# **BEE INSPIRED** Community Pollinator Habitat Kit











## **BEE INSPIRED** Community Pollinator Habitat Kit

#### "It's the little things that run the world""

There is an urgent need for educating our students and communities about the importance of our native pollinators. With the collapse of honey bee colonies around the world, solitary bees and other native pollinators have become vital to the survival of our food crops and ecosystems.



The Squamish River Watershed Society with a grant from the Community Foundation of Whistler have created this Community Pollinator Habitat Kit to help support our schools and communities in restoring or enhancing pollinator habitats. By creating healthier ecosystems for our native pollinators, we create a healthier environment for ourselves.

#### **Overview:**

You will find the kit to be a hive buzzing with information and resources to help you get started on your pollinator habitat restoration project. Your project can be as small as a few pots filled with native flowers or as big as a wildflower meadow enhanced with native bee houses, hotels and beyond – that part is up to you. All are important. All will make a difference.

More than anything, we want this kit to inspire its users to "leave no child inside," create lasting personal outdoor memories, get people working together, and maybe, amidst all the learning and laughter, help save the world.

## **Pollinator Habitat Kit includes:**

- \*Inspiring Imax pollinator video and teacher's guide
- \*Pollinator and pollination themed books, activities and games
- \*Pollinator models and educational props
- \*Mason Bee kit/ How to build a "Bee Hotel" instructions
- \*Pollinator/bee garden resources
- \* Native plant lists
- \*Pollinator and plant ID picture charts/posters/pamphlets
- \*Important links to supportive information and so much more...





Thank you to the **Community Foundation of Whistler** for their support in the creation of this project.

# **Community Pollinator Habitat Kit** Introduction

Children are natural-born scientists, ever curious about the world around them - and they LOVE bugs. Creating a school, or community pollinator garden offers children the opportunity to personally experience nature, other species and the role humans play in this complex ecosystem called earth.

A garden created for the benefit of both humans and animals can be a powerful teaching tool for innovative academic and social lessons. They can inspire children to write, draw, paint and sing. They challenge students to learn the principles of ecology. They teach math and science through measuring and recording, estimating and observing. They reveal hidden relationships and beauty. Most importantly, gardens and their insects reconnect children with nature, teach us tolerance for our fellow earthlings and help us raise mindful stewards of the earth.

Please involve the children in all stages of creating the garden and caring for the pollinators. Let them plan, design, plant and care for the garden and any other pollinator habitats you create.

The more personal the connection is to the garden, the more likely it will be maintained and cherished by the children throughout the years.



# **BEE INFORMED** Background Information and Other Interesting Stuff



# **FOR YOUR INFORMATION** What is Pollination?

"Pollination is a love story that feeds the world" - Louie Schwartzberg

Pollination is an important process which leads to the creation of new seeds that grow into new plants. Pollination begins with the flower.

Flowering plants have several different parts that are important in pollination. Flowers have male parts called stamens that produce a sticky powder called pollen. Flowers also have a female part called the pistil. The top of the pistil is called the stigma, and is often sticky. Seeds are made at the base of the pistil, in the ovule.

To be pollinated, pollen must be moved from a stamen to the stigma. When pollen from a plant's stamen is transferred to that same plant's stigma, it is called self-pollination. When pollen from a plant's stamen is transferred to a different plant's stigma, it is called cross-pollination. Cross-pollination produces stronger plants. The plants must be of the same species. For example, only pollen from a daisy can pollinate another daisy.



Pollen from a rose or an apple tree would not work.

But how does pollen from one plant get moved to another? Plants usually rely on animals or the wind to pollinate them.

## WHAT IS A POLLINATOR?



"The bee is more honoured than other animals, not because she labours, but because she labours for others" – St John Chrysostom

A pollinator is any animal that carries pollen from the male part of the flower (stamen) to the female part of a different flower (stigma) of the same species. The movement of pollen must occur for a plant to become fertilized and produce seeds or fruit.

Most pollinators visit flowers to gather nectar – a high energy food source, and pollen to feed themselves and their young. Pollination is an accidental side effect of this foraging.

When pollinators, such as bees, butterflies and hummingbirds feed from flowers, pollen unintentionally gets stuck to their hairs or feathers and is then transported to the next flower.

Although the pollinator is oblivious to their essential role in the survival of flowering plants and life on earth, the flower isn't so innocent.

