian Academy of Science.

Maria Sibylla Merian (1647-1717), Entomologist and Botanical Illustrator

Cooper Hewitt, Smithsonian Design Museum

Maria Sibylla Merian (German, 1647-1717) was a remarkable naturalist, famous for her expertise in entomology and the art and details of her scientific illustrations. From a young age, Merian was taught how to draw. This image of Maria was engraved for use on German currency before the Euro.

Discussion Questions

Look at artwork- Ask and answer questions- Cite your reasons- Explain and elaborate

• Look at Maria’s illustrations. Are they abstract or realistic? How might an artist draw an insect so accurately?
• Maria was interested in the life cycle of butterflies even when she was a little girl. How would you describe her interest(s)?
• Have you ever looked at a bug closely? What were some of your observations?
• Describe what you know about the life cycle of a butterfly.
• What does the word metamorphosis mean?
• How did Maria learn to draw?
• Can you describe the difference between a butterfly and a moth?
• Why did Maria feel she would get into trouble if people knew about her interests?

**Process:**

**Wake up watercolors.** Dip brush in clean water and drip a few drops into watercolors that will be used in the beginning of the composition. I suggest artists begin with warm or cool colors to wake up. Color of butterfly can follow actual illustration by Maria, or they can be different.

**Work on a flat surface.** Fold the full sheet of white paper to be used for this project in half. The center line of the fold will be the body of butterfly. Tape one half to table. Leave tape on paper until end of project.

Select one of Maria’s butterflies or moths to draw. There are four wings. Begin with the shape of the first wing. Dip brush into a light value (like yellow or blue). Make 2 helper dots to show the beginning and end of the top of the wing. Connect the dots with a line of watercolor. (Parent should assist young artists by pointing and showing technique.)
While the paint is still wet, fold the paper onto the side of the paper that is taped down. Rub your hand over the line (from the back side) and transfer some of the paint onto the other half of the paper.

Use helper dots to complete wing. Fold and press.

Hint: Each time a line is drawn with paint on one side, fold over and press to transfer the paint so that a perfectly symmetrical wing is created. Paint must be wet, but not too wet.

Paint, fold, press and rub

Continue to paint each line, fold and press to transfer shape of wing until two symmetrical wings are created on either side of fold.
Notes for Parent Teachers:

- Keep tape in place until project is complete; remove carefully at end of lesson.
- It takes practice to get the rhythm of making a mark and transferring it every time.
- Once process is understood by artist, they may paint on either half and transfer colors for symmetry.
- Go over lines that do not transfer with more pigment/water.
- Help artists wake up watercolors as they need them.
- Concentrate color by color

- Let areas dry before layering more color
- On a separate piece of paper, show what happens when complements are mixed\(^2\)
- It is OK to make a butterfly that copies Maria or artist’s own design
- Young artists should fill with color and not worry about detail lines (as shown)
- Body and antennae of butterfly is last detail painted after wings are filled in.

**For antennae and body: Use a thin line. Fold and press.**

Look at Maria’s examples and note where the head is beyond the body of wings and where the body ends.

How many shapes make up the body?

Moths are quite different from butterflies.

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\(^2\) Complementary Colors: red and green, blue and orange, purple and yellow
With paint, draw one thin line for antennae and transfer. Pressing brush will make line fat; light touch will make thin line. (If artist prefers, draw antennae with a pencil or pen)

I drew (with a brush and blue watercolor) the wing shapes- folding and pressing after each line to transfer a symmetrical shape. It took some practice to paint a line then press each time.

I filled areas with small amounts of color and pressed each time. I took care not to combine complementary colors.

More accomplished artists will be able to create details and designs.

Artists may want to follow the illustrations of Maria to copy some of the amazing butterflies she drew from her travels.

This lesson not only gives the artist the chance to practice their drawing skills but to create a detailed symmetry that is very difficult to do without this technique.
Extra credit!

I was very intrigued with the witch moth. I tried this technique using just black and white watercolor. It was a lot of fun to look closely at the designs on the moth Maria illustrated from her travels. Line by line, press and transfer.