



Ross Biological Reserve

Purdue University

ECOLOGY and ART

K- 12 Outreach Program

Contact

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Ross Biological Reserve Director

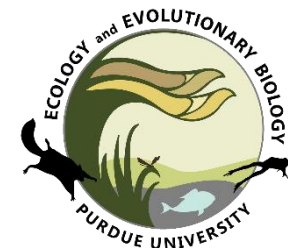
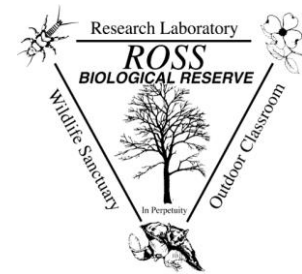
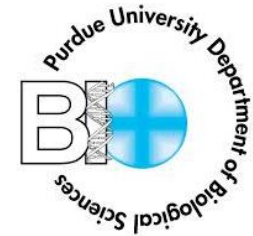
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Ecology and Art

K- 12 Outreach Program

The Ecology and Art Program offers field trips to the Ross Biological Reserve led by ecologists addressing scientific principles and conservation concerns in conjunction with art workshops. The workshops are held at the Alton A. Lindsey Field Laboratory in the Reserve. They have been designed to enhance the experience of visiting the Reserve, and to complement science classes with a **learning-across-the-curriculum** approach. Students learn about biology through observation and discovery of the wonders of nature found in the Reserve year round, while incorporating numerous means of artistic exploration. We include connections with other subjects such as geometry and math while investigating patterns at multiple scales. Most of the artistic techniques can be adapted to any topic that the teacher would like to emphasize during the field trip, presenting new creative possibilities for students with different skill levels.

Besides the joy of walking through this unique natural area, and the benefits of hands-on-activities, students will gain a deeper understanding of the vital connections between the natural and the human worlds as a reminder of the importance of protecting our environment.



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Indiana Education Standards

All art projects have been designed to complement studies of the following **Science State Standards Topics**:

- 1 - **Diversity of Life**: study of plants and animals observing size, patterns, colors, forms, shapes, and their differences; learning about the environmental foundation of the variety of life.
- 2 - **Scientific Inquiry**: study of plants and animals through manipulation and close observation of specimens; understanding principles of ecology that explain patterns.
- 3 - **Interdependence of Life**: representation of life cycles; interactions like predation and mutualism.
- 4 - **Ecology**: habitat, environment, native/introduced species; what factors determine distribution and abundance of species
- 5 - **Natural Resources**: recycling and human impacts; the resilience of natural communities.



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Ecology and Art
K- 12 Outreach Program
Department of Biological Sciences

Focus Visits Topics **and** **Optional Art Projects**



Forest Insects

Topics: Predation, principles of warning coloration, chemical defense, and crypsis.

Grades: K-3

Science Standards: 1, 2, 3, 4, 5

Art Project: mixed media collage, printmaking with natural elements.

Images: Monarch (*Danaus plexippus*) caterpillar



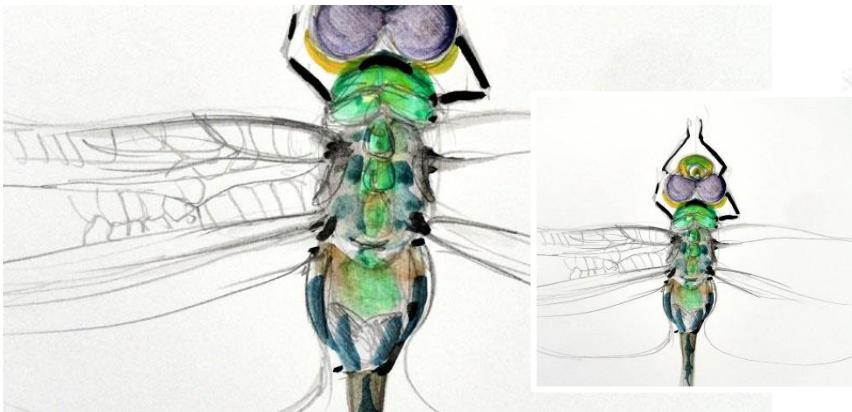
Butterflies & Dragonflies

Topics: Physics of flight, mimicry, and complex life cycles.

