



LIVE INTERACTIVE LEARNING @ YOUR DESKTOP

USFS: Bees Can Teach Science! Meet Standards by Studying Pollinators in the Field and Classroom

Presented by: Thelma Redick, Nancy Lowe, Dr. John Pickering and Jan Schultz

Tuesday, April 13, 2010
6:30 p.m. - 8:00 p.m. Eastern time

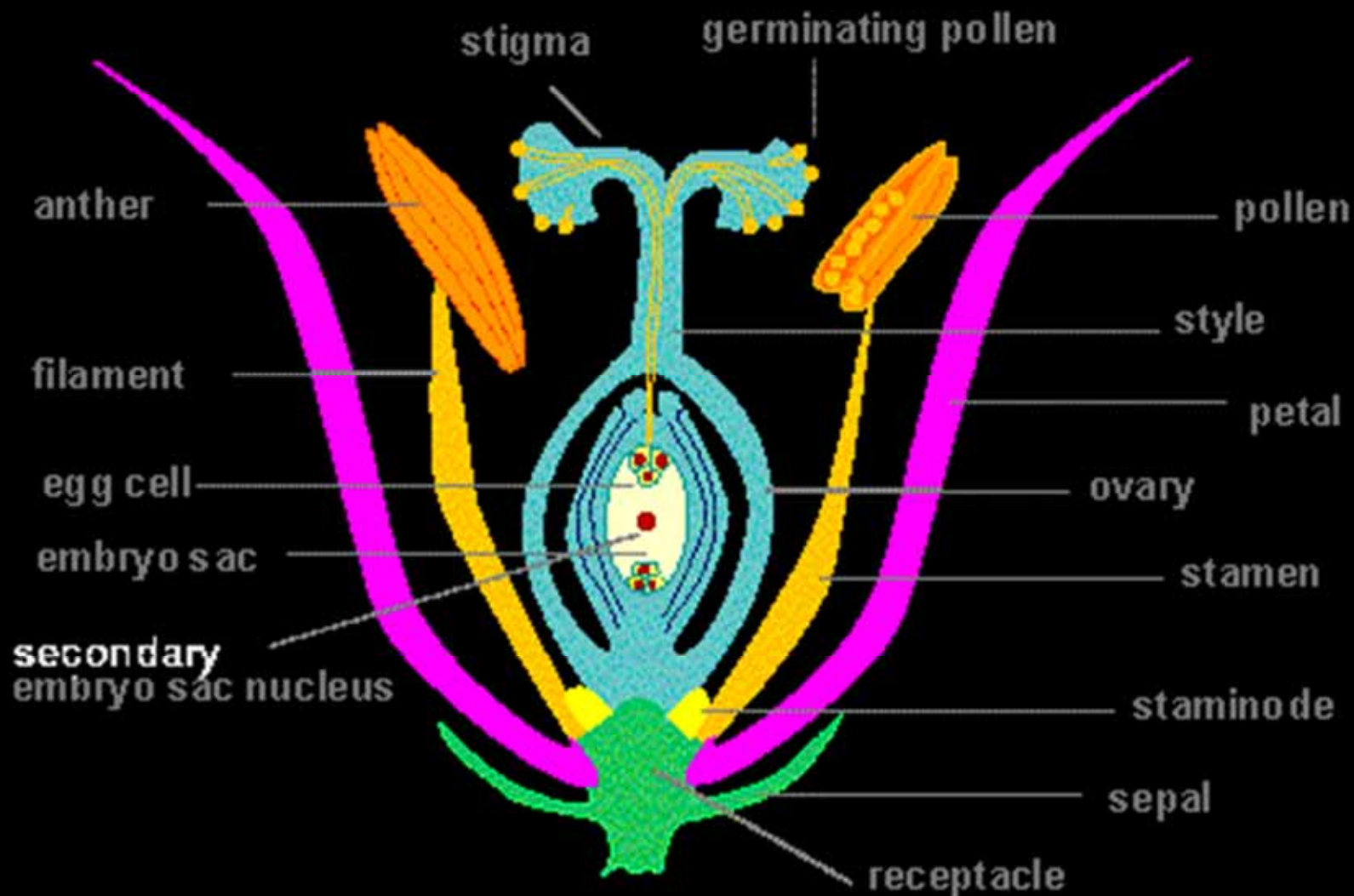


www.pollinatorlive.pwnet.org



Thelma Redick,
Wildlife Habitat
Council

What is Pollination?





