

4-H Wildflower Project



Big Bluebell - *Hyacinthoides*



Wild Rose - *Rosa blanda*



Wild Yam - *Dioscorea*



Blackberry - *Rubus*



Blackberry - *Rubus*



Blackberry - *Rubus*



New York Thistle - *Cirsium peruvianum*



Arrowweed - *Sagittaria*



Solanum - *Solanum*



Large Blue Flag - *Iris*

Prepared by a committee of volunteers from the Hamilton County Master Gardeners Association:

Kathy Apple

Harriet Green

Nancy Jolliff

Judy Langdon

Kathryn Mascaro

Nancy Roberts

Eddie Wood

Emily Woodworth-Roark

Melanie Baker, co-chair

Mary Kraft, co-chair and contact person:

317-773-5361

mkraft2@earthlink.net

Special thanks to Jeff Baker and Bob Kraft for their invaluable assistance!

3-29-00

Revised 12-02-03

YOUR WILD ADVENTURE BEGINS

Welcome!

As a 4-H Wildflower Project member, you will have numerous opportunities to learn about the world of wildflowers: botany, identification techniques, plant diversity, conservation, and the environment. On the following pages you will find basic information about Indiana native wildflowers and why we should care for them.

This is the 10th grade manual one of a series of exciting project booklets that will guide you through this year's wildflower project. Each year you will expand your knowledge of Indiana native plants as you complete many activities. This manual not only explains the project requirements, but also suggests numerous activities and provides you with a wealth of information concerning the vast resources available to you as a project member.

Now let's get started!



Table of Contents

YOUR WILD ADVENTURE BEGINS	3
INDIANA NATIVE WILDFLOWERS.....	5
PROJECT REQUIREMENTS, GRADE 10	6
EXHIBIT REQUIREMENTS, GRADE 10.....	7
INDIANA WILDFLOWERS.....	8
WILDFLOWER IDENTIFICATION.....	10
VOCABULARY WORKSHEET	11
GROW YOUR OWN!	12
PROPAGATION REQUIREMENTS FROM SEED	13
GENERAL TIPS FOR STARTING SEEDS INDOORS.....	22
PROPAGATION RECORD.....	23
INVASIVE FLOWERS AND PLANTS IN INDIANA.....	24
INVASIVE PLANTS IN THE MIDWEST	25
COMPARE AND CONTRAST TWO SPECIES	27
COMMUNITY SERVICE.....	28
WRITING YOUR WILDFLOWER JOURNAL.....	28
OPTIONAL WORKSHOPS	29
WHERE TO GO TO SEE SPRING WILDFLOWERS	30
OPTIONAL ACTIVITY.....	31
GLOSSARY	34
WILDFLOWER PROJECT RESOURCE LIBRARY	38
PRINT RESOURCES.....	39
NON-PRINT RESOURCES.....	40
SEED AND PLANT SUPPLIERS.....	42
4-H WILDFLOWER PROJECT RECORD SHEET	45

INDIANA NATIVE WILDFLOWERS

An Indiana Native Wildflower may be defined as a flowering plant that has evolved and grown naturally in the area we know as the state of Indiana since before the time the first settlers arrived.

Webster's dictionary defines a wildflower as a plant that can survive without cultivation. These plants are able to grow on their own regardless of climate extremes. Wildflowers are adapted to the local growing conditions, surviving and generally flourishing regardless of the weather. A plant can be native to a region, state, or just a certain valley, so there are plants that are found in only specific areas of the state, such as the Indiana Dunes or southern hills and lowlands of the state. Every area has a group of plants that have lived there naturally for hundreds, even thousands, of years. Those plants are that area's native flora.

To understand the concept of "native," it is also important to understand the term, "non-native." Non-native plants may be known as introduced, alien or exotic, all of which mean that the plants did not originate in a particular location. Many non-native plants have escaped from cultivation and now grow wild in areas where they are not native. These include Queen Anne's lace, dandelions, chicory, dame's rocket, and the orange Asiatic daylilies that grow along the edges of country roads. Many of these plants are called wildflowers because they have been here so long that we assume they are native plants, when indeed they have been introduced to our state from other parts of the world. Many of these non-native plants are actually native to Europe and were brought here by settlers for food, medicine, or ornamentation. Other plants came by chance; their seeds may have been mixed in with agricultural seeds or even have been part of the bedding used on ships that crossed the Atlantic on their way to the new colonies.



PROJECT REQUIREMENTS, GRADE 10

1. Identify ten (10) Indiana native wildflowers
2. Complete Wildflower Identification Sheets - page 10 (duplicate as needed)
3. Define vocabulary (page 11)
4. Grow three (3) varieties of Indiana native wildflowers from seed
5. Complete Propagation Record - page 23 (duplicate as needed)
6. Identify three (3) Indiana invasive plants - page 24
7. Complete Wildflower Identification Sheets for your invasive plants - page 10 (duplicate as needed)
8. Compare and contrast two (2) Indiana native wildflowers - page 27
9. Keep a journal - page 28
10. Perform a Community Service project – page 28
11. Complete 4-H Wildflower Project Record Sheet with Community Service segment - page 45 (your **4-H Club Leader** must sign page 45)



EXHIBIT REQUIREMENTS

During your tenth-grade year in the 4-H Wildflower Project, you will choose ten (10) Indiana native wildflowers to study and exhibit. [You may certainly exhibit more; however, place the ten (10) plants that you want judged as the first ten (10) in your exhibit notebook.]

1. Choose the exhibit medium that most interests you. You may mix media if you choose. The three choices are:
 - Photographs -
 - Take one (1) site photo and one (1) close-up photo of each of the ten (10) plants.
 - Photos must be at least 4" x 6", color or black and white.
 - Both photos of each plant must be mounted on the same page on black paper.
 - Label each photo with scientific and common names.
 - Drawings and paintings -
 - Do one (1) drawing or painting of each of the ten (10) plants.
 - Drawings or paintings must be a minimum of 4" x 6", a maximum of 5" x 7".
 - Drawings or paintings of each plant must be mounted on black paper.
 - Label each drawing or painting with scientific and common names.
 - Art media may include:
 - line drawings in pencil or black ink on white paper
 - colored pencils - on white paper
 - watercolor - on white paper
 - Collection of Indiana native wildflowers -
 - Collect **ONLY** those wildflowers named on the list on page 9.
 - Collect and dry each of the ten (10) plants, including the bloom, at least one (1) pair of leaves, and part of the stem (**no** roots!)
 - Mount each plant on black paper.
 - Label each plant with common and scientific names.
2. Identify each plant by completing the Wildflower Identification worksheet for each plant (page 10). Include it in your exhibit notebook *
3. Complete the Vocabulary Worksheet (page 11). Include it in the exhibit notebook *
4. Grow-Your-Own (see page 12); complete Propagation Record (page 23); include in exhibit notebook *
5. Identify three (3) Indiana invasive plants (page 24). Identify each plant by completing a Wildflower Identification worksheet for each plant (page 10). Include in exhibit notebook *
5. Compare and contrast two (2) species of Indiana native wildflowers (page 27). Include your written comparison in the exhibit notebook.
6. Complete a Community Service project – page 28 (**4-H Club Leader** must sign page 45).
7. Keep a journal (page 28). Display next to the exhibit notebook.
8. Complete the 4-H Wildflower Project Record Sheet with Community Service segment (page 45). Include in the exhibit notebook.

(continued on page 8)

10. Display exhibit in a 3-ring notebook in the following order:

- Wildflowers: each page of photographs, drawings, paintings, and/or dried wildflowers should be facing the appropriate Wildflower Identification Worksheet, so that when your notebook is being viewed, all information about a specific plant can be seen at once.
- Invasive plants: each page of photographs, drawings, and/or paintings of plants should be facing the appropriate Wildflower Identification Worksheet, so that when your notebook is being viewed, all information about a specific plant can be seen at once.
- Vocabulary worksheet
- Propagation Record (3)
- Written comparison of two (2) species of Indiana native wildflowers.
- 4-H Wildflower Project Record Sheet with Community Service Segment (**4-H Club Leader must sign**)

11. Display journal next to exhibit notebook.

*You may photocopy worksheets as needed (or obtain copies at the 4-H office).

~~ INDIANA WILDFLOWERS ~~



This is a selected list of Indiana wildflowers that may be collected for your exhibit. Please do NOT collect from any public park, or state or national woods, or other protected area. Obtain permission of the land-owner before picking any flower, and take no more than you must have for your exhibit. Remember, we **strongly** recommend that your first choice be to photograph, draw, or paint wildflowers for your exhibit instead of actually collecting specimens! Buy reliable wildflower books, or borrow from your 4-H library, your school library, or the public library to take on your hikes for identification purposes, and for pictures and names of many hundreds more that may be drawn, painted, or photographed. Please do not pick any wildflowers not on this list. Call the contact person in the front of this book if you have questions.