Plants have adapted, over time, to be more attractive to insects and other pollinators. Flowers' colours and scents did not evolve for human pleasure, but rather act like natural neon signs, advertising sweet rewards to visiting pollinators. Some flowers have evolved personalized attractants (smell, colour) that lure specific species of insects. Some pollinators have evolved specialized mouth parts, body and beak shapes for feeding from certain species of flowers.

Other than bestowing upon us beauty, the perfume of spring blossoms and the sweet goodness of honey, pollinators are important to our very existence. Over three-quarters of the crop plants that feed the world and many of the plants from which we develop medicines from need pollinators to produce healthy fruits and seeds. Pollinators are vital to orchards and crop production, gardening, ecological restoration and forage plants for the diary and beef industry.

## WHICH FOODS DEPEND ON BEES?

"One out of every three bites of food we eat is courtesy of bees."

Do you love chocolate? Could you survive without your morning coffee? Well, without bees or other pollinators those luxuries would no longer exist. But neither would many of the food crops we depend up

a list of some of those crops. Eggplant

Alfalfa Almonds Apples Asparagus Beans Beets **Blackberries** Blueberries **Brussels** sprouts Buckwheat Cabbage Cantaloupe Cauliflower Celerv Cherries Chestnuts Chives Cocoa Beans **Coffee Beans** Clover Cranberries Cucumber

Currants

Flax Garlic Gooseberries Grapes Horseradish Kale Lettuce Mustard Onions Parsley Peaches Pears Plums Pumpkins **Radishes Raspberries** Rhubarb Squash **Strawberries Sunflowers** Sweet potatoes Turnip Watermelon







\*Without bees to pollinate crops like alfalfa and clover we would not have as many meat or dairy products. Say good-bye to hamburgers, ice-cream and yogurt.

"If the bee disappears from the surface of the earth, man would have no more than four years to live." Albert Einstein

## FOOD CHOICES WITH AND WITHOUT POLLINATORS







# **MEET OUR POLLINATORS**

A pollinator can be any creature that moves pollen from one flower to the next. Some pollinators, however, are more productive than others. Below are pictures of some of the local pollinator heroes we have in BC.

Native Bees:



Mason Bee male and female

Non-native Bees:



Honey Bee

Flies:



Hover Flies



**Bumble Bees** 

Bee Flies

Beetles:

Mining Bee



Ladybird Beetle

Butterflies



Western Swallowtail Butterfly



Common Blue Butterfly



Morning Cloak Butterfly

#### Hummingbirds:



Rufous Hummingbird

Pollinator Word Search link

FOR MORE INFORMATION ABOUT LOCAL POLLINATORS GO TO:

http://www.sfu.ca/biology/faculty/elle/Bee\_info.html

## **ARE POLLINATORS IN DANGER?**

There is scientific evidence that pollinators are at risk. Honey bee colonies are dying off at alarming rates all over the world. Native bees and other pollinators have to contend with mass habitat loss and extensive use of pesticides. Simply put, pollinators need our help and they need it now.

One of the biggest threats facing most species on earth is habitat loss. As native vegetation is replaced by urban development, roads, highways, commercial and private real estate, pollinators lose habitat necessary for their survival.

The proliferation and improper use of pesticides, particularly in agricultural, has negatively impacted pollinators and their natural habitats. Pesticides include products such as weed killers and insecticides, which are designed to prevent, destroy or reduce pests, weeds and viruses. Herbicides also create a problem for pollinators as they are used to kill off weedy species, such as dandelions, which are often the only flower available to pollinators in many areas.



Both bee and butterfly populations have been devastated over the last several decades due to habitat loss and poisoning. We can no longer afford to sit on the sidelines and continue watching this downward trend.



Unfortunately, there is no end in sight until agricultural practices and policies change.

But we, as aware citizens, can still make a difference and help save our pollinators.

## WHAT CAN WE DO?

### 1. Education:

Share what you learn about pollinators and their plight - with everyone! Most people don't give a second thought to insects unless they are buzzing around their heads. Be aware and mindful of the little things that share our communities, feed us and make this planet such a wonderful place to live. Using this kit is one giant step in securing the survival of our pollinators and ourselves.

### 2. Preserve or Restore Habitat:

Preserving or restoring natural habitat is the greatest act we can do to save not just pollinators, but all species . As property and land owners we can make a big difference. If you can, share your yard, farm or cottage with nature. Leave a good percentage of it wild or recreate a "natural area" in an underused corner of your property. "Grow, don't mow" and

celebrate the difference you can make for pollinators and the earth.