Got *Pollination?*





Which Animals Pollinate?

- Bees (native & managed)
- Butterflies
- Moths
- Bats
- Birds
- Wasps
- Flies
- Beetles
- Ants
- Unusual pollinators
(lemurs, honey opossums,
geckos, lizards)



© Paul Growald





Food Crops



- Chili peppers (bee)
- Apple (bee)
- Palms (beetle,bee)
- Squash (bee)
- Potato (bee)
- Beans (thrip,bee)
- Cocoa (midge)
- Tea (fly,bee)
- Coffee (fly,bee)
- Tomato (bee)
- Avocado (bee, fly, bat)
- Mango (fly,bat,bee)



- Vanilla (bee)
- Alfalfa (bee)
- Banana (bee, bat)
- Agave (bat)
- Fig (wasp)
- Sunflower (bee)
- Cashew (bee,moth,bat)
- Almond (bee)
- Raspberry, blackberry, blueberry, strawberry, cranberry (bee)





This is your breakfast....





...this is your breakfast, thanks to
POLLINATORS...



Pollinators as part of the ecosystem



Photo by employees of Unimin Corporation

Growing Concerns About Pollinator Decline

- **Habitat destruction & fragmentation**
  - Human development
  - Agriculture (monocultures, pesticides)
- **Misuse and overuse of pesticides**
- **Competition from exotic/
introduced species**
- **New diseases and parasites**
- **Lack of public awareness/support**



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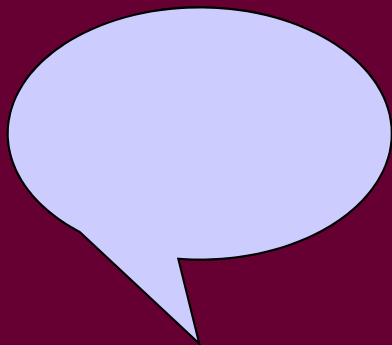
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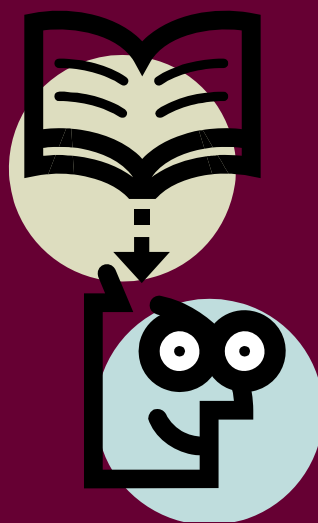
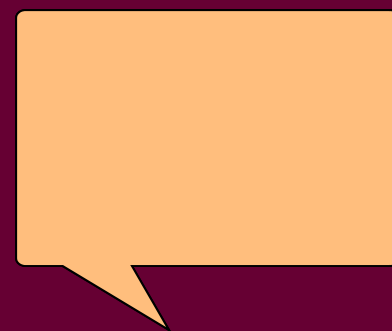
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Let's Pause 2 Minutes for Questions