American Bellflower- *Campanula americana*
 Anemone, Woodland- *Anemone quinquefolia*
 Angelica- *Angelica atropurpurea* or *A. venenosa*
 Aniseroot- *Osmorhiza longistylis*
 Arrowhead, Common- *Sagittaria latifolia*
 Aster, Hairy- *Aster pilosus*
 Aster, Heath- *Aster ericoides*
 Aster, New England- *Aster novae-angliae*
 Avens, White and Rough – *Geum canadense*, *G. laciniatum*
 Beardtongue- *Penstemon calycosus* and *P. digitalis*
 Bedstraw- *Galium* spp.
 Beggar's Ticks, Tickseed- *Bidens* spp
 Bellwort, Large-flowered- *Uvularia grandiflora*
 Bishop's Cap, 2-leaved Mitrewort- *Mitella diphylla*
 Black-eyed Susan- *Rudbeckia hirta*
 Blazing Star- *Liatris aspera* and *L. spicata*
 Blue Cohosh- *Caulophyllum thalictroides*
 Blue Flag Iris- *Iris virginica*
 Blue Vervain- *Verbena hastata*
 Boneset, Common- *Eupatorium perfoliatum*
 Butterflyweed- *Asclepias tuberosa*
 Carrion Flower, Common- *Smilax lasioneura*
 Chickweed, Star- *Stellaria pubera*
 Chicory- *Chicorium intybus*
 Cinquefoil- *Potentilla simplex*
 Cleavers- *Galium aparine*
 Compass Plant- *Silphium laciniatum*
 Coneflower, Grey-headed- *Ratibida pinnata*
 Coneflower, Purple- *Echinacea purpurea*
 Coreopsis- *Coreopsis* spp.
 Cow Parsnip- *Heracleum sphondylium*
 Cress, Common, Creeping and Spring- *Rorippa palustris*, *R. sylvestris*, *Cardamine bulbosa*
 Cup Plant- *Silphium perfoliatum*
 Daisy Fleabane- *Erigeron annuus*
 Dutchman's Breeches- *Dicentra cucullaria*
 Evening Primrose- *Oenothera biennis*
 False Rue Anemone- *Enemion biternatum*
 False Sunflower- *Heliopsis helianthoides*
 Feverfew, American, or Wild Quinine- *Parthenium integrifolium*
 Geranium, Wild (Cranesbill)- *Geranium maculatum*

Goatsbeard- *Aruncus dioicus*
 Golden Ragwort- *Packera aurea* and *P. obovata*
 Goldenrod – *Euthamia* spp and *Solidago* spp
 Ground Cherry- *Physalis* spp
 Heal-All or Self-Heal- *Prunella vulgaris*
 Horsemint- *Monarda punctata*
 Ironweed, Tall- *Vernonia gigantea*
 Jewelweed- *Impatiens pallida*, *I. capensis*
 Joe Pye Weed- *Eupatorium purpureum*, *E. maculatum*,
E. fistulosum
 Leather Flower- *Clematis viorna*
 Lobelia, Blue- *Lobelia siphilitica*
 Loosestrife- *Lysimachia ciliata* and *L. quadrifolia*
 Lopseed- *Phryma leptostachya*
 Licorice, Wild- *Galium circaeazans*
 Marsh Marigold- *Caltha palustris*
 May Apple- *Podophyllum peltatum*
 Milkweed, Common- *Asclepias syriaca*
 Milkweed, Swamp- *Asclepias incarnata*
 Milkweed, Whorled- *Asclepias verticillata*
 Milkwort, Whorled- *Polygala verticillata*
 Monkey Flower- *Mimulus ringens*
 Obedient Plant- *Physostegia virginiana*
 Partridge Pea- *Chamaecrista fasciculata*
 Phlox, Woodland, Smooth, or Downy- *Phlox divaricata*, *P. glaberrima*, *P. pilosa*
 Pokeweed- *Phytolacca americana*
 Puccoon, Hairy and Hoary- *Lithospermum caroliniense*
 and *L. canescens*
 Pussytoes- *Antennaria* spp
 Rattlesnake master- *Eryngium yuccifolium*
 Rose mallow- *Hibiscus laevis*
 Rue anemone- *Thalictrum thalictroides*
 Senna, Northern Wild – *Senna hebecarpa*
 Skunk cabbage- *Symplocarpus foetidus*
 Sneezeweed- *Helenium autumnale*
 Solomon's Seal- *Polygonatum biflorum*, *P. pubescens*
 Spatterdock- *Nuphar lutea*
 Spiderwort- *Tradescantia virginiana*
 Spring Beauty- *Claytonia virginica*
 Spurge, Creeping or Spotted- *Euphorbia maculata*
 Squirrel Corn- *Dicentra canadensis*
 Sunflower spp.- *Helianthus* spp
 Sweet Cicely- *Osmorhiza claytonii*
 Sweet William- *Dianthus barbatus*
 Thistle, Yellow Star- *Centaurea solstitialis*
 Tick trefoil- *Desmodium* spp
 Toothwort- *Cardamine concatenata*
 Turtlehead- *Chelone glabra*
 Violets- *Viola* spp
 Virginia Bluebells- *Mertensia virginica*
 Waterleaf- *Hydrophyllum* spp
 White Snakeroot- *Eupatorium rugosum*
 Wild Cucumber- *Echinocystis lobata*
 Wild Garlic- *Allium canadense*
 Wild Leek- *Allium burdickii*
 Wild Lettuce- *Lactuca* spp
 Wild Petunia- *Ruellia* spp
 Wild Strawberry- *Fragaria virginiana*
 Wood Sorrel- *Oxalis*

WILDFLOWER IDENTIFICATION

(Include in exhibit notebook)

Scientific name: _____

Common name(s): _____

Exact location of specimen:

Address: _____

City, town or rural area: _____

County: _____

State: Indiana

Date photographed, drawn or painted, or collected: _____

Identifying Characteristics –(check those that apply)

Leaves:

alternate _____

opposite _____

whorled _____

basal _____

entire _____

toothed _____

lobed _____

divided _____

hairy _____

smooth _____

Stem:

smooth _____

fuzzy _____

square _____

round _____

Blooms:

regular _____

irregular _____

indistinguishable _____

Your initials _____

Date _____

VOCABULARY WORKSHEET

(Include in exhibit notebook)

Write the definitions of the following words. Include this sheet in your exhibit notebook

Parts of a Plant

Creeping _____

Trailing _____

Prostrate _____

Runner _____

Bulb _____

Tuber _____

Rootstock _____

Recurved _____

Reflexed _____

Axil _____

GROW YOUR OWN!

Very soon now you will become a creator...a sower of seeds! Study the plant list and the Propagation Requirements from Seed beginning on page 13. This information will guide you as you decide which seeds you would most like to plant. Then study the General Tips for Starting Seeds Indoors on page 22. Gather the supplies and seeds necessary for success. Have fun!

1. Choose three (3) varieties of Indiana native plants to grow from seed.
2. Research additional information about your plant choice.
3. Plant a minimum of ten (10) seeds of each plant, as not all will germinate.
4. Complete the Propagation Record provided on page 23 and include in your exhibit notebook.



PROPAGATION REQUIREMENTS FROM SEED

Alumroot; *Heuchera richardsonii*; perennial; germinates in 10-60 days, requires light and 60-70 degrees; start 8-10 weeks before transplanting

American Bellflower; *Campanula americana*; perennial; difficult, germinates in 14-28 days, requires light and 60-70 degrees; start 8-10 weeks before transplanting

American Lotus or Waterlily; *Nelumbo lutea*; perennial; germinates in 14-30 days; scarify seed and submerge in hot water (75-85 degrees), change water twice a day until it germinates

Anemone (Woodland); *Anemone quinquefolia*; perennial; germinates in 15-180 days; stratify for 2 to 3 weeks; sow in a flat, sink the flat in the ground in a shady location, cover with glass, transplant as seedlings appear

Angelica; *Angelica venenosa*; biennial; easy; direct seed in late summer, requires light and 60 degrees; germinates in 4 weeks

Arrowhead; *Sagittaria latifolia*; perennial; grow from seed or fall division

Aster; *Aster spp.*; perennial; easy; germinates in 14-36 days; stratify for 2 week and provide 70-75 degrees thereafter; start 6-8 weeks before transplanting

Beardtongue; *Penstemon calycosus* and *P. digitalis*; perennial; germinates in 18-36 days, requires light and 55-65 degrees; start 8-10 week before transplanting

Bedstraw; *Galium spp.*; perennial; grows easily from seed

Bellwort; *Uvularia grandiflora*; perennial; sow in flats, sink flats in ground against north facing wall, cover with glass, moisten soil occasionally; germinates in 30-180 days, germinates only outdoors

Bishop's Cap; *Mitella diphylla*; perennial; sow outdoors, requires dark (usually propagated by runners)

Black-eyed Susan; *Rudbeckia hirta*; perennial; easy; stratify for 2 weeks in moist growing medium in refrigerator; then provide light and 70 - 75 degrees

Blazing Star; *Liatris spicata*; perennial; germinates in 20-25 days; sow seeds in flats, barely cover, requires 55-75 degrees. Start 8-10 weeks before transplanting

Bloodroot; *Sanguinaria canadensis*; perennial; germinates in 30-90 days; start indoors in peat pots at 50-55 degrees; start 8-10 weeks before transplanting; or sow in flats & sink flats in ground against north facing wall, cover with glass, moisten soil occasionally

Blue Cohosh; *Caulophyllum thalictroides*; perennial; propagate by division or cutting

Blue Lobelia; *Lobelia siphilitica*; perennial; germinates in 15-21 days; requires light, stratify for 3 months, then grow at 65-75 degrees; watch for damping off, don't overwater

Blue-eyed Mary; *Collinsia verna*; annual; germinates in 14-21 days; requires 65-70 degrees, sow outdoors when soil is cool and light frost is still possible

Boneset; *Eupatorium perfoliatum*; germinates in 1-3 months, do not cover seeds

Bunchberry; *Cornus canadensis*; perennial; remove seed from fleshy fruit; sow in flat of peat moss and sand, requires dark, sink flat in ground against north facing wall for winter, cover with glass

Butterflyweed; *Asclepias tuberosa*; and **Common Milkweed (*A. syriaca*)**; sow seeds in peat pots; secure in plastic bags, and refrigerate for 21 days; provide light and 50-75 degrees thereafter

Calamus or Sweetflag; *Acorus calamus*; grow in swamps and along streams; scatter ripe seeds in late fall in those areas, as they bloom in the spring and early summer

Cardinal Flower; *Lobelia cardinalis*; perennial; germinates in 15-21 days, requires light; stratify for 3 months, then grow at 65-75 degrees; watch for damping off—don't over water; needs rich, moist soil

Carrion Flower; *Smilax herbacea*; Plant ripe berries (blue-black) in woods and thickets in late fall or very early spring; somewhat vine-like; will climb all over bushes.