## 3. Grow a Pollinator Garden:

Pollinators need abundant nectar and pollen sources throughout the growing season. Create a garden with a variety of colours, shapes, and bloom times. Try to use species native to your area, as these plants and their pollinators have adapted to and for each other through time. Make sure to provide at least three species of flower in bloom each season and try to avoid plants from nurseries that use pesticides.

## 4. Don't Use Pesticides

Populations of bees and other insect pollinators have fallen dramatically in recent years and there is growing scientific evidence that pesticides are playing a significant role. Pesticides don't only target the "problem" insects, they kill the essential ones as well. Please research other techniques in controlling unwanted plants and insects. There are countless ways to manage a garden without using pesticides and herbicides. Your health, as well as the health of the birds and the bees, will thank you.

### 5. Houses for Pollinators

Other than growing a pollinator garden or leaving some "wild space" in your yard, you can build a bee house or hotel. They provide that extra help and habitat our pollinators so greatly need. Bee houses can be purchased through many organizations or you can easily build your own using recycled materials. Bee houses and hotels were originally created as a way of attracting bees and other beneficial insects to gardens and crops. Today, they can be found in the middle of city parks, schools and as pieces of ecological art in front of "human" hotels.



**Bug Hotel** 

## A GUIDE TO CREATING A SCHOOL OR COMMUNITY POLLINATOR GARDEN



## Creating a Pollinator Garden by Kids Gardening.Org

Animals can roam about and seek mates with whom to reproduce, but imagine the challenge for a plant, rooted firmly to the ground, to achieve the same end. Pollinators, which include thousands of insect species (bees, tiny wasps, butterflies, beetles, and flies) and other animals (such as hummingbirds and bats), unwittingly move pollen from the male anther of one flower to the female stigma of another as they search for sweet, nourishing nectar and fat- and protein-rich pollen.

The amazing diversity of flowers results in large part from their fascinating adaptations that have evolved to lure pollinators. After all, every aspect of a flower, from the designs on its petals to the timing of its blooming, is vital to the process! In this unique alliance, flowers become fertilized and capable of producing seeds, and everybody wins. But, what's it to us? For starters, one out of every three bites of food we eat is made possible by a pollinator, and 80 percent of all flowering plants rely on pollinators for survival. Without them, our gardens and lives would be less fruitful.

Plant scientists are concerned about our role in weakening pollinator/plant relationships. The overuse of pesticides, which often kill beneficial pollinators, is one factor. Another one, particularly serious for migrating pollinators such as monarch butterflies, is land fragmentation that results largely from development. Isolated plants can't attract a variety of pollinators or visitors frequent enough to sustain the plants and ultimately their partners.

By cultivating a garden, schoolyard, or even a few containers that allure these important plant partners, students can provide vital oases amidst deserts of buildings and concrete. They can, in turn, set up investigations of animal visitors and their sometimes flashy floral partners, and begin to understand how these threads of life connect.

#### **Creating a Pollinator Garden continued...**

You don't need a lot of space to start a pollinator garden. Even a few containers can attract perusing pollinators. If you don't already have a garden site, have the class scope out a location that receives at least six hours of full sun each day. They should also have an idea about the basic needs of wildlife — food, water, shelter, and places to rear young — and a notion of what makes pollinators tick.

Consider launching the project by exploring who's already in the neighborhood and what plants they seem to prefer. Next, decide who you'd like to attract (a variety of pollinators?) and what they need to thrive and reproduce. In general, the greater variety of plant types you have (trees, shrubs, perennials, annual flowers and herbs), the more pollinators you'll attract. Since pollinators have different needs during different life cycle stages, maintaining diversity will also make your site more of a full-service oasis!

- 1. Plant plenty of nectar- and pollen-rich flowers. (See chart, below, for ideas.) Use as many plants native to your region as possible. Native plants have evolved closely with native insects and are well-suited to meet their needs. In fact, some pollinator species are entirely dependent on the availability of certain native plants. Whether using native or nonnative plants, shoot for old-fashioned varieties. Many garden varieties have been bred to look or smell nice for humans, but they often lack accessible nectar or pollen for animal partners. (Never dig plants from the wild unless the area is slated for destruction and development and you have permission from the landowner. The best source for native plants in a local nursery if they have been grown and not gathered.)
- 2. Try to put in flowers with a range of shapes and sizes. Trumpet or cup-shaped flowers, such as cardinal flower, honeysuckle, and bee balm, attract a wide range of pollinators. Pollinators with shorter tongues, such as small native bees and wasps, feed on tightly packed clusters of small flowers, such as those found on milkweed, zinnia, phlox, and mint. Hummingbirds feed on red, purple, or orange flowers with lots of nectar, such as bee balm, fuchsia, sage, and nasturtium.