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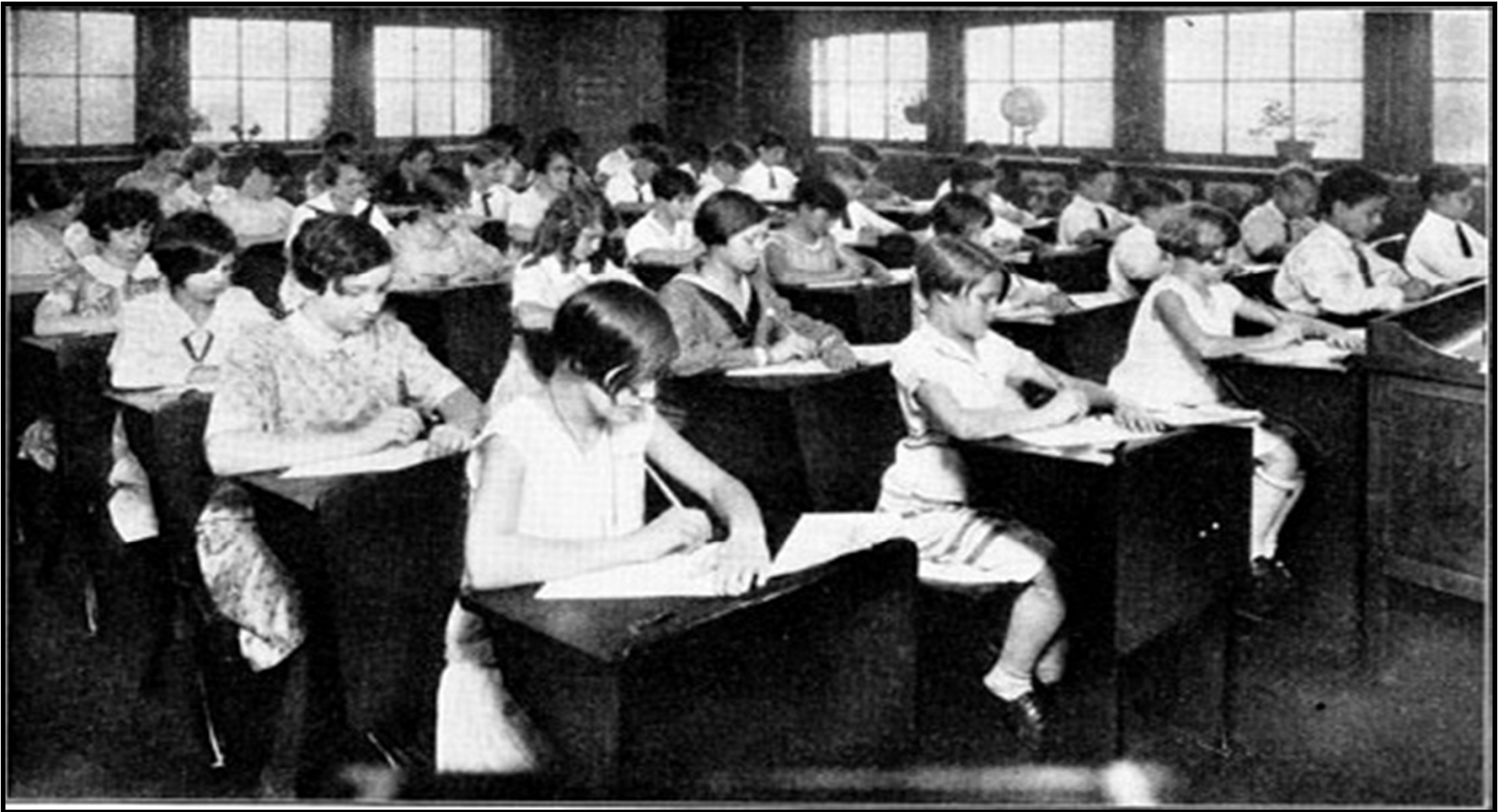
Bee Hunt!



Servers: [University of Georgia](#) • [Missouri Botanical Garden](#)
[Smithsonian Tropical Research Institute](#) • [American Museum of Natural History \[https\]](#) • [original](#)



Introduction



Why use yesterday's technology ...
TO PREPARE FOR THE FUTURE..

How should we teach in the age of



ENCOURAGE CREATIVITY!



Kids are naturally curious.

Put new technology in their hands.

Let them explore the world, ask their own questions.

Big picture problems require big picture solutions.



Acid rain



Climate change, drought



Invasive species

How do we manage all the information?



USE TECHNOLOGY:

Internet, web tools

Digital cameras

Cell phones, GPS

WORK TOGETHER:

