



Clearly Classified

Grades:	Lower Elementary (K–2), Upper Elementary (3–5), High School (9–12)
Subjects:	Science and Visual Arts
Time Required:	1–3 class periods
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Featured Getty Artwork

Flower Still Life by Ambrosius Bosschaert the Elder
<http://www.getty.edu/art/gettyguide/artObjectDetails?artobj=842>

Lesson Overview

Students will classify the plants and insects depicted in a painting.

Learning Objectives

Students will:

- create categories for plants and insects based on shared traits.
- classify plants by color, leaf or petal shape, means of reproduction, and season of bloom.
- classify insects by scientific name.
- chart classifying characteristics.
- closely observe plants and insects in an artwork and from life, and draw from observation.
- list at least three characteristics or properties of a virus.

Materials List

Beginning Level Activity:

- Reproduction of *Flower Still Life* by Ambrosius Bosschaert the Elder
- Background Information and Questions for Teaching about the painting
- Reproductions of details of the different insects in the painting *Flower Still Life*.
- Reproductions of details from the artwork (see images on the Web page for this lesson)
- Prepared notes about the lifespan, habitat, and biology of the insects visible in the painting: two butterflies, and a bumblebee, dragonfly, and caterpillar
- Student Handout: *Insect Info*

Intermediate Level Activity:

- Materials listed above, plus:
- Bug viewers or magnifying glasses
- Drawing paper, pencils, and colored pencils
- Reference resources for Linnaeus's system of scientific names. Some online resources for ideas about how to use keys to help classify plants and animals include:
 - The National Biological Information Infrastructure (<http://www.nbi.gov/>) has many resources about scientific nomenclature
 - BugGuide (<http://bugguide.net>) has a guide of bug types
 - The Royal Botanic Gardens, Kew Web site (in England) has resources for students about plants and flowers (<http://www.kew.org/education/index.html>)
 - Flora of North America lesson, "Species and Specimens" (http://www.fna.org/FNA/Outreach/FNA_lesson_biodiversity.shtml)

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Advanced Level Activity:

- Materials listed above, plus:
- Research materials on viruses
- Botanical texts and other research tools (see resources listed above)
- Pencils and colored pencils

Steps

Beginning Level Activity

1. Display or hand out reproductions of *Flower Still Life* by Ambrosius Bosschaert the Elder. Tell students that still-life paintings often depict living and non-living things together— animals, plants, and objects. Create a graphic organizer on the board to classify objects in the artwork as either living or non-living. Then, within the list of living things, have the class identify the plants and animals in the still life and sort them into the graphic organizer.
2. Tell students that classification is an important step in understanding all the things that make up our world. Scientists classify things by finding common characteristics. By separating the items in this still life into non-living and living, and then plants and animals, they have created a classification of the items in the painting.
3. Give each pair of students a reproduction of a detail of a different insect from the painting: two butterflies, bumblebee, dragonfly, and caterpillar. Have partners answer the questions about their insect on the *Insect Info* student handout, using their observations and the notes that you prepare for the students.
4. Once the students have answered the questions for their insect, chart the answers on the board. Ask how this list could be divided into two sub-groups of insects that share certain qualities. Some options include: whether they live in groups or by themselves, winged and non-winged insects, and **carnivores** and **herbivores**. Come up with as many variations as possible.

Intermediate Level Activity

5. Have each student collect an insect or flower specimen from an area of the schoolyard or from home and bring it to class.
6. Review with students the reasons for classification and background on **Linnaeus's** system of naming, called **binomial nomenclature**, which was instituted in the 18th century. Chart the scientific names of various familiar organisms like *Canis familiaris* (domesticated dog), *Eschscholzia californica* (California poppy), or *Ursus horribilis* (grizzly bear) and explain the hierarchy implicit in the names, which describe the scientific family and species. For example, explain to students that the Latin word "Ursus" means "bear" and is the family name that all bears belong to. The second word "horribilis" is Latin for "horrible" and describes the specific type of bear within the family of bears.
7. Hand out bug viewers or magnifying glasses to the students. Students will observe their insect or flower and draw it carefully. Students should use shading to give the specimen three-dimensional form. Using scientific texts, students should research the scientific name of their specimen. The lesson "Species and Specimens" from the Flora of North America Web site (http://www.fna.org/FNA/Outreach/FNA_lesson_biodiversity.shtm) provides ideas about how to use keys to identify plants and animals.
8. Display the correctly labeled drawings around the classroom.

Advanced Level Activity



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9. Explain to students how new classifications of living things can arise. Scientists can discover new organisms previously unknown to them. A new species can develop through natural selection. And genetic mutation and can cause new traits to develop in adaptation with an environment to create new species. Explain to students that viruses caused the stripes and bright color streaks in the tulips seen in the Bosschaert painting. These viruses once made tulips valuable commodities. Today these infected tulips are common, but that was not the case when this painting was made in 17th-century Holland. The virus was used to create a new variety of tulip. Infected tulips were highly prized and people traded enormous fortunes for the thrill of owning even one infected bulb.
10. Review with your students what they know about viruses. Point out the fact that they occur in plants as well as animals.
11. Have students use printed research materials and the Internet to add to their knowledge about viruses in tulips. Students should understand the following before they continue with the activity:
 - A virus is an infectious organism that reproduces within the cells of a host.
 - A virus is not alive until it enters the cells of a living plant or animal.
 - Viruses can be introduced in plants by insects or other plant seeds or pollen.
 - A virus is composed of genetic information within a protein coat.
 - Viruses can be contained so that they do not infect the environment or other organisms.
12. Ask students to draw a diagram of a plant cell and a virus, based on the research they just completed. Students should use a variety of shading techniques, including cross-hatching, to distinguish the different components of the cell and the virus in their drawings. Write out a list of similarities and differences comparing the plant cell and the virus.
13. Divide students into groups. Tell group members that they are tulip farmers who want to create a new variety of tulip by genetically engineering a virus and introducing it to a crop. Ask students to address the following based on the research they have done in previous steps:
 - Describe how they will introduce the virus.
 - Predict how the infected tulips will look.
 - Determine how they will safeguard against the virus spreading into the environment and contaminating other plants.

Standards Addressed

Refer to the charts for national and California state standards for this curriculum, found on the Web pages for this curriculum on www.getty.edu.

