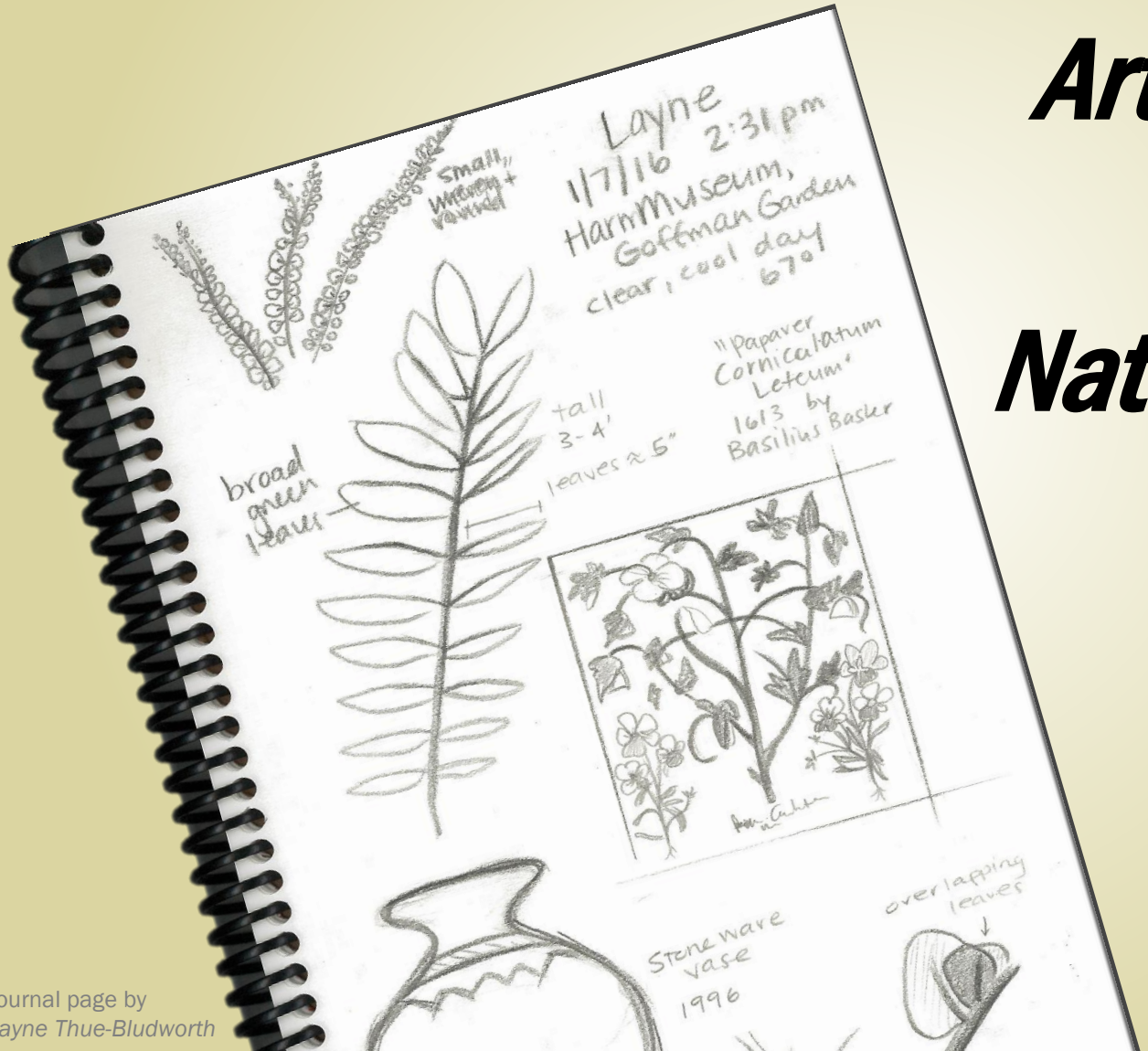
Harn Museum of Art

Educator Resource



Journal page by
Layne Thue-Bludworth

Art & Science of Nature Journals

HARN MUSEUM OF ART
UNIVERSITY OF FLORIDA

Nature Journals & Scientific Illustration

Nature Journals – Integrating Diverse Disciplines

Nature Journals are powerful curriculum tools for the classroom that can bring together math, language arts, local history, and even physical education. They also encourage observation and critical thinking about the world while actively engaging students through the use of their senses.