Cinquefoil; *Potentilla simplex*; stratify in moist conditions in refrigerator for 6 weeks, grow at 65-70 degrees; germinates in 14-30 days

Closed Gentian; *Gentiana andrewsii*; perennial; difficult; germinates in 14-180 days; requires dark, stratify for 8 wks; grow at 70-75 degrees thereafter

Columbine; *Aquilegia canadensis*; perennial; germinates in 30-90 days, stratify for 2-3 weeks, sink flat in the ground in a shady location and cover with glass

Compass Plant; *Silphium laciniatum*; stratify for 2 weeks and provide 70-75 degrees thereafter; start 6-8 weeks before transplanting

Coneflower, Grey-headed; *Ratibida pinnata*; direct seeding: collect seed in fall after it becomes dark and sow outdoors immediately; for spring seeding stratify in refrigerator for at least one month before planting

Coneflower, Pale Purple; *Echinacea purpurea*; direct seeding: collect seed and sow outdoors immediately; for spring seeding: stratify in moist cold for 3-4 months

Coreopsis; *Coreopsis lanceolata*; easy perennial; sow seeds indoors under 70 degrees in moist conditions; germination in 2-4 weeks

Corydalis; *Corydalis flavula*; difficult; germinates in 30-365 days, requires light; sow seed & place at 60-65 degrees for 6-8 weeks, then chill in refrigerator for 2 weeks, then put back at 60-65 degrees

Cow Parsnip; *Heracleum sphondylium*; perennial; germinates in 30-90 days; requires dark; in spring, stratify for 2-3 weeks, sow in flat, sink flat in ground against a north facing wall, cover with glass

Cup Plant; *Silphium perfoliatum*; perennial; germinates in 21 days; requires dark; scarify seeds, sow in flats, sink flats in ground against a north facing wall, cover with glass

Daisy Fleabane; *Erigeron annuus*; perennial; germinates in 10-25 days, requires light and 70 degrees; start 8-10 wks before transplanting

Dutchman's Breeches; *Dicentra cucullaria*; perennial; germinates in 30-365 days, stratify in freezer for 6 wks, then grow at 55-60 degrees thereafter; germinates in midsummer

Evening Primrose; *Oenothera* spp.; perennial; germinates 5-30 days; start 8-10 weeks prior to transplanting; sow seed in peat pots, requires darkness, 65-70 degrees

False Dragonhead; *Physostegia virginiana*; perennial; germinates in 15-30 days at 60-65 degrees; start 8-10 weeks before transplanting

False Foxglove; *Aureolaria flava*; germination in 10-15 days at 55-65 degrees, cover completely, needs darkness to germinate; sow directly into peat pots if indoors, as it resents transplanting, direct sow outdoors in early spring

False Rue Anemone; *Enemion biternatum* [formerly *Isopyrum biternatum*]; - keep seeds cold and moist in refrigerator all winter, then plant in pots in Feb., and transplant outside in May in rich, moist, shady wooded area; or plant outdoors in fall

False Solomon's Seal; *Smilacina racemosa*; perennial; sow seed as soon as it ripens, separate seed from fleshy fruit, sow in flats, sink flats in ground against north facing wall, cover with glass; germinates in 30-180 days

False Sunflower; *Heliopsis helianthoides*; needs full sun or partial shade; ripened seeds should be planted immediately in the fall and left in ground for spring germination; average, well-drained; moist soil; 1' - 3' apart; mulch well. (Even though these are the preferences, it can grow on gravel and tolerates drought. Divide every 3 to 4 years by cutting apart the stocky rhizomatous rootstock with a knife, leaving at least 2 or 3 eyes in each division.)

Fireweed; *Epilobium angustifolium*; perennial; germinates in 14-30 days and requires dark; as soon as seed is ripe in autumn sow in flats, sink flat in ground against north facing wall and cover with glass, moisten soil occasionally

Four O'Clock; *Mirabilis nyctaginea*; perennial; germinates 5-21 days, requires light and 70 degrees; start 6-8 weeks before transplanting

Fringed Loosestrife; *Lysimachia ciliata*; perennial; germinates in 30-90 days; in autumn sow in flats, sink flats in ground against north facing wall & cover with glass

Geranium, Wild; *Geranium maculatum*; plant 12" apart; full sun; moist, slightly acid, well-drained soil; inside grow in a sunny, airy, moist atmosphere where nighttime temperatures are at 50 to 55 degrees

Goatsbeard; *Aruncus dioicus*; perennial; germinates in 30-90 days, requires light and 55-65 degrees; start in late winter

Golden Ragwort; *Packera aurea*; perennial; germinates in 10-21 days; start 6-8 weeks before transplanting; needs light and 65-75 degrees; sow in vermiculite; water only from below; highly susceptible to damping-off

Goldenrod; *Solidago* spp.; perennial; easy; germinates in 14-42 days at 50 degrees; start 6-8 weeks before transplanting

Green Dragon; *Arisaema dracontium*; perennial; difficult; germinates in 30-180 days; separate seed from fleshy fruit, stratify for 6 weeks, grow at 55-60 degrees

Ground Cherry; *Physalis virginiana*; perennial; difficult; germinates in 15-30 days, requires light and 70-75 degrees

Hepatica; *Hepatica acutiloba*; perennial; use seed as soon as ripens, stratify 3 weeks in moist medium, then grow at 50-55 degrees in peat pots or outdoors in shady to partially shaded wooded area; plant immediately after stratification

Hoary puccoon; *Lithospermum canescens*; propagate by cuttings; grow in peat enriched soil in sun, or on rocky or gravelly slopes and margins of grasslands; good in rock gardens

Horsemint; *Monarda punctata*; perennial; germinates in 10-40 days, requires 60-70 degrees; start 8-10 weeks before transplanting

Ironweed, Tall; *Vernonia gigantea* and Missouri Ironweed *V. missurica*; likes moist meadow situations, with neutral to slightly acidic soil; sun to partial sun; propagate by dividing its roots with an axe or chainsaw (ADULTS ONLY!); can be cut back in June to a more manageable size

Jack-in-the-Pulpit; *Arisaema triphyllum*; perennial; difficult; remove seed from fleshy fruit; stratify for 6 weeks; provide 55-60 degrees thereafter; germinates in 30-180 days

Jerusalem Artichoke; *Helianthus tuberosus*; perennial; propagate by tuber division

Jewel Weed; Jewelweeds - there are two:

Spotted Touch-me-not (*Impatiens capensis*) orange with reddish-brown spots

Pale Touch-me-not (*I. pallida*) light yellow with few or no spots; after flowering pods are formed; when they start to turn from green to tan to brown, cover with very fine netting to catch seeds before they disperse. Plant in fall where you want plant to come up in spring. They can spread VERY freely

Joe Pye Weed; *Eupatorium maculatum*; perennial; germinates in 30-90 days, requires 55 degrees; start 8-10 weeks before transplanting

Lead Plant; *Amorpha canescens*: adaptable; full sun to part shade; tolerates dry, infertile, sandy sites because of long taproot; considered weeds in mild climates; sow seed outdoors in the fall, or stratify in refrigerator for at least 2 months, then plant in peat pots

Leather Flower; *Clematis viorna*; perennial; germinates in 30 days to 3 years; in spring stratify in freezer for 3 weeks, sow in flat, sink flat in ground in shaded location, cover with glass; transplant seedlings as soon as they appear

Lopseed; *Phryma leptostachya*; plant in rich woods in late fall or early spring, as they bloom in summer; only one seed is formed in the carpel, enclosed in the tubular calyx, which "lops" down against the stalk; harvest this in fall, plant immediately in neutral to moderately acid soil in open woods or woodland garden

Marsh Marigold; *Caltha palustris*; perennial; sow seed outdoors in peat pots standing in shallow water as soon, germinates in 30-90 days

Mayapple; *Podophyllum peltatum*; perennial; difficult; sow seed as soon as ripens (late summer to September) in flat, sink flat in ground against north facing wall, cover with glass; germinates in 30-180 days

Milkweed, Common; *Asclepias syriaca*; germinates 30-90 days; start 8-10 wks before planting outside; sow seeds in peat pots, secure in plastic bags, refrigerate for 21 days; provide light and 50-75 degrees

Milkweed, Swamp; *Asclepias incarnata*; sow outdoors in late fall; moist area

Milkweed, Whorled; *Asclepias verticillata*; sow outdoors in late fall; dry area

Milkwort or Yellow Candyroot; *Polygala lutea*; biennial; first year produces a rosette of rounded leaves; second year produces flowers and seeds; bogs and wet sandy flats, in *strongly acid* soil; can be transplanted to a bog garden during the first year (when they're in rosettes). **Gay-wings or Fringed Milkwort; *Polygala paucifolia***; can be propagated by seed or by the long underground branching stems. Difficult; susceptible to slugs, fungi, and other pests. Both of these species each produce only one hairy seed per plant, which should be planted in rich acid humusy soil in the fall.

