

# Bee Campus Final Report



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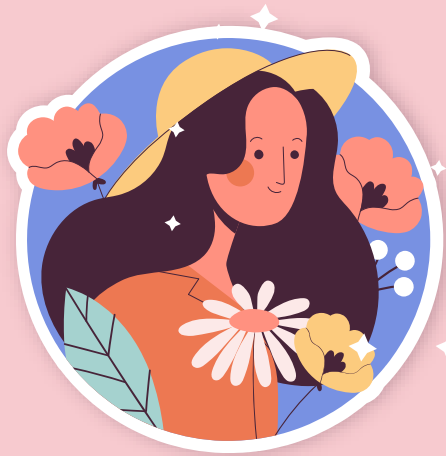


## Issue 02

What are we trying to solve?

## Bee Campus 04

What is it? And what did we create?



# 01

## Introduction

What has our group been working on?

# About Bee Campus

Bee Campus USA aims to develop initiatives and planning efforts through native conservation, education, and outreach. The goal of the bee campus group is to redesign the First Street Towers' garden, the Entomology Statue garden, and Whistler Hall Pollinator garden to enhance the ecosystem services they provide to pollinators and to gain a Bee Campus Accreditation for Purdue.



02

# Issues

What are we trying to solve  
and fix?



# Purdue's Bee Campus Accreditation

We will solve this by:

- Educating the Purdue Body on pollinator conservation, pesticides, and benefits of pollinator gardens
- Community outreach
- Proposed garden redesigns
- Decrease pesticide use





# 03 Gardens

What gardens did we have proposed plans for?

# Our Three Gardens

One goal of our group was to redesign the gardens at First Street Towers, the Entomology Statue, and Whistler Hall to enhance the ecosystem services they provide to pollinators



Whistler



1st  
Street



Entomology



# 04 Bee Campus Deliverables



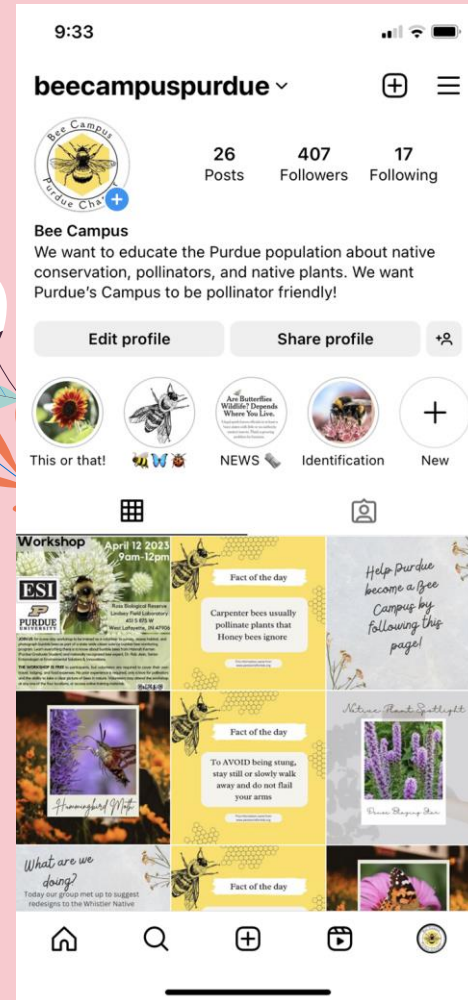
# Bee Campus Club

- We have a google drive created for the club that the Officers, Advisor and Brooke Sammons will have access to
  - It holds all the fact sheets, Bee Campus constitution, Canva templates, Instagram posts/stories, blueprints of the gardens, and garden inventories...aka everything

# Instagram

We created an  
Instagram!  
We have 412 followers!

We created it for  
informational and  
outreach purposes.



# Bee Campus Club

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## Purdue University Student Organization Constitution Template

This document serves to guide students in writing or revising the constitution for a new or existing student organization at Purdue University. An official student organization may structure and govern itself in any way it deems appropriate, so long as it does not violate the Regulations and Procedures for Recognized Student Organizations [found in the Student Regulations](#).