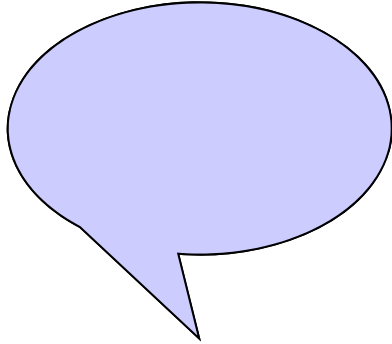
Teachers and students

Research scientists

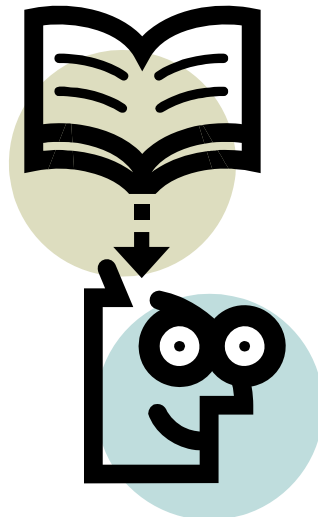
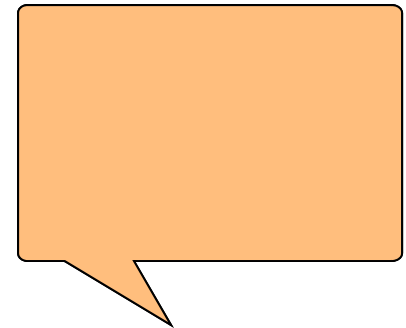
Universities, Museums,
Parks, Nature Centers



www.discoverlife.org



Let's Pause 2 Minutes for Questions



www.discoverlife.org/bee

Many ways to participate in Bee Hunt

- Inventory your site
  - Simplest
  - Great for all ages of students
  - More diversity
- Compare two patches
  - Teaches experimental design
  - Suitable for older students (7th grade and up)
- Affiliated pollinator projects

How many species do you see in this picture?



A. 2

B. 3

C. 4

D. 5

E. more than 5



goldenrod



honeybee



crab spider



World's smallest vultures



Run for your life!



aphid lurking

Affiliated Pollinator Projects

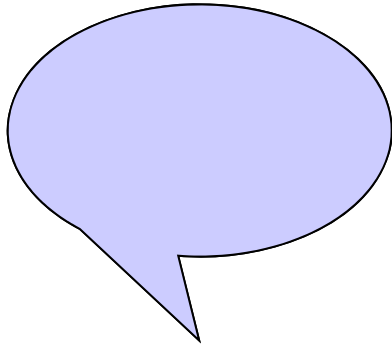
- Osmia Phenology Project
  - <http://www.discoverlife.org/bee/opp/>
- Bee bowls
  - <http://www.discoverlife.org/bee/bowl>
- Great Sunflower Project
  - <http://www.greatsunflower.org/>
- Project Bud Burst
  - http://www.windows.ucar.edu/citizen_science/budburst/
- National Phenology Project
  - <http://www.usanpn.org/>

....USE DISCOVER LIFE TO STORE DATA!

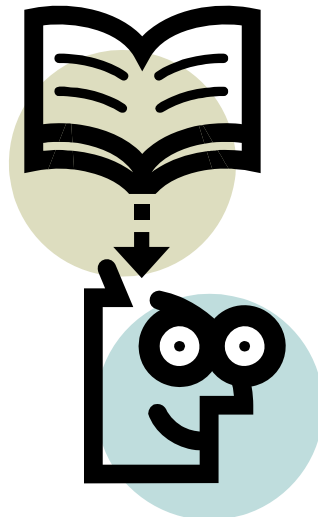
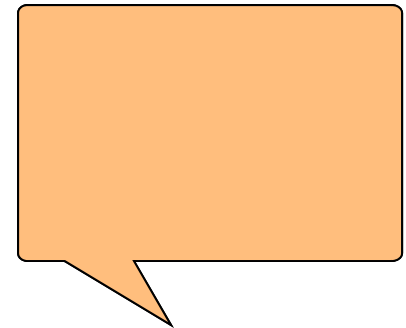


To Participate in Discover Life





Let's Pause 2 Minutes for Questions



Get a camera with good macro

- Dime test
- 10x optical zoom
- For advice about good cameras see <http://www.discoverlife.org/popa/camera.html>