Grades: K-6

Science Standards: 1, 2, 3, 4

Art Project: learning to draw symmetric forms in nature, color pencil drawing, and watercolor painting.



Green Darner (*Anax junius*) dragonfly, sketch detail



Giant Swallowtail (*Papilio cresphontes*) butterfly

Going Green

Topic: Conservation of natural resources and biodiversity.

Grades: K - 6

Science Standards: 1, 4, 5

Art Project: Art with recycled materials.

Images: selection of collages and 3D works created with recycled materials.



Amphibians and Wetlands

Topic: Understanding causes of wetland loss and amphibian declines. Environmental requirements of frogs; endangered species; habitat loss; ecological restoration; complex lifecycles.

Grades: 2 - 5

Science Standards: 1, 4, 5

Art Project: Book making depicting concepts learned in the fieldtrip.

Images: Field trip and art project. Mayflower Elementary School, 2nd /3rd grade multiage class.



Native Wildflowers I

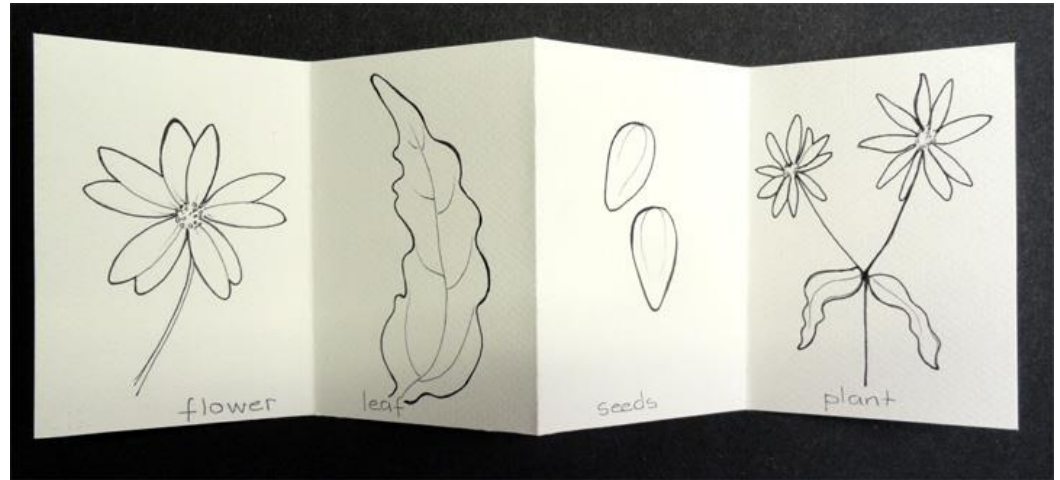
Topics: Plant reproductive strategies, flower structure, and pollination.

Grades: K- 6

Science Standards: 1, 2, 3, 4

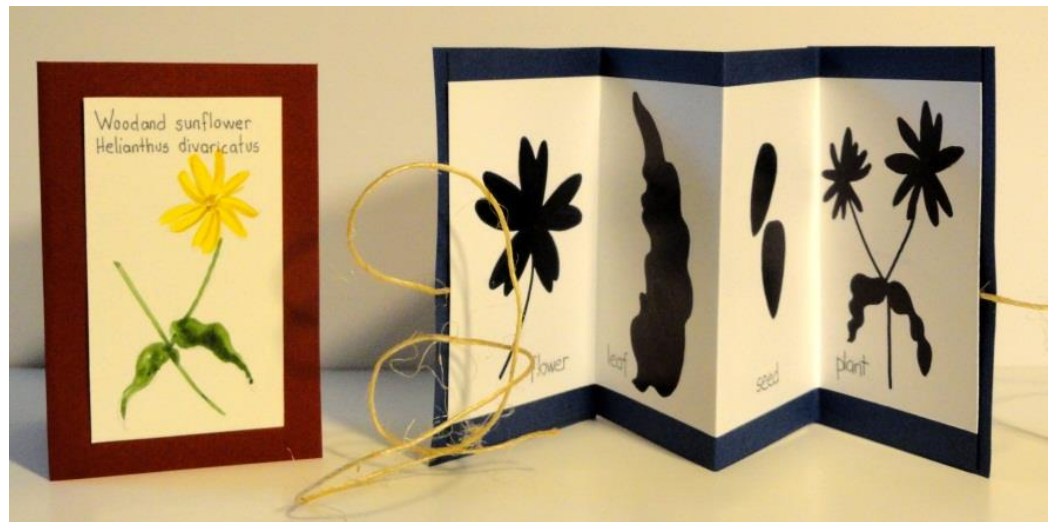
Art Projects: plant life representation, bookmaking, drawing and painting.