Monkey Flower; *Mimulus ringens*; perennial; germinates in 7-21 days, requires light, stratify for 3 weeks, provide 70-75 degrees thereafter; start 10-12 weeks before transplant

Partridge Pea; *Chamaecrista fasciculata*; annual; germinates in 5-90 days; requires dark; chip seed with sharp knife and soak in warm water for 2-3 hours, grow at 70-75 degrees; start 6-8 weeks before transplanting

Phlox, Woodland, Smooth and Downy; *Phlox divaricata*, *P. Glaberrima*, *P. pilosa*; plant 6" apart; full sun; rich, light, sandy soil with excellent drainage; keep moist during growing season

Pussytoes; *Antennaria neglecta*; perennial; germinates in 30-60 days, requires 55-60 degrees; start in late winter

Rattlesnake Master; *Eryngium yuccifolium*; direct sow outdoors in sun; needs moist well-drained soil

Rose Mallow; *Hibiscus laevis*; perennial; germinates in 10-30 days; chip seed and soak in hot water for 1 hour, requires light and 70-80 degrees; start 8 weeks before transplanting

Royal Catchfly; *Silene regia*; germinates 5-20 days; start 8-10 weeks before transplanting; needs dark and 70 degrees

Rue Anemone; *Thalictrum thalictroides*; perennial; tuber—propagate by division

Scarlet Pimpernel; *Anagallis arvensis*; annual; sow seed outdoors; requires dark; 50-65 degrees; germinates in 30-42 days

Shooting Star; *Dodecatheon meadia*; perennial; difficult; germinates in 90-365 days, requires light, stratify for 3 weeks, grow at 60-70 degrees

Skunk Cabbage; *Symplocarpus foetidus*; perennial; collect seed in late summer; germinates in 30-60 days, requires dark and 55-65 degrees; sow in flat; stand flat in pan of water to keep moist

Sneezeweed; *Helenium autumnale*; perennial; germinates 7-10 days; start 8-10 weeks before transplanting; needs dark and 70 degrees

Soapwort or Bouncing Bet; *Saponaria officinalis*; reseeds freely in place

Solomon's Seal; *Polygonatum biflorum*; perennial; stratify for 2-3 weeks, sow in flat, sink in ground in shade location, cover with glass

Spatterdock or Yellow Pond Lily or Cow Lily; *Nuphar lutea*; flowers float or are immersed in shallow waters or muddy shores; spreads rapidly; not good for a small garden pool; sow seeds in sand and cover with sand; place pan in water of 70 to 80 degrees F; the surface of the sand should be above the water line, but in contact with it; 2-3 wks to first floating leaf; transplant to flats with 2" soil/compost mix; pot up as necessary before planting outside and after planting outside to restrain spreading

Spiderwort; *Tradescantia* spp.; perennial; germinates in 10-40 days; grow at 55-56 degrees, barely cover seed; grow in fertile, well-drained soil in a warm, sheltered site in sun or partial shade; provide a deep winter mulch

Spring Beauty; *Claytonia virginica*; perennial; seeds rarely available; germinates in 14-21 days and requires dark; sow seeds as soon as ripe in flats outdoors (late summer), sink flats in ground against north facing wall and cover with glass, moisten soil occasionally

Spring Cress; *Cardamine bulbosa*; plant seeds in boggy areas in fall or very early spring or divide the small bulbous tubers; moist humusy soil; partial shade; white bloom in late spring

Squirrel Corn; *Dicentra canadensis*; perennial; germinates in 30-365 days; in midsummer stratify seed for 6 wks, grow at 55-60 degrees

Starry Champion or Starry Catchfly; *Silene stellata*; plant ripe seeds in open woods, or divide by cutting through the roots, or take cuttings and root them in sandy soil in a cold frame, shaded from the sun, until rooted; once established, the plants should not be moved; plant in partial shade; transplant to dry sandy, or clay soil.

Sweet Cicely; *Osmorhiza claytonii*; perennial; germinates in 14-42 days and requires light; stratify seeds in freezer for 1 month; grow on at 55-65 degrees

Sweet William; *Dianthus barbatus*; perennial; germinates in 10-21 days, requires light and 70 degrees; stratify 3 weeks; start 8-10 weeks before transplanting

Tick Trefoil; *Desmodium canadense*; perennial; requires dark to germinate; nick seed coat before planting; takes 2-4 weeks to germinate

Toothwort, Cut-leaved; *Cardamine concatenata*; perennial; grow from seed as soon as seed is ripe

Trillium; *Trillium* sp.; perennial; difficult; germinates in 18 months to 3 years; as soon as seed is ripe stratify for 3 months in moist starting mix, then place at 60-70 degrees for 3 months, repeat this entire cycle again

Turtlehead; *Chelone glabra*; perennial; requires dark to germinate; stratify seed for 4 months

Twinleaf; *Jeffersonia diphylla*; perennial; takes up to 2 years to germinate; as soon as seed is ripe (autumn) sow seed sparsely in flats outdoors, sink flats in ground against north facing wall & cover with glass, moisten soil occasionally

Violets; *Viola* spp; perennial; germinates in 50 days; sow seeds in flats outdoors in autumn, sink in ground against north facing wall and cover with glass, moisten soil occasionally

Virginia Bluebells; *Mertensia virginica*; perennial; germinates in 30-60 days, as soon as seed is ripe (late summer) sow seed sparsely in flats outdoors, sink flats in ground against north facing wall and cover with glass, moisten soil occasionally

Waterleaf; perennial; propagate in spring or fall by division, open woods in neutral or slightly acid soil or in a woodland garden; there are four:

Appendaged; *Hydrophyllum appendiculatum*

Broad-leaved; *H. canadense*

Large-leaved; *H. macrophyllum*

Virginia; *H. virginianum*

White Snakeroot; *Eupatorium rugosum*; perennial; germinates in 30-90 days, requires 55 degrees; start 8-10 weeks before transplanting

Wild Cucumber; *Echinocystis lobata*; annual; grows from seed

Wild Garlic; *Allium canadense*, perennial; grows from bulbs and bulblets

Wild Ginger; *Asarum canadense*; perennial; easy; germinates in 7-18 days; as soon as seed ripens stratify for 3 weeks grow on at 60-65 degrees thereafter

Wild Leek; *Allium burdickii*; perennial; difficult; germinates in 14-365 days, requires light to germinate, stratify for 30 days; grow on at 55-65 degrees; can also grow by separating bulbs and replanting

Wild Lettuce; *Lactuca canadensis*; biennial; grows from seed

Wild Petunia; *Ruellia humilis*; perennial; seeds rarely available; germinates in 30-60 days, requires 65-75 degrees; start 8-10 weeks before transplanting

Wild Sarsaparilla; *Aralia nudicaulis*; perennial; as soon as seed is ripe (autumn) soak seed for ½ to 1 hour in sulfuric acid, wash in water and plant immediately

Wild Strawberry; *Fragaria virginiana*—propagates by runners

Wood Sorrel; *Oxalis fontana*; annual; sow in autumn as soon as seed is ripe; germinates in 14-60 days; requires 55-70 degrees

Woodland Sunflower; *Helianthus divaricatus*; gather seeds in fall when ripe (put an old nylon stocking over the flowerhead to keep birds away and harvest when seeds are dry); keep dry and cool all winter indoors (above 35 degrees); plant outside about May 15 in dry open woods (but keep moist during first growing season).

Yellow Pimpernel; *Taenidia integerrima*; annual; sow seed outdoors; requires dark; 50-65 degrees; germinates in 30-42 days



GENERAL TIPS FOR STARTING SEEDS INDOORS

Propagation requirements from seed page

Containers- should have drainage hole on the bottom and be rinsed in a solution of one part bleach to ten parts water. Let them dry before filling with grow mix.

Soil- A seed-starting medium should be used. MetroMix 250 is an excellent choice.

Water- should not contain chlorine or salt. Never use softened water. If city water is used, let it sit in open jugs over night to let the chlorine evaporate. Bottom water the plants and seeds (the grow mix will soak up the water). You may wish to mist them with a sprayer.

Light- some seeds require darkness to germinate and should be covered with soil. Other seeds require light to germinate and should be left on top of the soil. Some seeds don't have a preference. Once the seedlings have emerged they should be kept **3-4 inches** away from fluorescent bulbs for **14-16 hours** a day. One cool white and one warm white light should be used.

Temperature- most seeds will germinate between 65-72 degrees. Most seedlings do best at 60-65 degrees at night and 70-75 degrees during the day.

Fertilization- after the true leaves (second set) appear, start using water soluble 15-30-15 fertilizer at a rate of ¼ tsp. per gallon. Once plants are larger, use ½ tsp. per gallon.

Seeding- lightly moisten Grow Mix grow in a bucket before using. Fill container almost full and tamp soil down firmly. Place seed on top of soil and cover, unless otherwise instructed. A good rule of thumb is to cover seeds twice their thickness. Mist with water. Place pots in flat and cover with plastic. Never allowing plastic to touch soil. Top of soil should be kept moist until seeds germinate.

Growing On- after seedlings are established, they will need a drier medium. Allow surface of grow mix to become dry to the touch between waterings; lower layers should never dry out. (If hardy plants, such as *Rudbeckia* are being grown, members can still mist them.)

Pinching- if plants are getting too tall before planting time, cut them back just above a leaf joint. Most plants will respond by branching.

Hardening Off - transplants must get used to the sun, wind, and rain. Move trays outdoors to a shady, sheltered area during the day. Keep them well watered. Bring them back indoors each evening. After three (3) days, move to a half sun location for three (3) more days. Allow them to stay out overnight for at least two (2) days before planting.

Stratify, stratification – cold treatment given to seeds for a given period of time.

Damping Off- a fungal disease causing the stem to close and the plant to die.

Scarify, scarification - sanding, nicking, or chipping a hard seed covering, making sure not to touch the seed itself.