A constitution is comprised of the fundamental laws and principles that prescribe the nature, function and limits of an organization. Constitutions generally provide current and potential members with information about:

- What the organization's mission and purpose are and what the organization does.
- Who can become a member and how does someone become a [member](#).
- The essential operation of the organization, including the structure of elections, meetings, general officer/member duties, and more.

Essentially, the constitution provides an enduring, basic structure upon which an organization operates. Constitutions generally do not get into specifics of operation, leaving those ideas to an additional bylaws document. As a basic structure of the organization, any amendments or changes to an organization's constitution should be both rare and difficult to make, albeit not impossible. They should also [require](#) a high level of participation/approval from the organization's membership. Many organizations cite Robert's Rules of Order, latest edition ([download a cheat sheet from BoilerLink here](#)) when building their constitution. This document often helps guide groups in times of conflict.

- New organizations should use the Constitution **TEMPLATE** (below) and customize it for their organization. Existing organizations should use the template to make sure their document is clear and concise.
- **Items highlighted in yellow** are standard University statements and **MUST** be written in your constitution exactly as stated.
- All other sections are **Examples** of what could be included or guiding questions to help you

File Home Insert Draw Page Layout Formulas Data Review View Automate Help

Comments Share

Paste

Clipboard

Font

Alignment

Number

Styles

Cells

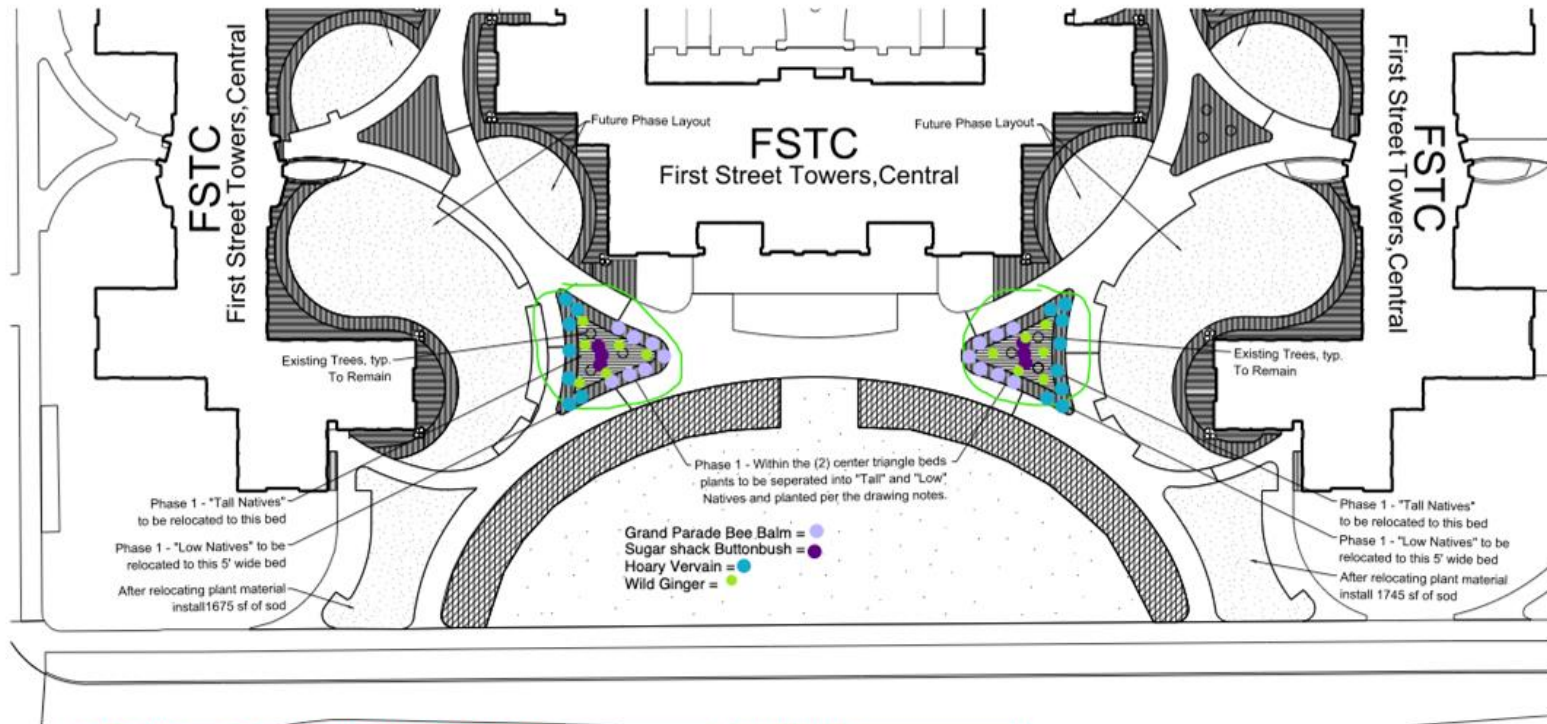
Editing

Analysis

Sensitivity

	J	K	L	M	N
	<b>Whistler Hall</b>				
	<b>Common name</b>	<b>Scientific Name</b>	<b>Climate/Preferences</b>	<b>Status</b>	
	Vanilla Twist Redbud	Cercis c. 'Vanilla Twist'	prefers moist, well drained soils. full-partial sun	native cultivar	
	Red Cedar	Juniperua virginiana 'Ca	tolerates almost any conditions, thrives in well drained soils, full sun to part shade	native	
	Hoptree	Ptelea trifoliata	prefers moist well drained soils and partial shade	native	
	Cuttleaf Tiger Eye Staghorn Sumac	Rhus typhina 'Balitiger'	prefers well drained soil and full to partial sun. tolerates dry soil	native	