Choose a way to participate

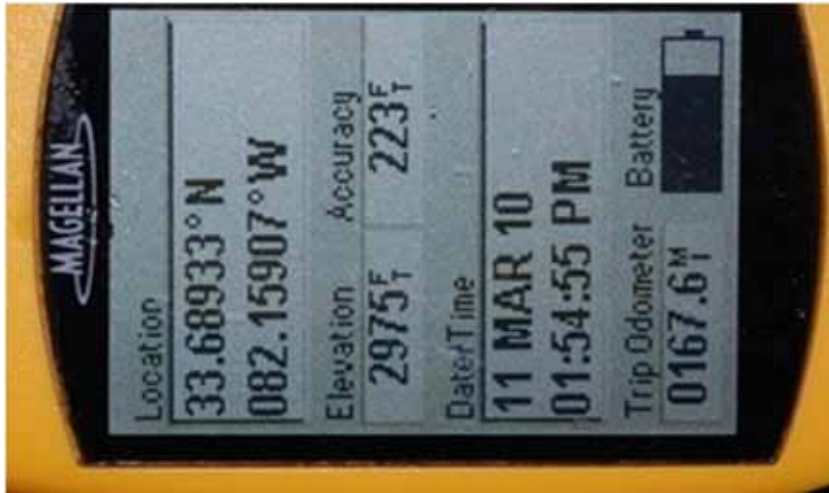
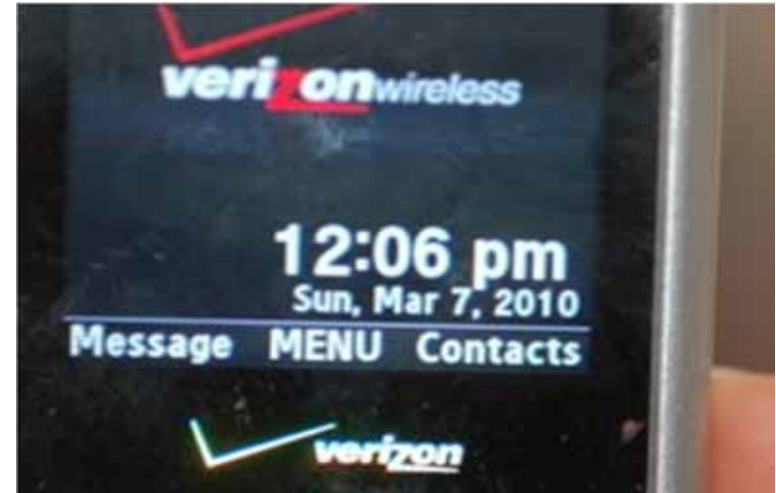
- Inventory your site for pollinators and others
- Conduct a comparison
- Partner with other projects
- Design a project of your own...

....use Discover Life to store your data.

Get an album to upload

- Go to Bee Hunt “Participate” page
- Follow instructions there to get album
- After taking photos you will:
  - Upload photos
  - Identify species
  - Edit photos: add ID, time and place data

Use our protocols for high quality data

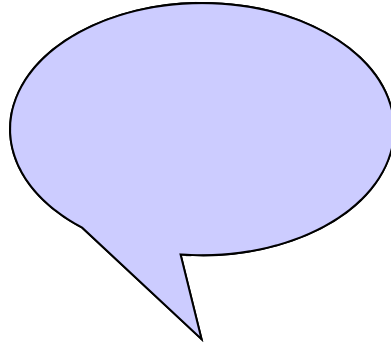


- **Where are you?**
  - Picture of GPS, any signs
- **What is the habitat?**
  - Pix of N, E, S, W, habitat, sky
- **When did you gather data?**
  - Picture of cell phone
- **Who are you with?**
  - Pix of your companions



Take photos, upload, identify ... and
Discover Life!

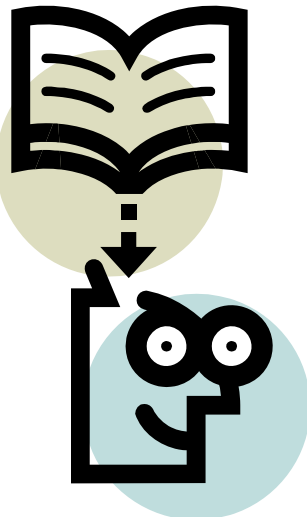
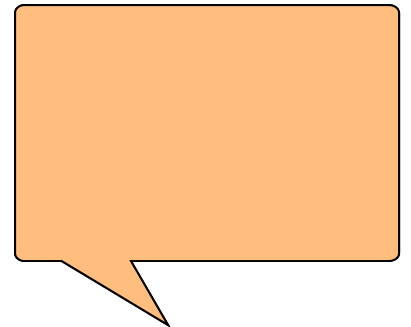


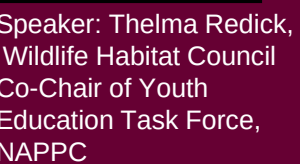


Let's Pause 2 Minutes for Questions

Thank you!