PROPAGATION RECORD

(Include in exhibit notebook)

Flower name, Common: _____
 Flower name, Scientific: _____
 Other Common names: _____

Date planted: _____
 Garden soil type (sandy? loam? clay? etc.): _____
 Germination date: _____
 If sown indoors, date transplanted outdoors: _____
 Native American & pioneer uses: _____

STOP here if you are a Clover (Grades 3, 4, & 5)

Flower Name	Light or Dark	Temp.	Stratify, Scarify, Presoak	1 st Flower Date	Growth rate mid-season	Comments
<i>Yarrow</i>	<i>light</i>	<i>60-65</i>	<i>none</i>	<i>7-22-99</i>	<i>compact</i>	

Environmental Factors: (check as appropriate)
 Especially cold weather _____ hot weather _____
 drought _____ other _____

STOP here if you are a Junior (Grades 6, 7, & 8)

Name the birds and/or butterflies that were attracted to this flower/plant: _____

Name the insects that were attracted to this flower/plant: _____

Only project members in Grades 11 & 12 (2 year projects) are required to answer the following:

Did the plant or plants you grew last season come back? Describe or explain. _____

Describe this plant's mode of reproduction: (self-seed, multiply by putting up new shoots, layering) _____

STOP here if you are a Senior (Grades 9, 10, 11, & 12)

INDIANA INVASIVE FLOWERS AND PLANTS

EXHIBIT REQUIREMENTS

During your tenth-grade year in the 4-H Wildflower Project, you will choose three (3) invasive flowers and plants to study and exhibit. Use the Wildflower Identification Sheet on page 10 for your invasive plants [You may certainly study more; however, place the three (3) plants that you want judged as the first three (3) in your exhibit notebook immediately following your wildflower section.]

Choose the exhibit medium that most interest you - you may mix media if you choose. The choices are:

Photographs *

- One (1) site photo and one (1) close-up photo of each of the four (4) plants
- Photos must be at least 4" x 6", color or black and white
- Both photos of each plant must be mounted on the same page on black paper
- Label each photo with scientific and common names

Drawings and paintings *

- One (1) drawing or painting of each of the four (4) plants
- Drawings or paintings must be a minimum of 4" x 6", maximum of 5" x 7"
- Drawings or paintings of each plant must be mounted on black paper
- Label each drawing or painting with scientific and common names

Art media may include:

- Line drawings in pencil or black ink on white paper - mounted on black paper
- Line drawings in colored pencils on white paper - mounted on black paper
- Watercolor on white paper - mounted on black paper

Identify each plant by completing the Wildflower Identification worksheet for each plant (page 10) and include in exhibit notebook *

Optional: you may exhibit a potted invasive next to your notebook for illustrative purposes if you wish.

INVASIVE PLANTS IN THE MIDWEST

Herbaceous

Angelica; *Angelica sylvestris*
Beefsteak mint; *Perilla frutescens*
Bugleweed; *Ajuga reptans*
Bull-thistle; *Cirsium vulgare* *
Canada thistle; *Cirsium arvense*
Celandine (swallow wort, wartweed); *Chelidonium majus*
Chinese lespedeza; silky or Himalayan bush clover; *Lespedeza cuneata*
Common teasel; *Dipsacus sylvestris*
Crested wheat grass; *Agropyron pectiniforme*
Crown vetch; *Coronilla varia*
Dame's rocket; *Hesperis matronalis* *
Daylily; *Hemerocallis fulva*
Eurasian water milfoil (spiked water milfoil); *Myriophyllum spicatum*
Garlic mustard; *Alliaria petiolata*
Japanese knotweed; *polygonum cuspidatum*
Leafy spurge; *Euphorbia esula*
Moneywort; *Lysimachia nummularia*
Nodding or musk thistle; *Carduus nutans*
Purple loosestrife; *Lythrum salicaria*
Ragweed; *Ambrosia artemisiifolia*
Red sorrel; sheep sorrel; *Rumex acetosella* *
Star of Bethlehem; *Ornithogalum umbellatum*
White bedstraw (cleavers, wild madder); *Galium aparine*
White sweet clover; *Melilotus albus* *
Wild parsnip; hogweed; *Pastinaca sativa*
Yellow sweet clover; *Melilotus officinale*

Grasses

Canada bluegrass; *Poa compressa*
Common reed (reed grass); *Phragmites australis*
Japanese stilt grass; Nepal grass; *Microstegium vimineum*
Johnsongrass; *Sorghum halepense*
Maiden grass; *Miscanthus sinensis*
Reed canary grass; *Phalaris arundinacea*
Smooth brome; Hungarian chess; *Bromus inermis*
Tall fescue; *Festuca elatior* or *Festuca pratensis*

*Considered by some researchers to be more "weedy" than truly invasive.

Trees

Black locust; *Robinia pseudoacacia*
Common fig; fig tree; *Ficus carica*
Crabapple; *Malus sylvestris*
Empress tree; princess tree; *Paulownia tomentosa*
Lombardy poplar; *Populus nigra* var. *italica*
Norway maple; *Acer plantanoides*
Perfumed cherry; *Prunus mahaleb*
Russian olive; *Elaeagnus angustifolia*
Siberian elm; *Ulmus pumila*
Silver birch; *Betula pendula*
Stinktree, tree of heaven; *Ailanthus altissima*
Tamarisk; *Tamarix parviflora*
White mulberry; *Morus alba*

Shrubs

Amur honeysuckle; *Lonicera maackii*
Autumn olive; *Elaeagnus umbellata*
Bicolor lespedeza; *Lespedeza bicolor*
Black alder; *Alnus glutinosa*
Common buckhorn; *Rhamnus cathartica*
Common privet; *Ligustrum vulgare*
Glossy buckhorn; alder buckhorn; *Rhamnus frangula*
Highbush cranberry; *Viburnum trilobum*
Japanese barberry; *Berberis thunbergii*
Multiflora rose; *Rosa multiflora*
Siberian peashrub; *Caragana arborescens*
Sweetbriar (Eglantine, sweetleaf rose); *Rosa eglanteria*
Tartarian honeysuckle; *Lonicera tatarica*
Winged euonymus; winged spindle-tree; burning bush; *Euonymus alatus*

Vines

Chinese yam; cinnamon vine; air potato; *Dioscorea batatas*
Climbing euonymus; *Euonymus fortunei* *
Creeping Jenny; *Lysimachia nummularia*
English ivy; *Hedera helix*
Ground ivy; *Glechoma hederacea* *
Japanese honeysuckle; *Lonicera japonica*
Japanese hops; *Humulus japonicus*
Kudzu; *Pueraria montana*
Oriental bittersweet; *Celastrus orbiculatus*
Periwinkle; *Vinca minor*

*Considered by some researchers to be more "weedy" than truly invasive

COMPARE AND CONTRAST TWO SPECIES

Indiana Native Wildflowers

(Include in exhibit notebook)

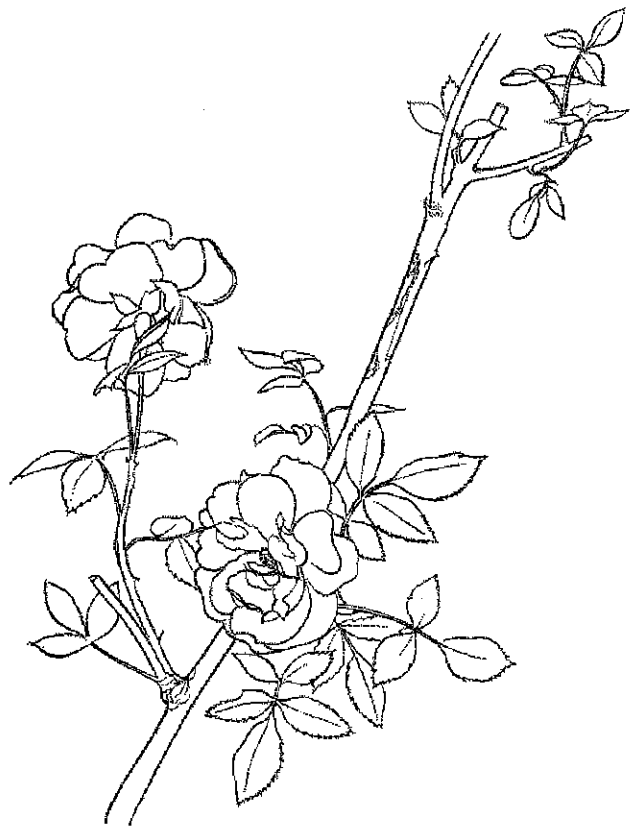
In writing, compare and contrast two species of the same genus of Indiana native wildflowers. Describe characteristics that both plants have in common, as well as characteristics of each that differ from the other.

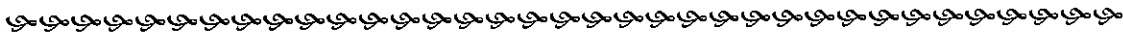
For example:

The Smooth Aster (*Aster laevis*) and Short's Aster (*Aster shortii*) are both shade-tolerant woodland asters. Each has blue-violet blooms in early to mid fall and alternate leaf placement on the stem. The distinguishing characteristic between these two asters is the leaf itself. Leaves of the Short's Aster are toothless, narrowly heart-shaped and on wiry stalks. Leaves of the Smooth Aster are clasping.