	Erecta Chokeberry	Aronia arbutifolia 'Erect	prefers moist soils by tolerates dry conditions, moderately tolerant of shade	native	
	Bottlebrush Buckeye	Aesculus parviflora	requires moist soil, prefers well-drained, part shade to full shade.	nonnative	
	Buzz Magenta Improved Butterfly Bush	Buddleia Buzz Magenta	prefers medium moisture, well drained soils. Does not tolerate very moist soil, prefers full sun	invasive?	
	Green Gem Boxwood	Buxus x 'Green Gem'	prefers medium moisture, well drained soils and full sun to part shade	nonnative cultivar	
	Hummingbird Clethra	Clethra alnifolia 'Humm	prefers medium moist (but not dry) soil conditons, can tolerate full shade	possibly invasive	
	Slender Deutzia	Deutzia gracilis 'Nikko'	prefers medium moisture well drained soil with full sun to part shade	nonnative cultivar?	
	Michigan Sunset Dwarf Bush Honeysuckle	Diervilla lonicera 'Michig	prefers dry to medium moisture, well drained soils, with full sun to partial shade	possibly invasive?	
	Variegated Aralia	Eleutherococcus siebold	grows in almost any conditions	possibly invasive?	
	Japanese Kerria	Kerria japonica 'Pleniflo	prefers medium moisture well-drained soils, prefers full sun to part shade, tolerates full shade	possibly invasive	
	Spice Bush	Lindera benzoin	prefers medium moisture well drained soil with partial shade	native	
	Tiny Wine Ninebark	Physocarpus opulifolius	prefers medium moist well drained soils, does best in full sun, tolerates light shade	native	
	Smooth Sumac	Rhus glabra	prefers well drained medium moist soil and full sun	native	
	Goatsbeard	Aruncus dioicus	prefers moist well drained soils and partial shade	native	
	Butterfly Milkweed	Asclepias tuberosa	prefers well drained dry soils and full sun	native	
	Angel Hair Blue Star	Amsonia illiustris 'Angel	prefers moist loamy soils, tolerates some drought, partial sun (no pruning if in full sun)	~native	
	Solar Flare Baptisia	Baptisia 'Solar Flares Pr	prefers well drained rich soils, grows best in full sun, requires pruning if in shade.	native	
	Enchanted Eve Coreopsis	Coreopsis lancelet	prefers full sun and mesic to dry, well drained soil conditions	native	
	Blazing Star	Liatriis lingustylis	partial to full sun, moist to average well drained soil	~native or naturalized	





**First Street Towers - Landscape Retrofit**  
Phase 1 - 40' Scale  
Scope:  
Remove and relocate approx. 5,630 sf of native landscape area.  
Divide the center beds to tall and short (5' area at sidewalk edge) natives.  
Install Sod within the 2 southern areas.