#### **Creating a Pollinator Garden continued...**

#### Include a variety of flowers that bloom throughout the season.

By doing so, you will accommodate different pollinators' preferences and provide a sequence of pollen and nectar sources throughout different life cycle stages. Consider shrubs and tress, such as dogwood, blueberry, cherry, plum, and willow, that provide nectar or pollen in early spring when other food is scarce.

**Use containers, if necessary.** If your growing space is limited, consider growing the following types of pollinator plants in containers filled with a rich, well-drained soil mix: Aromatic herbs (coriander, catnip, mint, parsley, lavender); annuals (marigold, phlox, bachelor's button, zinnia, cosmos, salvia); perennials (bee balm, asters, columbine, coneflower, wild rose, red flowering currant).

2. Provide food sources (host plants) and overwintering places for eggs and larvae. Although pollinators in their adult stages generally thrive on flower nectar and/or pollen, larval stages have more of a penchant for plant leaves. Allow a section of your schoolyard to revert to wild grasses, weeds, and wildflowers.

**3. Provide water.** Pollinators will gather and sip at shallow pools, mud puddles, and bird baths; bees and wasps can use mud as a home-building material. Mud puddles also provide important minerals for some pollinators.

**4. Avoid using pesticides and herbicides.** Many can be harmful to pollinators as well as pests. Herbicides may wipe out key plants (weeds) that are important for pollinators' food mix. If you feel that you must control pests, judiciously use homemade remedies such as garlic spray, or pesticides derived from plants or microbes. Apply them only after sundown, when most pollinators have stopped their rounds.

**5. Provide sites and materials for nesting and overwintering.** Leave cut plant stems exposed, turn flowerpots that have drainage holes upside down, leave twigs and brush in small piles, create mud puddles, or put out pieces of string or other light fibres. Students can build nesting structures for certain types of bees and other pollinators.

## **Pollinators**

## **Flower Preferences**

#### Bees

Did you know? There are about 800 species of native bees in Canada ranging in length from less than one eighth of an inch to more than one inch. Most of these bees are "solitary" nesting and, having no hive to defend (as do non native honeybees), they are unlikely to sting! Yellow, blue, purple flowers. There are hundreds of types of bees that come in a variety of sizes and have a range of flower preferences. They can't see red, but are attracted to some red flowers, such as bee balm, that reflect ultraviolet light. Small bees, which have short tongues, prefer packed clusters of tiny flowers (e.g., heather, asters, and aromatic herbs).

Butterflies	Red, orange, yellow, pink, blue flowers. They need to land before feeding, so like flat- topped clusters (e.g., zinnia, calendula, yarrow, blazingstar) in a sunny location. They also need food sources for larvae and places to lay eggs. These include milkweed, aster, lupine, thistle, fennel, violets, hollyhock, black-eyed Susan.
Moths	Light-coloured flowers that open at dusk such as evening primrose.
Pollinating Beetles	They prefer wide-open flowers, such as aster, sunflower and rose.
Flies	Green, white, or cream flowers. They have short tongues, so prefer simple-bowl shapes.
Hummingbirds	Red, orange, purple/red tubular flowers with lots of nectar (e.g., honeysuckle, sage, fuchsia, jewelweed, fireweed, columbine, bee balm, nasturtium, red flowered currant). No landing areas are needed since they hover while feeding.

For Curriculum Connections from Kid's Gardening.org: <u>http://www.kidsgardening.org/classroom-projects/creating-pollinator-garden/curriculum-</u> <u>connections</u>

## POLLINATOR GARDEN CHECKLIST

Adapted from Pollinators Habitat Kitfor the Sonoran Desert Region

Below is a checklist to help you get started on your Pollinator Garden Adventure. This will not only serve as a guide, but will be helpful when applying for grants.