Contact nancy@discoverlife.org

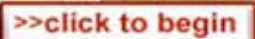




Nature's Partners
Pollinators, Plants, and You



A comprehensive pollinator curriculum for grades 3-6





Nature's Partners Curriculum:

- The Who, What & Why of Pollinators
- Pollinators and Plants in Partnership
- The other Half of the Partnership: Pollinators
- Pollinator-Friendly Habitat in Your Area
- Created Pollinator-Friendly Habitat
- Community Service Project and Celebration

Co-investigator leads students through lessons, activities to build:

- Observation Skills
- Communication Skills
- Ability to Compare/Contrast
- Organizational Skills
- Looking for Relationships
- Inferring (predicting patterns and relationships)
- Applying knowledge to the real world



Concepts Explored Include:

- Structure of plants, functions of their parts, adaptation
- Structures of pollinators, adaptations
- The interdependence of life (food webs, habitats)
- Human influence on the environment /human dependence on the environment
- Changes in ecosystems





Tools to take your study OUTSIDE....

- ENTER SCAN OF JOURNAL PAGE from Nature's Partners





Photos from PPG Monroeville, PA
and
WHC staff, Silver Spring

Nature's Partners: Pollinators, Plants and You

- FREE: download from <http://www.nappc.org/curriculum>
- Correlations to your state's science standards? Contact Thelma at CLL@wildlifehc.org
- Each module has background, resource links, outlines what materials are needed, suggests way to carry out lesson .
- Each module offers 3-4 activities designed to engage learners through a cycle of exploration, concept introduction/development and application.
- Service learning components are unique aspect of the program.
- Designed to be adaptable.





Thank you for your interest in education about Pollinators from : The North American Pollinator Protection Campaign (NAPPC)

Tri-national efforts for pollinator conservation

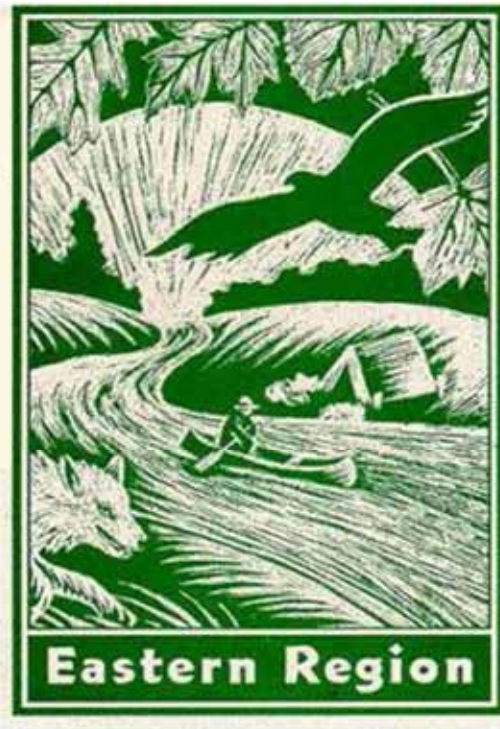
- United States
- Mexico
- Canada

Made up of 120+ *participating partner organizations: Government & non-gov't. agencies, environmental groups, corporations, gardeners, landowners, scientists, beekeepers, farmers, & private individuals.*

© Paul Mirocha



Jan Schultz
Program Leader Botany & NNIS
Eastern Region
U.S. Forest Service



Zaagkii Wings & Seeds Project



Jan Schultz, USFS
Botany, Non-native Invasive Species
Special Forest Products Program Leader
1-414-297-1189 (Office)



These Gardens Create Assistance for & Awareness of Pollinators



Why It Matters...

Landscaping with Locally Native Plants

... an opportunity to tread lighter on the land



Why it matters -

Cultivars can be tricksters - beware...

Many cultivars are clones - > propagated by cutting & grafting.