Images: variations of small books depicting Woodland Sunflower (*Helianthus divaricatus*) plant.



Woodland Sunflower (*Helianthus divaricatus*) plant.

Technique: botanical ink drawing, book making



Woodland Sunflower (*Helianthus divaricatus*) plant.

Technique: botanical drawing, watercolor, ink, book making 8

Native Wildflowers II

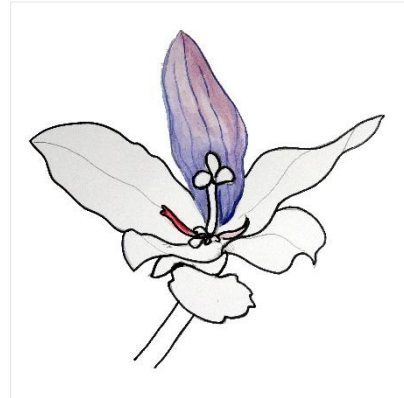
Topics: Plant reproductive strategies, flower structure, & pollination.

Grades: K- 6

Science Standards: 1, 2, 3, 4

Art Project: Introduction to botanical drawing and painting.

Images: left: Venus's Looking-Glass (*Triodanis perfoliata*)
right: Woodland Sunflower (*Helianthus divaricatus*).



Native Trees

Topics: Leaves as solar powerplants and identification aids, and the effects of seasons and pollution.

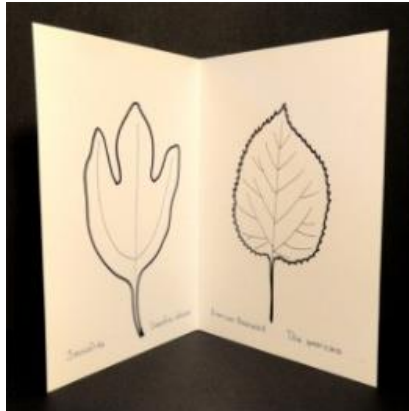
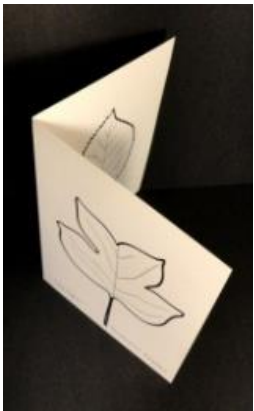
Grades: K- 6

Science Standards: 1, 2, 3, 4

Art Project: pencil drawing and watercolor painting.

Optional: create a book with a variety of leaves.

Images: Book with drawings and paintings depicting leaves of native trees.



Native and Invasive Plants

Topics: History, identification, and control of invasive plants, from rationale for introduction to impacts in Native communities.

Grades: K- 6

Science Standards: 1, 2, 3, 4, 5

Art Project: Pop-up card design, drawing, paper cutting and folding, card assemblage.

Images: Field trip and art project. In this opportunity the art was done in the classroom in coordination with a follow-up project the teachers assigned to the students. 4th Grade students, Happy Hollow Elementary School, West Lafayette, IN.