Through nature journaling, students can learn about relationships among plants, animals and humans as well as systems of the earth. Weather, rocks, soil and water are transformed from abstract concepts into tangible elements. Perhaps most importantly, nature journaling encourages students to study where they live and how they relate to the environment.

Scientific Illustration - Studying Nature Through Art

Scientific illustration is art that reflects the findings and ideas of science. It is often a way to visually communicate information that is otherwise unobservable – including atomic elements, internal anatomies, extinct life forms and even the expanse of the universe. Scientific illustrators are artists in the service of science.

Before the invention of photography, detailed and realistic illustrations of plants and animals assisted in species identification and contributed to an understanding of life cycles and habitats. Artists such as Maria Sibylla Merian and Basilius Besler were artists and naturalists who observed plants and animals carefully, then illustrated their observations in such great detail that we can still learn from them today.

Observation

Nature journaling develops and refines observation and documentation skills, which are essential to the scientific process as well as other school subjects. Even though photographs of specimens are now easily available to study from, the act of drawing from observation requires students to look closely and pay attention to details that may have been overlooked otherwise.

Educational Power of Drawing

In recent years, scientists have started to explore the educational power of drawing. Research shows that drawing serves as an anchoring task to increase information retention and recall. Even more remarkable, researchers have also found that drawing improves comprehension, especially for complicated concepts and processes. **A study published in *Science* in 2011 revealed that when students create their own visual representations of ideas and concepts, they have a considerably deeper learning experience.**

> *Study the science of art. Study the art of science. Develop your senses – especially learn how to see.*
>
> - Leonardo da Vinci

Maria Sibylla Merian

Maria Sibylla Merian (German, 1647 – 1717)

Maria Sibylla Merian was an entomologist, botanist, naturalist, and artist. Merian was born in Germany, where she learned about painting and engraving from her family. She started studying insects at the age of 12, and at age 13, painted her first images of insects and plants from specimens she collected. Throughout her career, Merian focused on illustrating insects, their habitat and food sources, and the process of metamorphosis. During the 17th century, it was not well-understood how a caterpillar changed into a butterfly. Because of Merian's careful observation and documentation of the stages of development and process of metamorphosis in her book *Metamorphosis Insectorum Surinamensium*, she is considered to be a significant contributor to the field of Entomology. Six plants, nine butterflies, and two beetles are named for her.

Plate 44, From *Metamorphosis Insectorum Surinamensium*
(see larger image provided in this resource)

Achiote (Bixa Orellana)

Mature tree with seed pods
Photo by J.M. Garg

Left: Flower

Right: Mature seed pods
Photo by Arria Belli

Plate 44 from *Metamorphosis Insectorum Surinamensium*

This image shows a stem and inhabitants of the Achiote (*Bixa orellana*), a small tree from the tropical region of South America. Merian observed and illustrated the plant during her work in Surinam, and her text accompanying the plate refers to it as the Urucu tree – the plant's original name used by Tupi-speaking native South Americans.

The plate shows the Achiote's pink flowers and red-brown seed pods, with one open to reveal the red seeds inside. Originally used to make body paint and lipstick, the seeds are still used today to make yellow to reddish-orange food coloring.

The insects inhabiting the plant represent the life cycle of two species – with a caterpillar, chrysalis and adult of each. In her written notes, Merian recorded detailed descriptions of the caterpillars and the dates they transformed into different stages of their life cycles.

Basilius Besler

Basilius Besler (German, 1561 – 1629)
Basilius Besler was an apothecary (early pharmacist), botanist and collector of natural history specimens. At the request of the ruling bishop, Besler created a botanical garden at Willibaldsburg castle. He then produced a plant atlas, *Hortus Eystettensis*, that presented detailed and accurate images of every plant in the garden. Published in 1613, it was the most modern book on plants of its time.