**LOW NATIVES:**  
Identify & Relocate Alliums and Bulbs from the southern island beds to the isolated center beds.

**TALL NATIVES:**  
Identify & Relocate Lobelia, Amsonia, Coneflower, Salvia, Stachys and Cardinal Flower from the southern island beds to the large beds adjacent to the building (within 6' from edge of building).







## Targeted Invasives Watchlist for Midwest

The National Park Service has multiple collaborations with other organizations in order to stop the spread of invasives and to better ensure removal of said invasives. An Integrated Pest Management plan uses chemical, biological, mechanical and cultural means to manage invasive plants.

### Garlic Mustard

(*Alliaria petiolata*) ... By the time native species are ready to grow in the spring the Garlic Mustard has already block their source of sunlight and outcompeted for nutrients and root room.



### Buckthorn

(*Rhamnus* spp.) has the quick ability to mature faster than other plants and grows a dense foliage that decimates nearby plants who are also competing for sunlight and nutrients.



### Canada Thistle

(*Cirsium arvense*) has a extensive root system and its presence alters community structure that outcompetes other species and reduces biodiversity.



### Baby's Breath

(*Gypsophila* spp.) also outcompetes native species but does not help provide shelter or food for native wildlife.



### Crown Vetch

(*Securigera varia*) suppresses other vegetation due to its creeping growth, it can cover and shade out other plants. By doing this it can form dense monocultures.



All information came from the National Park Service, The Nature Conservancy, Michigan's Department of Natural Resources, and Minnesota's Department of Agriculture. See their websites for more information.

## The Lowdown On Bees

There are various types of bees, this sheet has general information that applies to most of them. There are various sizes of bees, from a large Bumble bee to a Perdita minima bee which is 2 millimeters long.

### 20,000 Bee Species

Bees are found on every continent except Antarctica. North America has about 4,000 types of native bees in forests, deserts, and grasslands. Bees originated from Eurasia.

### Diet

Bees only eat the sugary nectar and high protein pollen that they collect from flowering plants. They wasps they originally evolved from were carnivores.

### Fun Fact

Some bees use buzz pollination to collect more pollen by rapidly vibrating its flight muscles to loosen the pollen.

### Conservation

Many native bees are in decline due to habitat destruction, pesticides, climate change and other controversial issues. Pollinators are critical to North America's ecosystems and societies.

### It's time to take action.

Take action by educating yourself and urging your community to get involved in addressing environmental concerns.

Information Source:  
National Wildlife Federation | <https://www.nwf.org/Educational-Resources/Wildlife-Guide/invertebrates/bees>

## TYPES OF POLLINATORS

There are many kinds of pollinating insects below are some of our favorites

All information came from the Xerces Society. See their website [www.xerces.org](http://www.xerces.org) for more information

### Bees

There are about 20,000 species of bees. More than 90% are solitary. They have specialized anatomical structures that collect and transfer pollen.



### Butterflies

There are 160,000 species. They live in every terrestrial ecosystem. They support the health of their ecosystems and agriculture. Sadly, they are experiencing significant declines in population.



### Dragonflies

Dragonflies are accidental pollinators and considered carnivores. They're one of the most successful carnivores on the planet. They can fly 19-38 mph. All their eggs are laid and grown underwater.



### Beetles

1 in 4 of every species on the planet is a beetle. They began pollinating 150 million years ago, in the late Jurassic era. These resilient species can pollinate in dry and wet ecosystems.



## Pollinator Conservation Practices



### Plant Native Flowers

- Native plant species can provide important sources of nectar and pollen for pollinators.



### Create Habitats

- Increase pollinator habitats with safe nesting sites and adequate food sources to protect pollinators.