#### **STEP 1: DEVELOPING A PROPOSAL**

- \_\_\_\_\_ Start a Garden Record Book
- \_\_\_\_\_ Gather Resource Information (how to)
- \_\_\_\_\_ Determine the Purpose for the Garden (to attract pollinators and teach students the connection between us and pollinators)
- \_\_\_\_\_ Identify Potential Sites
- \_\_\_\_\_ Identify and Meet with Potential Project Co-leaders
- \_\_\_\_\_ Outline Project Requirements (What do you need)
- \_\_\_\_\_ Prepare a Preliminary Budget
- \_\_\_\_\_ Start a Pollinator Garden Advisory Committee
- \_\_\_\_\_ Identify Potential Funding Sources and Donors of Materials
- \_\_\_\_\_ Keep Your School Community Informed (Principal, teachers, school board, parents, PAC)

#### **STEP 2: PLANNING THE GARDEN**

#### \_\_\_\_ Begin a Classroom Garden Journal

- \_\_\_\_\_ Determine A Garden Theme (Native flower Pollinator Garden)
- \_\_\_\_\_ Select a Site
- \_\_\_\_\_ Site Analysis: Map and Inventory the Site; Identify Site Needs
- \_\_\_\_\_ Discuss Plans For Ongoing Garden Maintenance (native plants need little maintenance once established)
- \_\_\_\_\_ Develop a Timeline for the Project
- \_\_\_\_\_ Revisit and Update the Budget
- \_\_\_\_\_ Write Grants and Conduct Fund Raising Activities
- \_\_\_\_\_ Keep Your School Community Informed

#### **STEP 3: DESIGNING THE GARDEN**

- \_\_\_\_\_ Create a Preliminary Design
- \_\_\_\_\_ Select Appropriate Plants
- \_\_\_\_\_ Water System?
- \_\_\_\_\_ Finalize the Garden Design
- \_\_\_\_\_ Make a Shopping List
- \_\_\_\_\_ Complete Any School District Paperwork
- \_\_\_\_\_ Finalize the Budget
- \_\_\_\_\_ Keep Your School Community Informed

#### **STEP 4: PREPARING THE SITE**

- \_\_\_\_\_ Purchase Gardening Equipment
- \_\_\_\_\_ Establish Guidelines with Students, etc. for Working in the Garden
- \_\_\_\_\_ Coordinate Volunteer and Student /Class Teams
- \_\_\_\_\_ Schedule and Organize Work Days

#### SITE PREPARATION

- \_\_\_\_\_ Remove Surface Debris
- \_\_\_\_\_ Remove "Weed" Species
- \_\_\_\_\_ Test and Prepare the Soil
- \_\_\_\_\_ Install Water System if Needed
- \_\_\_\_\_ Add Other Required Structures
- Construct Paths and Delineate Planting Areas
- \_\_\_\_\_ Keep Your School Community Informed



#### **STEP 5: PLANTING THE GARDEN**

- \_\_\_\_ Determine the Appropriate Planting Times for Plants and Seeds
- \_\_\_\_ Planting Trees
- \_\_\_\_\_ Planting Herbaceous Plants
- \_\_\_\_\_ Sowing Seed
- \_\_\_\_\_ Purchase Plants and Seeds
- \_\_\_\_\_ Establish Guidelines with Students , etc for Working in the Garden
- \_\_\_\_\_ Coordinate Volunteer and Class Teams
- \_\_\_\_\_ Schedule and Organize Planting Days
- Provide Recognition for Garden Volunteers and Funding Sources
- \_\_\_\_\_ Organize a Garden Ribbon-Cutting Celebration

#### **STEP 6: ONGOING GARDEN MAINTENANCE AND CARE**

- \_\_\_\_\_ Develop and Write Plan for Ongoing
  - Maintenance
- \_\_\_\_\_ Preventing Vandalism
- \_\_\_\_\_ Periodically Check Plant Health
- \_\_\_\_ Water
- \_\_\_\_\_ Weed removal
- \_\_\_\_\_ Pruning
- \_\_\_\_\_ Fertilizer
- \_\_\_\_\_ Seasonal Care
- \_\_\_\_\_ Repairs



## STEP 7: USING THE GARDEN AS AN OUTDOOR CLASSROOM AND GATHERING AREA

- \_\_\_\_ Establish Garden Rules
- \_\_\_\_\_ Help develop and research curriculum and lesson ideas
- \_\_\_\_Organize Special Events
- \_\_\_\_Get Classes Outside

## School Garden/Greening Resources, Grants and Inspiration

**Evergreen** (www.evergreen.ca) has an amazing website promoting school ground greening, food growing, watershed education and native plant gardens. They also have some of the best teacher resources for getting your students outside and engaged. Follow link below for Teacher's Corner: <u>http://www.evergreen.ca/get-involved/resources/teachers-corner/</u>

#### For Edible/Vegetable Gardens:

**Whole Foods** (<u>www.wholefoodsmarket.com</u>) has an excellent webpage with detailed instructions on how to start your community or school garden, build partnerships, funding etc. As well as curriculum based lesson plans: ://www.wholekidsfoundation.org/resources/school-garden-resources/

<u>School Garden Wizard</u>: Resources and step-by-step templates for teachers interested in starting a school garden.