Garden of Willibaldsburg Castle, designed by Besler
Photo by Dark Avenger~commonswiki

Plants & Medicine
Plants can effect the human body in a variety of ways, such as relieving pain (willow bark) and changing heart rate (foxglove). Because of this, plants were the primary source of medicine for thousands of years. Early pharmacists and physicians relied on detailed and accurate images in order to make sure they used the correct plants for treatments.

Papaver Corniculatum Luteum, 1613
From *Hortus Eystettensis*, Eichstatt
(see larger image provided in this resource)

Papaver Corniculatum Luteum
The central plant in this print, *Papaver Corniculatum Luteum*, was commonly called Horned Poppy with a Yellow Flower, or Yellow Hornpoppy. It was known to cause disorientation and visions if consumed. Today, certain types of poppy plants are used to make medicines to treat severe pain.

Yellow Horned Poppy.
Photo by Stan Shebs

Viola Tri-color.
Photo by Jörg Hempel

Trinitatis Violaceus
The smaller flowers included in the lower left and right of this print are different varieties of the flower Viola tricolor. This flower was used in folk medicine to treat respiratory problems such as bronchitis, asthma and cold symptoms. Modern researchers have found chemicals in Viola tri-color that have been useful in developing new medicines.

Lesson: Observation & Communication

By Emma Roulette, Science Teacher, Alachua County Public Schools, Westwood Middle School

Objectives

- Students will be able to understand how observing an image and representing that image are connected through a process of communication.
- Students will be able to communicate more effectively by learning to create precise instructions.
- Students will understand the **detailed** and **objective** observation skills necessary to produce images that effectively represent reality.

Pre-Activity / Setup

Find an object that is not easily recognizable, and that is composed of several parts, such as an old camera, a classroom anemometer, or a strange old musical instrument. Be creative!

Activity

1. Have students get into pairs and determine who will be the **artist** and who will be the **observer**. **The artist is not allowed to talk. The observer must keep their hands behind their back at all times.**
2. The observer will visit the mystery object and observe it. Then the observer will return to the artist and explain how to draw the object.
3. The observer may not touch the artist's pencil at any time, use hand gestures, or say the name of the object.
4. After time is called, reveal the object to all the groups.

Post- Activity

Have a guided discussion with your class. Ask these questions to get the discussion going:

1. How was your drawing **different** from what the mystery object looks like? How was it **similar**?
2. What **specific words** did you use to explain your observations to someone else?
3. How could instructions be improved to help the drawing look more like the mystery object?
4. How is the activity you did in **partners** like the act of **one person** drawing something they see? How is it different?

Robinson Anemometer
Photo by Mr. Sean Linehan

Vintage 8mm Movie Camera
Photo by Joe Haupt

Sitar. Photo by Universidad Nacional de La Plata

The most important thing we can teach our young people is to observe well.
- Ernst Mayr, evolutionary biologist

Lesson: Observation & Drawing

> *Observing expands your world.*
> - Clare Walker Leslie & Charles E. Roth
> Authors, *Keeping a Nature Journal*

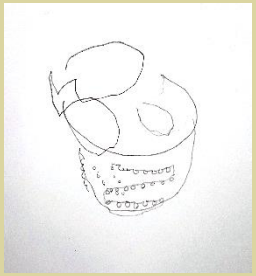
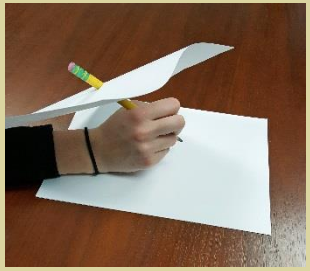
Blind Contour Drawing

Introduce students to nature journals and prepare them for observational drawing and field studies with a quick and stress-free warm up exercise – Blind Contour Drawing. This lesson activates right brain thinking, focuses students' observation skills, and encourages the hand, eye and brain to work together. Because students draw without looking at their paper, it also alleviates any concerns with results.