Here are some genera which have many species, but feel free to use others:

- Bellflower (*Campanula*)
- Cinquefoil (*Potentilla*)
- Goldenrod (*Solidago*)
- Milkweed (*Asclepias*)
- Sunflower (*Helianthus*)
- Thistle (*Cirsium*)
- Trillium (*Trillium*)
- Violet (*Viola*)





COMMUNITY SERVICE SEGMENT

This is a wonderful opportunity for you to become involved in your community by doing a great service. Besides being of value to your community, you will be helping the whole environment...our planet!!! Choose an activity that is related to our study of Indiana's native plants. A couple of ideas are: digging out and pulling invasive plants, such as garlic mustard, autumn olive, common and glossy buckthorn, honeysuckle (5 species of *Lonicera*). You might like to volunteer to do this at one of your local town, township, or county parks. Another good project would be to rescue native plants that are going to be destroyed by construction of roads, houses, subdivisions, etc. Make sure to have an adult with you, and have permission of the landowner before you start. It is best to have a release form. Call the contact person in the front of this workbook to obtain one. Perhaps you could assist park naturalists in collecting seeds in the fall. Or think of another creative way to volunteer. There's information about these things in your 4-H library at the Extension Office. Just please make sure it relates closely to our native plant theme! And make sure your 4-H Club Leader signs the appropriate place on your 4-H Wildflower Project Record Sheet on the last page of this booklet. And...WE ALL THANK YOU FOR HAVING THE VOLUNTEER SPIRIT!!!



WRITING YOUR WILDFLOWER JOURNAL

(include in exhibit notebook)

The purpose of the journal is to assist you in focusing on the new habitat, flowers, and other natural features you are learning about this year. You may make as many or as few entries as you wish, but try to do one per day, and at the very least, one per week. Please keep these from year to year, and add to them even after 4-H Fair time.

Two days' typical journal entries might be:

Dec. 10, 2000 - This morning on my way to school I saw a pair of cardinals pecking at some red berries on a tree in our yard. After I got home I looked that tree up and found that they were eating the fruit of a holly (Ilex) tree.

*May 15, 2001 - While walking through Starkey Woods in Zionsville with my parents and a friend yesterday, I saw a person lean over and begin to pick an orchid. I knew they are rare, so I told him he mustn't pick it. He left without the orchid! And I looked it up that night and found out it was the Showy Ladyslipper (*Galearis spectabilis*). I was thrilled to see this rare flower!*

In other words, just record something about nature and how you feel or felt about it when you noticed it.



OPTIONAL WORKSHOPS

In March you may attend a workshop in plant propagation. This hands-on workshop will teach you how to plant seeds of Indiana native wildflowers. You will actually take home and care for them during the spring, and HOPEFULLY plant them outside in May!

In late April or early May, all project members will be encouraged to participate in a wildflower identification hike at an outstanding local native plant area. This activity will be of great benefit to you, and lots of fun, too! Bring your camera, a notebook, and a pencil. Listen to the weather report and dress appropriately.

We will also sponsor a spring workshop for you at which you will be assisted in finding:

- what is permissible to pick and what is NOT...and why,
 - how to take care of the environment while you photograph, draw, or pick,
 - how to identify the wildflowers in the field,
 - how to label correctly, using both the scientific and the common names,
 - ideas for your nature journal,
 - how to plan your exhibit notebook.
-

In mid-summer you will want to attend a workshop on plant rescue and eliminating invasive plants. (For the community service requirement you may rescue plants from areas that are undergoing development or you may remove invasive plants in a local park areas if you obtain permission. And they'll be GLAD for the help!)

In late summer or very early fall you will enjoy another hike: this time to look for late-maturing wildflowers and learn how to identify them.

WHERE TO GO TO SEE SPRING WILDFLOWERS

Burnett Woods Nature Preserve: Avon
Butler Woods
Clifty Falls State Park
Cool Creek Park: Westfield
Crown Hill Cemetery: Indianapolis
Eagle Creek Park: Indianapolis
Flowing Well Park: Carmel
Fort Harrison State Park: Lawrence
Holliday Park: Indianapolis
Indianapolis Museum of Art Grounds & Gardens: Indianapolis
Marott Park: Indianapolis
McCormick's Creek State Park
Mounds State Park: Anderson
Patoka Lake: Southwestern Indiana
Potter's Bridge: Noblesville
Ritchey Woods: Fishers
Shades State Park
Southeastway Park
Starkey Park: Zionsville
Turkey Run State Park
White River State Park Botanical Gardens: Indianapolis

(No picking! Just look, enjoy, photograph, draw.)

On the next two pages you will find some

OPTIONAL ACTIVITIES !

The puzzles have been added for your enjoyment. The puzzles contain items associated with wildflowers and vocabulary. It is not required for 4-H. Just have fun!



Vocabulary Words

T X N P B I P K R W Z F E R T
U R P U J C R Q X U B E X S D
B W L K Q T O H V U N R C E X
E B Z F K T S T Q L O N X C M
R L I X A C T A K O Q E E T B
T J L V D K R G T C L Q M R L
C O H M T P A S N F L M J Y D
D N H P E R T I E I E M U K C
E U Z J Q O E R X R L I U R V
V U Z R C H L E W O B I D V U
R Q A K G N I P E E R C A R W
U Q I X A R H I Z O M E X R U
C A J G X L Y V H B Z R L S T
E L F C B T Q B Q T N W O W C
R O V B T I N J X Y V I U C D

AXIL
CREEPING
REFLEXED
RUNNER

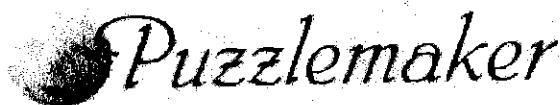
BULB
PROSTRATE
RHIZOME
TRAILING

CORM
RECURVED
ROOTSTOCK
TUBER

12 of 12 words were placed into the puzzle.

Solution

This puzzle was created at www.puzzlemaker.com by Network Solution Developers, Inc.



GLOSSARY

Alternate leaf arrangement: borne singly along a stem, one leaf at each node, not opposite each other

Annual: lives only one growing season, then dies

Anther: the pollen-bearing part of the stamen

Aquatic plants: those which grow in or on water or shorelines

Axil: upper angle formed by the main stem and any plant part arising from that stem

Barb: a short hooked bristle

Basal: leaves located at base of stem, at ground level

Biennial: a plant whose life cycle takes two years to be complete

Binomial system of nomenclature: the plant's botanical name has two parts -- the generic name and the species name (e.g., Dicentra cucullaria is commonly called "Dutchman's Breeches," while D. canadensis is known as "Squirrel Corn." The Latin name must be underlined or in italics, 1st word capitalized.)

Blade: the flat, expanded part of the leaf

Bog: an area of wet spongy ground (often with peat, and some evergreens)

Bract: a reduced or modified leaf sometimes found around the base of flower clusters

Bristly-toothed: leaves having a short bristle at the tip of each tooth

Bulb: underground stem or bud with thick fleshy leaves or scales

Bulblet: a small bulb, growing in a flower cluster

Calyx: outer circle of flower parts, made up of sepals, usually green

Capsule: a dry fruit that splits open at maturity into 2 or more sections

Chlorophyll: green pigment (color) in most plants' leaves that absorbs energy from the sun and enables photosynthesis

Clasping leaf: partially surrounding the stem

Cleft: deeply lobed about halfway to mid-vein

Cold frame: a box covered with glass in which to grow plants heated by winter's sun

Corolla: the inner circle of flower parts, made up of petals

Community: a certain set of situations (nutrients, moisture, temperature, light, etc.) that make it possible for a group of unlike plants to exist together successfully

Composite: many flowers arranged in a dense head; many small flowers surrounded by leafy rays (e.g., daisy)

Compound: made up of 2 or more parts

Cordate: heart-shaped (usually regarding the base of a leaf)

Corymb: a flat-topped or convex branched flower cluster in which the branching is usually alternate

Creeping: running along the ground, and rooting as it goes.

Cross-pollination: the transfer of pollen from the anther of one plant to the stigma of another

Cyme: a more or less flat-topped, branched flower cluster in which the branching is usually opposite

Damping Off: a fungal disease causing stem to close, and plant then dies

Disk: in composite flowers (e.g., daisy) it is the central part of the flowering head

Divided (leaf): cut down to or almost to the base or the midrib

Downy: covered with fine soft hairs

Drupe: a fleshy fruit, usually with only one seed

Egg-shaped: broader at one end than the other, usually 1-1/2 to 2 times longer than wide

Elliptical: broad in the middle, thin on the ends, and oval.

Entire: smooth leaf margins with no teeth or divisions or lobes

Family: a group of related plants (divided into genera, which are then divided into species)

Filament: the anther-bearing stalk of a stamen

Flower: the reproductive structure of a seed-bearing plant, usually with showy or colorful parts

Genus (plural: genera): a group of closely related species (it is the first word in the Latin scientific name and is always capitalized and either underlined or in italics)

Germinate: to sprout from seed or spore

Globular: round (like a globe)

Glucose: a sugary food produced by photosynthesis

Grasslands: an area of prairie or meadow grasses, relatively dry most of the year

Habitat: the natural place where a plant grows or an animal lives

Hairy: covered with hairs, fuzzy; used to describe some leaves and stems

Halberd-shaped: arrow-shaped but with lobes at base of leaf pointing outward

Head: a group of flowers joined together in a short, dense, terminal cluster

Indigenous: native to a region or area

Indistinguishable: used to describe flowers that have no visible petals or petal-like parts, or with such tiny petals that it is very difficult to determine their number or arrangement

Inflorescence: the flower

Introduced: not native to a particular region; exotic

Involucre: a circle of bracts below a flower or flower cluster

Irregular: a flower whose parts are unlike in size, shape or arrangement

Joint: the point on a stem where two parts are joined

Lance-shaped (leaf): a leaf that is about 3 or more times longer than it is wide, and broader toward one end, tapering at the other

Leaf: a usually green, usually flattened extension of the stem used to turn nutrients into food