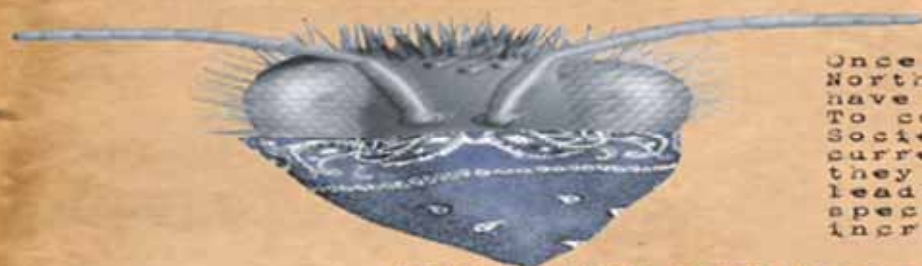
- Many do not produce pollen or nectar.
- They are time, energy, & habitat wasters for pollinators.





WANTED

FOR POLLINATION OF CROPS AND WILDFLOWERS



Once common through most of Eastern North America, *Bombus terricola* numbers have steeply declined in recent years. To conserve *B. terricola*, the Xerces Society is documenting the former and current ranges of this bumble bee and they need your help. Any information leading to the conservation of this species will be duly rewarded with increased food security.

YELLOW BANDED BUMBLE BEE A.K.A. BOMBUS TERRICOLA

**NOT TO BE CONFUSED WITH
BOMBUS PENNSYLVANICUS OR BOMBUS AURICOMUS**

Bombus terricola workers have black on the last three abdominal segments with a fringe of brownish yellow hairs near the tip of the abdomen.

B. pennsylvanicus and *B. auricomus* have black only on the last two abdominal segments. Also, *B. terricola* workers have lighter colored wings, shorter faces, and tend to be smaller than *B. pennsylvanicus* and *B. auricomus* workers.



Bombus terricola



Bombus pennsylvanicus



Bombus auricomus

**If you have seen *Bombus terricola* please contact info@xerces.org
For more information on bumble bees in decline please visit www.xerces.org/bumblebees**

Design by Elaine Evans



In Anishinaabemowin –

Zaagkii means:

“That which comes from the earth.”





The Zaagkii Project focuses on :

- Importance of native plants & their pollinators
- Pollination – an essential Ecosystem Service to us all
- Myriad youth activities focused on these essential life processes



Zaagkii Project includes Ojibwa Ethnobotany & Language

- Greenhouse at Keweenaw Bay Indian Community /KBIC
- Workshop training on Native Plant Propagation at KBIC
- Restoration at KBIC & beyond
- Ethnobotany Gardens installed & Interpretative signs at KBIC & NFs







**Zaagkii Program youth -
Visited a local bee keeper**









Teens built and painted mason bee houses.....



and butterfly houses.....





Houses used by Mason, Orchard bees & other Solitary bees

Zaagkii youth made ones on right.
Blue prints are at Celebrating Wildflowers

Habitat:

They learned about pollinator needs

- Larval host plants for shelter/ food
- Ground nesting areas – bare patches of damp sand or mud
- Shelter / windbreaks, overwintering areas, pupation sites
  - hedgerows, dead snags, leaf litter
- Rotting fruits, bird droppings, damp salt licks
- Habitat free of pesticides
- Manage for wild & undisturbed lands
- Artificial habitat - bee & butterfly boxes



They're waiting-
both the kids & the pollinators





Zaagkii Partners:

Keweenaw Bay Indian Community

Cedar Tree Institute

NMU- Center for Native American Studies

Eastern Region/ US Forest Service

Marquette Community Foundation

Marquette County Juvenile Court

Marquette County Courthouse

M.E. Davenport Foundation

Kaufman Foundation

Phyllis & Max Reynolds Foundation

Upper Peninsula Children's Museum

U.S. Forest Service - Eastern Region



<http://www.fs.fed.us/wildflowers/>
http://www.fs.fed.us/r9/wildlife/plants_botany/



Supporting Partners

- USDA Forest Service
- US Department of Agriculture: NRCS, NIFA
- Partners in Resource Education
- US Fish and Wildlife Service
- American Forest Foundation: Project Learning Tree
- American Public Gardens Association
- Discover Life
- Lady Bird Johnson Wildflower Center
- Monarch Watch
- National Environmental Education Foundation
- National Garden Clubs, Inc.
- National Science Teachers Association
- National Wildlife Federation
- North American Pollinator Protection Campaign
- Prince William County Public Schools
- Smithsonian Institution: National Zoo, Natural History Museum
- Wildlife Habitat Council





Register at

www.pollinatorlive.pwnet.org



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