Supplies

Objects for students to draw – one per seating group, placed on desks/group tables. Everyday objects with little surface decoration work best – cups, bottles, vases, baskets
Paper – 2 sheets per students, one to draw on and the other to slide over the top of their pencil to hide their drawing hand (see picture below)
Pencils

Sample subject, result & hidden drawing hand

Activity

Discuss the idea of warm-up exercises for a variety of activities, such as stretching before athletics and practicing scales before a music performance. They are not done with results in mind. Their purpose is to prepare the body and mind for a specific activity and to improve basic skills.

Set a time limit for the drawing – 1 minute.

With pencil and paper hidden from view and ready, have students carefully observe the object to draw. They should pick a point on the object where their eye can begin a slow journey around the contour, or edge.

As their eye moves along the contour, students should draw exactly what they see, without lifting their pencil from paper.

Students should not look at their drawing, only the object. Their eyes should remain on the object during the entire drawing time.

Post-Activity

When time is up, have students look at their drawing. Discuss whether anyone drew a realistic picture of their object. (Probably not.) Is anyone able to recognize the object they drew? Most students will say yes, and since nobody peaked at their drawing, this is remarkable.

If time permits, have students do another contour drawing of the same object, but allow them to look back and forth between the object and their drawing.

Lesson: Nature Journal Pages

You really do not see a plant until you draw it.
- Goethe

Objectives

Scientific illustrations will inform and inspire students to explore the natural world around them.

Students will strengthen observation skills and practice recording details of plants in notes and sketches.

Supplies

Collection of different, natural leaves (at least one for each student)
Pencils
Nature Journals or paper
Crayons or colored pencils (optional)

Pre-Activity

Choose one or more of the scientific illustration prints in this resource to share with students. Discuss the elements of details provided in the illustrations, such as colors, shading, leaf/flower shapes and sizes, parts of plants, and even withering or drooping elements.

Classroom Activity

Following a Blind Contour Drawing warm-up (see lesson provided), have each student select a leaf from those collected.

Before picking up paper and pencil, students should spend 3-5 minutes studying their leaf closely. Instruct them to look for details such as length, width, color, shape, texture, and pattern of veins.

Then, students should move their leaf out of sight and draw it from memory. Using just pencils, students should draw a life-size line drawing. Allow about 5 minutes.

When drawings are completed, students can compare their drawings to the leaves. How many details were they able to remember and include? How is the drawing different? If time permits, students can do another drawing while looking at their leaf. Crayons or colored pencils can be used to further describe their leaf.