## Where to Find Grants :

TD Bank: <u>https://fef.td.com/funding/</u> Whole Foods: <u>WholeKidsGrants</u> Evergreen: <u>Evergreen Funding</u> Tree Canada: <u>Tree Canada</u> Community Foundation of Whistler: <u>Whistler Foundation</u> Whistler Blackcomb Foundation: <u>Whistlerblackcomb</u> Home Depot : <u>Home Depot</u>

# WHAT TO PLANT Native Plant Guides For Pollinator Friendly Gardens



# **NATIVE SPRING FLOWERS**



Acer Circinatum Vine Maple



*Rosa nutkana* Nootka Rose



*Rubus spectabilis,* Salmonberry



Sorbus sitchensis Mountain Ash



*Aquilegia formosa* Western Columbine



*Ribes sanguineum* Red Flowered Currant



*Rubus parviflorus,* Thimbleberry



*Amelanchier alnifolia* Saskatoon Berry

# NATIVE SUMMER FLOWERS



*Epilobium angustifolium* Fireweed



Anaphalis margaritacea Pearly Everlasting,



Sedum spp. Broadleafed Stonecrop



Allium cernuum var. cernuum Nodding Onion



Lupinus polyphyllus Large -leaved Lupine



Holodiscus discolor Ocean Spray



Symphyotrichum subspicatum Douglas Aster



*Spiraea douglasii* Hardhack

## **POLLINATOR GARDEN RESOURCE LIST** Where To Purchase Native Plants

Last updated: 06 June 2015 by the Native Plant Society of BC

#### UBC Shop-in-the-Garden

University of British Columbia Botanical Garden 6804 SW Marine Drive Vancouver BC V6T 1Z4 T: 604.822.4529 www.ubcbotanicalgarden.org/shop

#### Garden Shop at VanDusen Botanical Garden

VanDusen Botanical Garden 5251 Oak Street Vancouver BC V6M 4H1 T: 604.257.8335 <u>www.vandusengarden.org</u>

#### Phoenix Perennials and Specialty Plants Ltd.

3380 No. 6 Road, Richmond BC V6V 1P5 T: 604.270.4133 www.phoenixperennials.com

#### Dykhof Nurseries Ltd.

460 Mountain Highway North Vancouver BC V7J 2L2 T: 604.985.1914 www.dykhofnurseries.com

### Native Plant Seed Suppliers:

#### VanDusen Seed Collectors

www.vandusen.plantexplorers.com/

### **Native Plant Nurseries**

#### Linnaea Nurseries Ltd.

3666 - 224th Street Langley BC V2Z 2G7 T: 604.533.8281 or 1.888.327.7705 F: 604.533.8246 E: linnaea@telus.net www.linnaeanurseries.com Wholesale\_pursery\_only\_trees\_and\_shrubs\_perennials\_

Wholesale nursery only, trees and shrubs, perennials, groundcovers, containers, liners, seeds, catalogue, online plant list

#### N.A.T.S. Nursery Ltd.

24555 32nd Avenue Langley BC V2Z 2J5 T: 604.530.9300 E: info@natsnursery.com

#### www.natsnursery.com

Wholesale nursery only, specialized growers and wholesalers of northwest native plants, groundcovers and hardy ferns, online plant list.