Leaflet: one segment of a compound leaf

Linear: long and narrow, sides nearly parallel

Lip: the upper or lower part of some irregular flowers

Lobe: a segment, usually rounded, of a leaf or flower

Margin: the outside edge of a leaf

Marsh: a wetland with tall grasses

Midrib: the central vein of a leaf or leaflet

Natives: naturalized plants; plants that originated in a particular area or region

Naturalized: not indigenous, but thoroughly established (such as Queen Anne's Lace)

Nectar: the sweet liquid produced by flowers that attract pollinators

Neutral (flower): without stamens or pistils

Oblong (leaf): longer than broad, with parallel sides
Opposite leaf arrangement: arranged in pairs on the stem
Oval: broadly elliptical
Ovate: egg-shaped
Ovary: the enlarged base of the pistil that produces the seeds
Ovules: the eggs of a plant that (when fertilized) become seeds

Palmate (leaf): leaflets radiate from a central point like the fingers of a hand
Panicle: an elongated loosely branched flower cluster
Parasite: a plant that gets its food from another living plant
Pedicel: the stalk of a single flower
Perennial: a plant that normally lives more than two years
Perianth: the floral "envelope" (sepals AND petals)
Petal: one of the segments of the corolla
Petiole: the stalk-like part of a leaf
Photosynthesis: the process by which plants use sunlight to convert water and carbon dioxide into glucose that plants need
Pinnate (leaf): divided in such a way that the leaflets are arranged on both sides of a common stalk (like a feather)
Pistil: the central female reproductive part of a flower
Pistillate: having pistils but no stamens
Pod: a dry fruit (especially of the pea family)
Pollen: the male spores produced by the anther
Pollination: the transfer of pollen from an anther to a stigma
Propagate: to reproduce
Prostrate: lying on the ground instead of growing upright
Pubescent: bearing short, soft hairs

Raceme: an elongated flower cluster with stalked flowers arranged along a central stem
Ray: one of the stalks of an umbel; also strap-like or petal-like flowers surrounding disk flower
Recurved: curved downward or backward
Reflexed: abruptly turned downward or backward
Regular: used to describe flowers having all the parts alike in size and shape, such as a daisy
Rhizome: an underground stem that sends up shoots
Rib: a prominent vein of a leaf
Rootstock: a horizontal, underground stem
Rosette: a circular cluster of leaves, usually at the bottom of a plant
Runner: a slender, prostrate branch

Saprophyte: a plant that gets its food from dead organic matter
Scarify: sanding, nicking, or chipping a hard seed covering, making sure not to touch the seed itself
Sepal: one of the segments of the calyx
Serrate: sharply toothed margin
Sessile: without a petiole or other type of stalk

Simple: composed of a single part with no subdivisions

Sheath: a thin membrane surrounding the stem

Smooth: lacking hairs or other protuberances

Spadix: a club-like spike bearing minute flowers, usually enclosed in a spathe, as a skunk cabbage

Spathe: a large bract (leaflike structure) enclosing a flower cluster or spadix, as a jack-in-the-pulpit

Species: a distinct kind of plant; the second part of the scientific name (in italics, not capitalized)

Spike: an elongated flower cluster with stalkless flowers arranged along a central stem

Spur: a tubular hollow projection on a flower that often holds nectar

Stem: stalk; the rising part of a plant from which leaves, flowers, & fruit develop

Stamen: male organ of a flower (consists of the anther and the filament)

Staminate: having stamens but no pistil

Stigma: the pollen-receiving tip of the pistil

Stipule: a small leaflike growth at the base of a leaf stalk

Stratify: cold treatment given to seeds for a given period of time

Style: the stalk of the pistil (connects the stigma to the ovary)

Tendrils: a slender, coiling, modified leaf or branch structure used for climbing and support

Terminal: at the end of a branch or a stem

Toothed (leaf): having several small indentations along the margin (as on a steak knife)

Trailing: running along the ground but not rooting

Trifoliate: leaflets arranged in groups of three on a common stem

Tuber: a short, thick, underground stem

Umbel: a flower cluster in which all the flower stalks radiate from the same point (like an umbrella)

Vein: one part of a network of little channels in a leaf through which fluid flow

Wetlands: wet, soggy or damp ground, such as a bog or swamp

Whorled: arranged in a circle around a central point

Wing: a thin, narrow membrane extending along a stem, stalk or other part

References:

Field Guide to Indiana Wildflowers, by Kay Yatskievych. Indiana University Press, c2000

Flowers of Pokagon, by Iva Spangler (Naturalist Ind. St. Parks). Fort Wayne: Wm. A.

Didier & Sons, Inc., c1961.

Growing and Propagating Wildflowers, by Harry R. Phillips. Chapel Hill: U. of North Carolina Press, c1985.

Newcomb's Wildflower Guide, by Lawrence Newcomb. Boston: Little, Brown and Company, c1977.

National Audubon Society First Field Guide: Wildflowers, by Susan Hood. N.Y.: Scholastic, c1998.

WILDFLOWER PROJECT RESOURCE LIBRARY

The following resources are made available only to current project members.

These resources are located in the 4-H Office of the Extension Building at the Hamilton County Fairgrounds. Project members may use the resources on site or may check them out, and will be responsible for returning them. Utmost care of resources is expected of project members. If materials are lost or abused, the student will be responsible for the replacement cost of those materials. These resources are on long-term loan from Hamilton County Master Gardener members.

BOOKS:

- American's Prairies, by Frank Staub, Carolrhoda Books, c1994.
Caterpillars, by A. B. Wright, Petersen First Guides, Houghton Mifflin, c1992.
Concise Illustrated Book of Wild Flowers, by J. Flegg, Brian Trodd Publishing, c1990.
Everybody's Everywhere Backyard Bird Book, Klutz Press, c1992,
Fern Finder, by A. & B. Hallowell, Nature Study Guild, c1981.
Ferns, Time-Life Books, c1977.
First Field Guide: Wildflowers, by S. Hood, National Audubon Society, Scholastic, c1998
Flowers of Pokagon, by Iva Spangler, c1961.
Flowers: A Guide to Familiar American Wildflowers, by H. Zim, c1963.
Gardening with Ferns, by Rex Mabe, c1973.
Hedgemaids & Fairy Candles: the Lives & Lore of North American Wildflowers, by Jack Sanders
How to Draw Plants: the Techniques of Botanical Illustration, by K. West, Timber Press, c1983.
Invasive Plants: Weeds of the Global Garden, by K. West, Timber Press, c1983.
Native Perennials: North American Beauties, Brooklyn Botanic Garden, c1996.
Natural Affairs, by P. Bernhardt, Villard Books, c1993.
Nature's Garden, Better Homes & Gardens, c1995.
North American Dye Plants, by A. Bliss, Scribner's Sons, c1976, 1980.
Ragged Mtn. Press, Camden, Maine, c1993.
Woman's Day Book of Wildflowers, by J. Hersey, Simon & Schuster, c1970, 1966.

VIDEOTAPES:

- Backyard Conservation, One Yard at a Time. c1998.
Wildflowers...A Woodland Heritage. c1997, 1998.

OTHER RESOURCES:

- Notebook of Wildlife activities for gr. 3-5
Notebook of Conservation info. for gr. 6-12
Pests Have Enemies Too: Teaching Young Scientists Biological Control (poster and paperback pamphlet)

An updated list will be published each year.

PRINT RESOURCES

Some of this material pertains directly to wildflowers, but others pertain to methods, lore, uses, pests, grasses, ferns, invasives, etc. A few of these resources may be found in your 4-H library at the Hamilton County Fairgrounds office. Other, more up-to-date materials, can be found at your local schools and public libraries. Make SURE you have a public library borrowing card!

Print:

- Archbald, David, *et al.* Quick-Key Guide to Wild Flowers, Doubleday, c1968.
- Blatchley, W. S. The Indiana Weed Book, Nature Publishing Co., c1930.
- Deam, Charles C. Trees of Indiana, Bookwalter Co., c1953.
- Foster, Steven, *et al.* A Field Guide to Medicinal Plants, Houghton Mifflin, c1990.
- Foster, Steven. Forest Pharmacy, Forest History Society, c1995.
- Harper, Peter, *et al.* The Natural Garden Book, Fireside Book (Simon & Schuster), c1994.
- Harstad, Carolyn. Go Native! Gardening with Native Plants and Wildflowers in the Lower Midwest, Indiana University Press, c1999.
- Heilerman, Diane. Gardening in the Lower Midwest, Indiana University Press, c1994.
- Homoya, Michael A. Orchids of Indiana, Indiana Academy of Science, c1993.
- Invasive Plants. Brooklyn Botanic Garden, 1995.
- Jeffords, M.R. & Hodgins, A.S. Pests Have Enemies Too, Illinois Natural History Survey, c1995.
- Johnson, Lady Bird. Wildflowers Across America, Abbeville Press, c1993.
- Jones, S. B. & Foote, L.E. Gardening with Native Wild Flowers, Timber Press, c1990.
- Ladd, Doug. Tallgrass Prairie Wildflowers, Falcon Press, c1995.
- Mabe, Rex E. Gardening with Ferns, Potpourri Press, c1973.
- Mohlenbrock, R. H. Where Have All the Wildflowers Gone?, Macmillan, c1983.
- National Audubon Society Field Guide to N.A. Wildflowers. Knopf, c1979, 1997.
- Native Perennials. Brooklyn Botanic Garden, 1996
- Newcomb, Lawrence. Newcomb's Wildflower Guide, Little, Brown & Co., c1977.
- Ottesen, Carole. The Native Plant Primer, Harmony Books, c1995.
- Phillips, Kathryn. Paradise by Design: Native Plants and the New American Landscape, North Point Press (Farrar, Straus and Giroux), c1998.
- Putnam, P. & M. North America's Favorite Butterflies, Willow Creek Press, c1997.
- Reilly, Anne. Park's Success with Seeds, Geo. W. Park Seed Co., c1978.
- Rogers, Marc. Saving Seeds, Storey Communications, c1990.
- Sanders, Jack. Hedgemaids and Fairy Candles, Ragged Mountain Press, c1993.
- Scott, Jane. Field and Forest, Walker & Co., c1984, 1992.
- Shaw, T. E. Fifty Common Trees of Indiana, Indiana Dept. of Natural Resources, 1968.
- Stein, Sara. Noah's Garden, Houghton Mifflin, c1993.
- Stein, Sara. Planting Noah's Garden: Further Adventures in Backyard Ecology, Houghton Mifflin, c1997.
- Sternberg, G. & Wilson J. Landscaping with Native Trees, Chapters Publishing, c1995.
- West, Keith. How to Draw Plants, Timber Press, c1983.
- Wherry, Edgar T. Wild Flower Guide: Northeastern & Midland U.S., Doubleday, c1948.
- Wright, Amy B. Peterson First Guide to Caterpillars, Houghton Mifflin, c1993.
- Yatskievych, Kay. Field Guide to Indiana Wildflowers, Indiana University Press, c2000.
- Recommended Magazines:** Organic Gardening (Rodale Press)
Hoosier Conservation (Indiana Wildlife Federation)
Outdoor Indiana, (Indiana Department of Natural Resources)