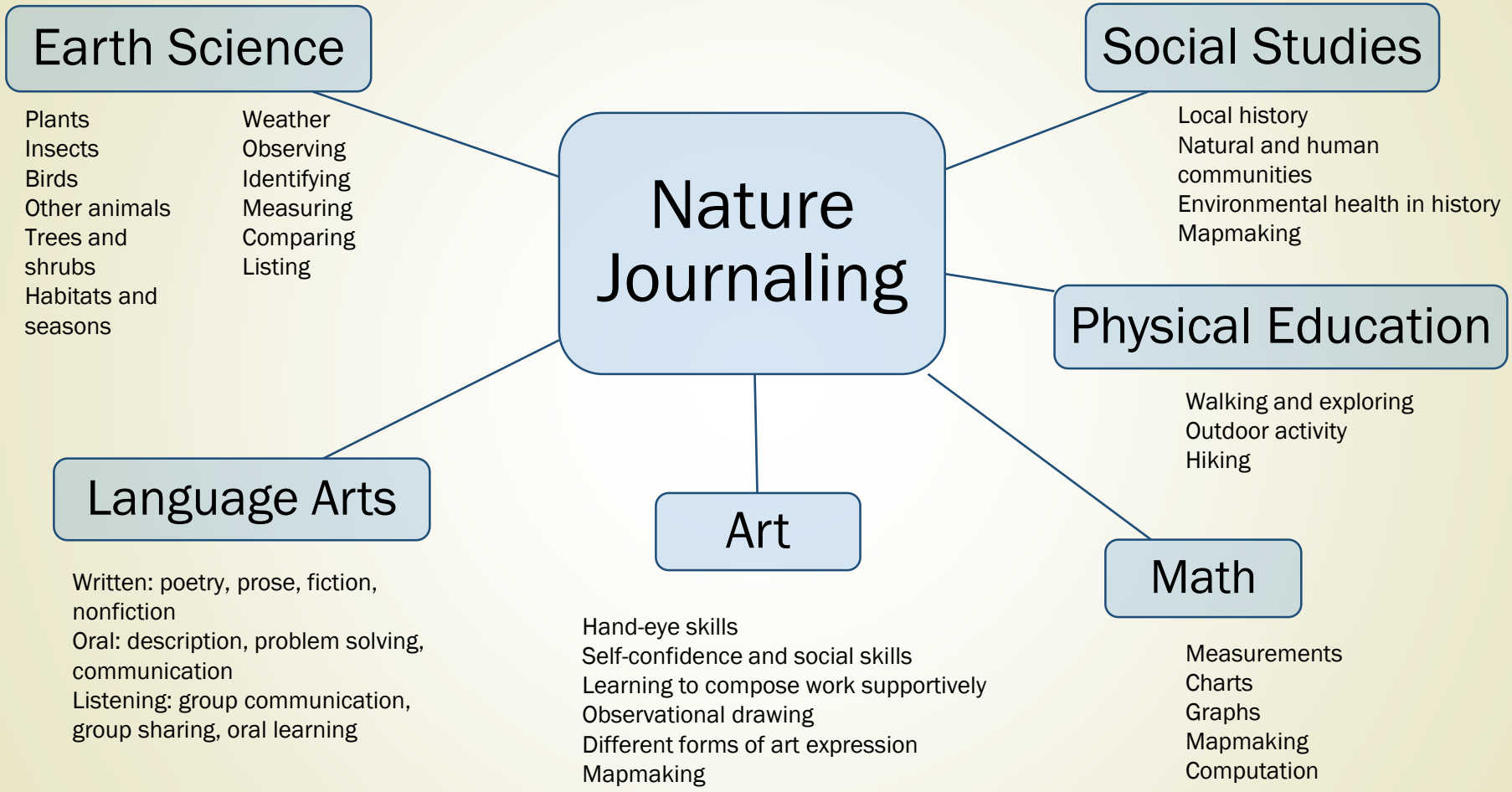
Field Activity

Have students work in pairs. With nature journals and pencils in hand, take the class to a site on campus that has a variety of plants.

Ask student partners to choose one plant that interests them. Give students 5-10 minutes to draw a sketch and write descriptive notes of their plant in their individual journals.