### Pesticide Mitigation

- The areas treated with pesticides are often shared with pollinators. Minimizing pesticide use can reduce pollinator's exposure to harmful chemicals.



### Site Monitoring

- Monitor the sites over time to note pollinator changes. Simple observation of floral visitors can understand pollinator population trend and their interactions with plant species.

### Public Education

- Spread awareness about the importance of pollinators and the need for conservation practices in the community to support pollinator conservation.





## HOW TO AVOID BEING STUNG BY AN INSECT

01. DO NOT SWING YOUR ARMS AROUND, REMAIN CALM
02. WEAR LIGHT COLORED CLOTHING, AVOID BRIGHT COLORS
03. AVOID PERFUMED SOAPS, SHAMPOOS, AND DEODORANTS
04. WEAR CLOTHING THAT COVERS MOST OF THE BODY
05. AVOID FLOWERING PLANTS WHEN POSSIBLE
06. CARRY AN EPIPEN IF YOU ARE ALLERGIC

All information came from the CDC, visit their website [www.cdc.gov](http://www.cdc.gov) for more information

# Welcome to the Hive of Information

All information in this fact sheet came from association of Zoos & Aquariums or Pest World for Kids

## Bees are just some of the pollinators

Hummingbirds, beetles, flies, wasps, butterflies, dragonflies, bats, and solitary bees can also pollinate.

## Bee Facts

### Bumble Bees

Bumble bees live in huge "families" and can sting more than once. Without bumble bees, there would be no humans because of important benefits such as keeping plants and trees alive.

### Honey Bees

These are the only social insects whose colony can survive for many years. This is because they huddle together to survive the winter months. They pollinate more than 100 crops in the U.S. These bees can only sting once.

### Carpenter Bees

These bees live alone and destroy wood to make their homes. They don't eat the wood though; they still eat pollen and nectar like other bees. These bees can sting multiple times.

## General Information

There are around 20,000 species of bees. Only female bees have stingers because they are a part of their reproductive system. Only the queen can use it for reproduction but all females can sting. The queen is very hard to distinguish from the worker and drone bees. Bees use their sense of smell to find and collect pollen.

## Reminder!!!

- Don't swat at bees, they are our friends!
- If bees are around you, keep still and they will eventually leave.
- Bees may be attracted to your scent or the bright-colored clothes you are wearing; when they realize you are not a flower they will leave.



## Native Plants

### What are Native Plants?

Native plants are species that are indigenous, or naturally occurring to a given region, ecosystem, or habitat without human introduction.

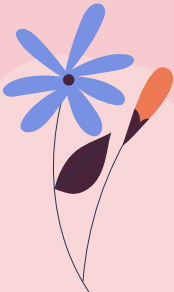
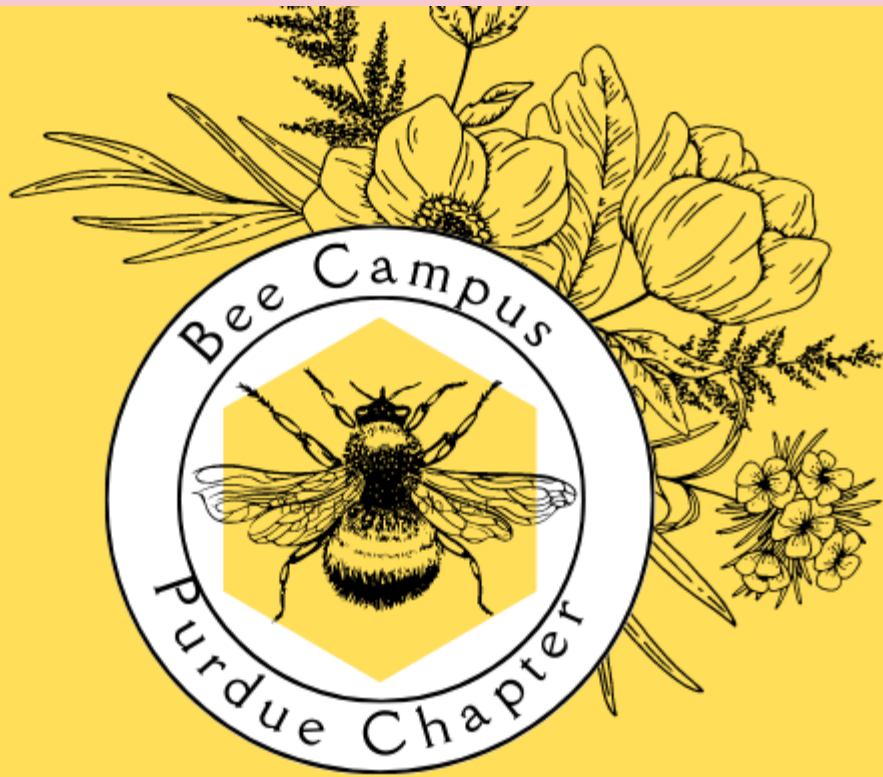
### Benefits of Native Plants?