NON-PRINT RESOURCES

Insect identification cards:

Helpful or Harmful? Learn the Difference! University of Florida
The Good Guys! Natural Enemies of Insects. Illinois Natural History Survey

Organizations:

Indiana Native Plant and Wildflower Society
Indiana Wildlife Federation
Ladybird Johnson Wildflower Research Center
Wild Ones!

Internet:

Butterfly site for young people:
<http://www.mesc.nbs.gov/butterfly/butterfly.html>

Butterflies of North America:
<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm>

Celebrating Wildflowers
<http://www.nps.gov/plants/color/imgs2/Trpe2b.gif>

Center for Plant Conservation
<http://www.mobot.org/CPC/welcome.html>

Flora of North America
<http://www.fna.org/Libraries/plib/WWW/online.html>

Green Landscaping with Native Plants
<http://www.epa.gov/greenacres/wildones>

Indiana Native Plant & Wildflower Society:
<http://www.inpaws.org>

National Wildlife Federation
<http://www.nwf.org/>

National Audubon Society
<http://www.audubon.org>

Purdue University's Prairie Page
http://www.hort.purdue.edu/ext/prairie_wildflowers.html

Wild School Site: Project Wild
<http://www.projectwild.org/>

Spence Restoration Nursery (commercial site in Muncie)
<http://spencenursery.com>

Crystal Palace Perennials (commercial site)
<http://www.crystalpalaceperennials.com>

Earthly Goods, Ltd. (commercial site)
<http://www.earthlygoods.com>

Let's Get Growing (commercial site)
<http://www.letsgetgrowing.com/>

Videos:

Backyard Conservation: One Yard at a Time. National. Association of Conservation Districts, c1998.

Wildflowers...A Woodland Heritage. c1997, 1998

The videos below may be at your school or public library. They are also available from the Indianapolis Museum of Art's Horticultural Society Library (call Mary Kraft at 773-5361 to reserve):

Wild in the City. Wild Hare Media, c1991.

Biological Control: Learning to Live with the Natural Order. NBCI, c1995.

Eastern Butterflies. Nature Science Network, c1995.

Plants of Indiana (Native Wildflowers of Woodland & Prairie Series). Purdue University

Insects, the Little Things that Run the World. Smithsonian, c1989.

Yardening: How to Grow & Nurture Seedlings. Burpee, Mantis & 4 Seasons, c1986.

A Greener Thumb: How to Enhance Lawn, Landscape and Environment. Extension office, Rutgers University, c1998.



SEED & PLANT SUPPLIERS

Acorn Ridge Nursery

22441 Bigler Road
LaCrosse, IN 46348
Tel: (219) 754-2662 or (877) 262-2662
E-mail: acornrdg@ix.netcom.com

Arrowhead Alpines

P.O. Box 857
Fowlerville, MI 48836
Tel: (517) 223-3581

Berg-Warner Tree Nursery

P.O. Box 259
Lizton, IN 46149-5487
www.berg-warner.com

Beineke's Nursery

513 Sharon Road
West Lafayette, IN 47906
Tel: (765) 463-2994
E-mail: bein@gte.net

Cold Steam Farm

2030 Free Soil Road
Free Soil, MI 49411
Tel: (231) 464-5809
E-mail: cfs@jackpine.com

Crystal Palace Perennials

P.O. Box 154
St. John, IN 46373
Tel: (219) 374-9419
www.crystalpalaceperennial.com

Designs on Nature

202 Lincolnway East
Mishawaka, IN 46544
Tel: (219) 256-2242
E-mail: designsonnature@hoosierlink.net

P.O. Box 614
New Albany, IN 47150
Tel: (812) 944-2903
www.earthlygoods.com

Earthly Goods Ltd.

Edge of the Prairie Wildflowers
1861 Oak Hill Road
Crawfordsville, IN 47933
Tel: (765) 362-0915

Enders Greenhouse

(Plants only)
104 Enders Drive
Cherry Valley, IL 61016
Tel: (815) 332-5255
E-mail: endersnatvs@aol.com

Heartland Restoration Services, Inc.

349 Airport North Office Park
Fort Wayne, IN 46825
Tel: (219) 489-8511
www.earthsourceinc.net

J & J Transplant Aquatic Nursery LLC

W 4980 County Road W
P.O. Box 227
Wild Rose, WI 54984
Tel: (715) 256-0059 or (800) 622-5055
E-mail: jmalchow@tranzplant.com
www.tranzplant.com

J.F. New & Associates, Inc.

708 Roosevelt Road
Walkerton, IN 46574
Tel: (219) 586-3400 or in Indy (317) 388-1982
www.jfnew.com

Jasper-Pulaski State Tree Nursery

15508 W. 700 N.
Medaryville, IN 47957
Tel: (219) 843-4827
E-mail: JasperNursery@dnr.state.in.us
www.state.in.us/dnr/forestry/treeimp/collectinfo.htm

Madeline E. Elder Greenhouse (IMA)
(Plants only)
1200 W. 38th Street
Indianapolis, IN 46208
Tel: (317) 920-2652
www.ima-art.org/grounds/greenhouse.html

Miller's Manor Garden & Nursery
Native Plants (no seeds), Rare Trees, Shrubs
12788 191st St. (2.8 mi. E. of Rt. 37)
Noblesville, IN 46060
Tel: (317) 770-7678

Munchkin Nursery & Garden
323 Woodside Drive N. W.
Depauw, IN 47115-9039
Tel: (812) 633-4858
www.munchkinnursery.com

Possibility Place Nursery
7548 Monee-Manhattan Road
Monee, IL 60449
Tel: (708) 534-3988
www.possibilityplace.com

Prairie Nursery
P.O. Box 306
Westfield, WI 53964
Tel: (800) 476-9453
E-mail: www.prairienursery.com

Prairie Seed Source
P.O. Box 83
North Lake, WI 53064-0083
E-mail: www.Ameritech.net/users/rasillon/Seed.html

Salsbery Brothers Landscaping
4317 E 146th Street
Carmel, IN 46033
Tel: (317) 843-0100

Shooting Star Nursery
444 Bates Road
Frankfort, KY 40601
Tel: (502) 223-1679
Email: Shootingsn@aol.com

Springcreek Landscaping & Nursery, Inc.
1860 N 525 E
Logansport, IN 46947
Tel: (219) 722-1128
E-mail: scheidjk@iquest.net

Sunlight Gardens
174 Golden Lane
Andersonville, TN 37705
Tel: (800) 272-7396
www.sunlightgardens.com

Taylor Creek Restoration Nurseries
17921 Smith Road
Brodhead, WI 53520
Tel: (608) 897-8641
www.appliedeco.com

Vallonia State Tree Nursery
2782 W County Rd. 540 S
Vallonia, IN 47281
Tel: (812) 358-3621
www.state.in.us/dnr/forestry/treeimp/collectinfo.html

Wetlands Nursery, Inc.
P.O. Box 14553
Saginaw, MI 48601
Tel: (517) 752-3492
E-mail: jewelr@aol.com

Wildseed Farms
425 Wildflower Hills
P.O. Box 3000
Fredericksburg, TX 78624-3000
Tel: (800) 848-9978
www.wildseedfarms.com

~ ~ ~ THIS PAGE MAY BE USED FOR NOTE-TAKING...OR DRAWING ~ ~ ~

4-H WILDFLOWER PROJECT RECORD SHEET

*Do NOT fail to complete this record:
this is as important as your exhibit!*

Name _____ Age _____

Name of Club _____ Year in club _____

Township _____ County _____

Date record started _____ Date record completed _____

Signature of leader _____ Date _____

1. Name three plants that grow in Indiana that are VERY invasive:

2. What can you suggest as a way the word can be spread all over Indiana about why invasive plants should be dug out and destroyed? How would you go about it if you were in charge?

3. What is the most challenging wildflower you have planted? Please write specifically what made it such a challenge.

4. What are two reasons that loss of native habitat can even ultimately impact humans?

5. What is the most valuable thing you learned during this year's study of Indiana natives?

6. Community Service Segment (4-H Club Leader should verify here with signature: _____)

I performed a community service at (place) _____

on (date) _____ under the supervision of _____

Description of my community service and how long it took me (you may use back of sheet): _____