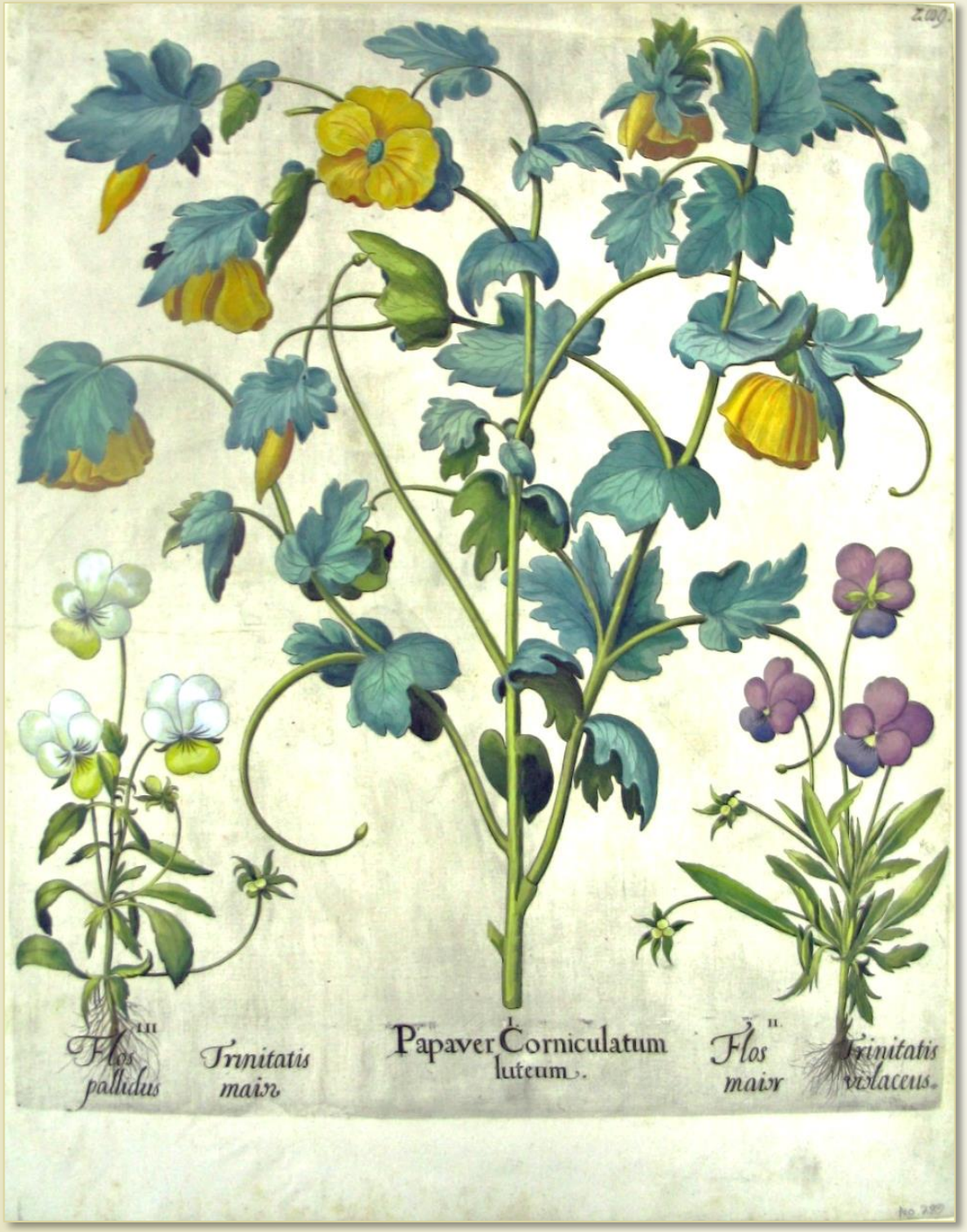
When sketching is completed, partners can compare their drawings to the plant. Did each student include different details? Would other classmates be able to find their selected plant based on their drawings?