Native plants provide nectar for pollinators, help to restore natural and native habitats, and improve soil fertility.

Native plants also help to prevent erosion!

### Examples of Indiana Native Plants

Black-eyed Susan, Milkweed, Indigo, Blazing Star, Wild Senna, Mountain Mint





## BEE CAMPUS COMMITTEE MAINTENANCE PROTOCOL

The purpose of this protocol is to ensure that the BeeCampus Club will maintain each garden and upkeep the aesthetics and functionality of the garden. Most maintenance procedures will include visiting the gardens to identify species of plants that are native vs. invasive.

### I. **Monitoring season: March 1st - October 31st**

- A. Monitoring season is crucial to the health and longevity of the gardens, as invasives can quickly decimate local, native populations. Within monitoring, the club should go out to each garden and identify and gauge native population success.
- B. Upon arrival, club members should be well versed and familiar with existing blueprints of the gardens.
- C. Identify native species and remove invasive species.

### II. **Equipment**

- A. Shovels, gloves, spades, bags for removed debris

### III. **Off season: November 1st - April 28th**

- A. Visit gardens once a month to remove leafy debris, litter, and other trash.
- B. Stay up to date with Purdue Arboretum

# What are Invasive Species?

## Definition

An invasive species can be defined as a plant or animal that resides in an area to which it is not native and causes harm to the environment.

## Examples



Canada Thistle  
*Cirsium arvense*



Domestic cats  
*Felis catus*



Japanese Honeysuckle  
*Lonicera japonica*



Japanese Beetle  
*Popillia japonica*



Garlic Mustard  
*Alliaria petiolata*



Common Starling  
*Sturnus vulgaris*

## Implications

The presence of invasive species can lead to the reduction or extinction of native populations through competition and habitat alterations. They also reduce biodiversity by overtaking areas through competition with lack of a natural predator.

## Prevention

- Don't transport firewood.
- Clean boots after each hike.
- Do research before choosing species for gardening.
- Do not release exotic animals into the wild.



THE NEW & IMPROVED  
POLLINATOR-FRIENDLY  
WHISTLER HALL GARDEN



OUR GOAL → incorporate more  
native plants and less non-native  
and invasive species!



THE NEW & IMPROVED  
POLLINATOR-FRIENDLY  
ENTOMOLOGY STATUE  
GARDEN



OUR GOAL → incorporate more  
native plants and less non-native  
and invasive species!



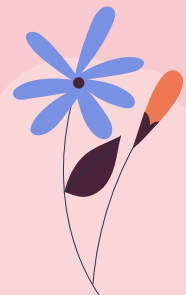
THE NEW & IMPROVED  
POLLINATOR-FRIENDLY  
FIRST STREET GARDEN



OUR GOAL → incorporate more  
native plants and less non-native  
and invasive species!



Purdue is on track to become  
an accredited Bee Campus!



# How can non-native species be bad for the environment?

Non-native plant species can impact native pollinator's foraging patterns and present structures that local pollinators are unable to use. Therefore, pollen isn't spread and the plant doesn't benefit the ecosystem.



## SUPPORTING POLLINATOR HEALTH

Supporting Pollinator Health in a Campus Setting - Purdue University Accreditation for Bee Campus USA

Zhangyue, Eva, Cody, Bella, Emma