Trees and plants

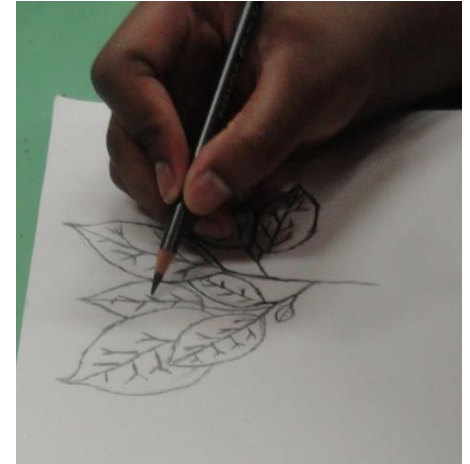
Topics: Leaf morphology, physiology, and function.

Grades: 6 - 12

Science Standards: 1, 2, 3, 4.

Art Project: Introduction to Scientific Illustration, graphite and color pencil drawing.

Images: 2013 Summer Camp art session at the Ross Biological Reserve. Drawings by 8th grade students depicting leaves of invasive plants.



Birds

Topics: Diversity of Indiana birds, roles in ecosystems, and diversity of behavior and migration.

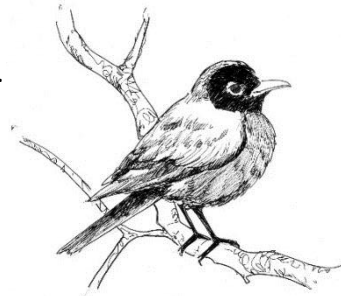
Grades: 6 -12

Science Standards: 1, 2, 3, 4.

Art Project: the technique for this activity will be selected according grade level.

Art technique options

- sketching with pencils or pens
- silhouettes with various materials
- painting with water based mediums: watercolor, tempera, ink



American Robin
sketch with ink



American Robin
ink silhouette



American Robin
basic painting

Images: Examples of the American Robin depicted with different techniques.

Bird Nests

Topics: Nest design and habitat use; life-history strategies.

Grades: K-5

Science Standards: 1, 2, 3, 4, 5

Art Project: mix media collage.



American Robin (*Turdus migratorius*) nest.



Ruby-throated Hummingbird (*Archilochus colubris*) nest.

Images: comparison between nests of different species.

Bird Vision

Topics: How do we see and use colors? What makes birds different from us?

Human and bird eyes, color perception, color mixing palette.

Grades: 3 - 6

Science Standards: 1, 2, 3, 4, 5.

Art Project: landscape painting from human and bird perspectives.



Images: Paintings representing variations in color perception.



Patterns in Nature

Topics: The geometry of life, functional principles, recurrent spatial patterns, and inspiration for art and design.

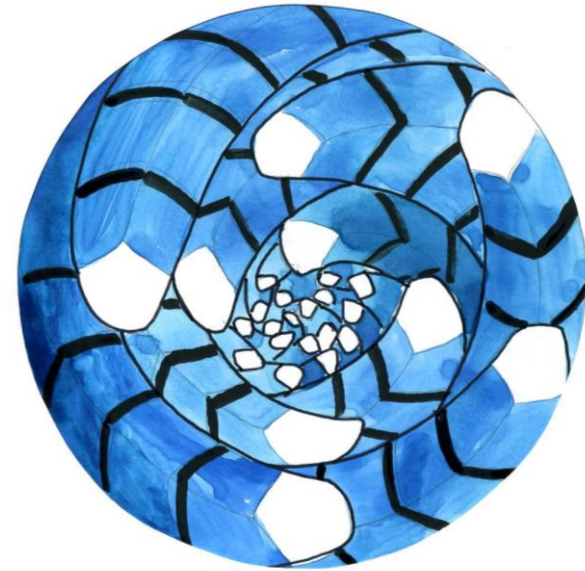
Grades: 4 -12

Science Standards: 1, 2, 4, 5

Art Project: abstract compositions with organic shapes and forms.
The technique for this activity will be selected according grade level.

Art technique options:

- drawing with pencils, pens, or markers
- paper collage
- painting with water based mediums: watercolor, tempera, ink
- 3D works: introduction to paper sculpture



Images: Paper works and design inspired by organic patterns