Curriculum Web for Nature Journaling

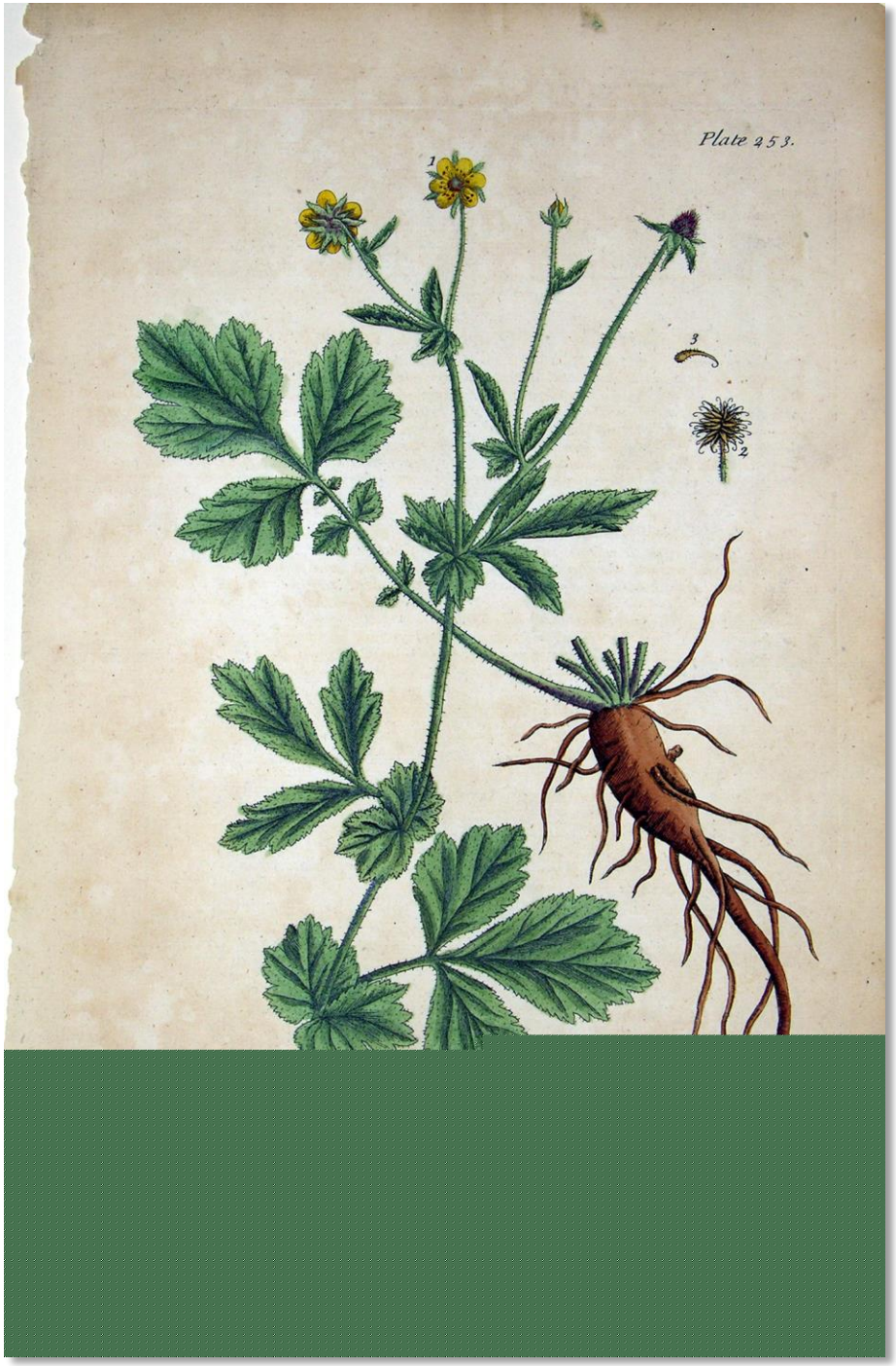


Source: Keeping a Nature Journal by Clare Walker Leslie & Charles Roth, Storey Publishing, 2003.

Maria Sibylla Merian, German, 1647 - 1717
Plate 44, 1705
From *Metamorphosis Insectorum Surinamensium*, Amsterdam
Engraving, hand-colored
Museum purchase, funds provided by Kevin and Margaret Harrington, 2010.27.5



Basilius Besler, German, 1561 - 1629
Papaver Corniculatum Luteum, 1613
From *Hortus Eystettensis*, Eichstatt
Ink on paper
Museum purchase, funds provided by Peter Descorcy, with additional funds provided by Gladys Harn Harris Art Acquisition Endowment, 2010.30



Additional image for reference & inspiration

Elizabeth Blackwell
Scottish, 1707-1758
Avens or Herb Bennet
1739
Engraving, hand colored
From *A Curious Herbal* (London, 1739)
Museum purchase, funds provided by Peter DeSorcy
2011.11.2

This plate depicts Avens or Herb Bennet, known today as *Geum urbanum L*. It was believed to be effective for treating poison and dog bites, liver disease, catarrh and stomach distress. More recently, it has been used to treat diarrhea, heart disease, halitosis and ulcers of the mouth. The accompanying text also claims the roots are “cordial and cheering to ye Spirits, when infused in Wine” (volume 2). Blackwell’s illustration includes two specimens, one that has been cut at the stem, and the other which is still connected to a large root full of offshoots. She also shows flowers in various stages of bloom as well as details of a flower, seed vessel and seed.