#### Peel's Nurseries Ltd.

11610 Sylvester Road **Mission BC** V2V 4J1 T: 604.820.7381 E: info@peelsnurseries.com www.peelsnurseries.com

Wholesale nursery only, propagator, trees and shrubs, perennials, grasses, containers, liners, cuttings, online plant list

#### Split Rock Sekw'el'was Wild Plant Nursery

Seton River Lower Spawning Channels on Cayoose Creek St'at'imc lands, Highway 99 North Lillooet BC Mailing Address: Box 484 , **Lillooet BC** VOK 1V0 T: 250.256.4136 <u>http://splitrockenvironmental.ca/product-category/plants/</u> Retail and Wholesale Nursery, Propagator Trees, Shrubs, Wildflowers and Grasses

## MORE INFORMATION ON NATIVE PLANT GARDENING

Below is a list of resources created by the Native Plant Society of BC

#### **Books Specific To Native Plant Gardening**

Native Plants in the Coastal Garden: A Guide for Gardeners in the Pacific Northwest by April Pettinger and Brenda Costanzo

*Gardening with Native Plants of the Pacific Northwest* by Arthur R. Kruckeberg Cultivating the Wild: Gardening with Native Plants of BC's Southern Interior and Eastern Washington By Eva Durance

*Propagation of Pacific Northwest Native Plants* by Robin Rose, E. C. Chachulski, Diane L. Haas

Naturescape British Columbia The Stewardship Series Field identification guides

Plants of the Pacific Northwest Coast by Jim Pojar and Andy McKinnon

Wildflowers of the Pacific Northwest by Mark Turner and Phyllis Gustafson

#### Websites For South-Western BC and Pacific Northwest

Evergreen.ca Start your own native plant garden <u>http://www.evergreen.ca/get-involved/resources/native-plants-and-invasive-species/start-your-own-native-plant-garden/</u>

Canadian Museum of Nature, Getting Started In Native Plant Gardening <u>http://nature.ca/plnt/res/lft\_gs\_e.cfm</u>

## POLLINATOR/POLLINATION ACTIVITIES AND LESSONS

## **DIY Mason Bee House**

## How to Build a Pollinator Hotel

## Exploring the Parts of a Flower (Pollination Activity)

**Cheese Puff Pollination** 

**Pollination Games** 

**Pollinator Survey** 

Pollinator, Meet Your Plants - Matching Game

**Educational Resources and Links** 

# **Bee Houses**

Bees have two basic necessities: Food and Shelter. Your pollinator and vegetable gardens will provide the needed nectar and pollen. So what about shelter?

Bees need a place to nest. Most native bees dig burrows in the ground. Simply leaving exposed areas of soil or "wild" spaces in your school yard or community garden is often enough to attract these ground-nesting bees. Other bees however need a little more elaborate nests.

Cavity-nesting bees use hollow stems or holes in old wood for their nests. These bees will use mud, leaves or other materials to create walls between their series of egg cells. You can attract these bees by providing small tunnel-like structures called: bee houses. Building bee houses is a wonderful project for classrooms or community groups. There are also many companies that sell bee houses of all shapes, sizes and cost.

### WHERE TO BUY BEE HOUSES:

West Coast Seeds:

https://www.westcoastseeds.com/shop/gardensupplies/pollination/mason-bees/ -

Crown Bees: <a href="http://crownbees.com/">http://crownbees.com/</a>

Mason Bee Homes: http://masonbeehomes.com/

## **DIY MASON BEE HOUSE** Craft A Home For Mason Bees With Recycled Material.

Mason bees are a native, gentle bees that rarely ever sting. Here's a project you can do with your class to help create a safe home for these amazing bees.

Gardeners seeking organic, natural ways of gardening often raise orchard mason bees to pollinate their orchard's fruit trees and vegetable gardens. Mason bees are much better pollinators than honeybees.

Materials (per student)

Container\* Empty toilet paper rolls, enough to fill your chosen container Brown paper\*\* Pencil Tape Scissors Peat moss Paint and paintbrush (optional)



\***Tip**: Try using wooden birdhouse, empty coffee can, large tin can or oatmeal canister.

**\*\*Tip**: Butcher paper, untreated parchment or paper bags will work perfectly for this project.

# **INSTRUCTIONS**

**Prepare the Container.** Have students thoroughly clean it, inside and out. If using an empty coffee can or similar, remove the lid but leave the bottom intact.

**Tip**: Now is also the time to paint or wrap the exterior of your bee house if desired — mason bees are drawn to bright colors, so choose something bold.

**Make Nesting Tubes.** Students can create nesting tubes by rolling a sheet of brown paper snugly around a pencil to make a sturdy tube. Secure the sides with a few pieces of tape, and gently slide off the pencil. (Make sure to leave the eraser of the pencil sticking our of the paper a bit so you can pull it out of the tube easier). Close one end of the tube by folding it over a bit and covering it with tape. Eyeball the size of your container to get an idea of how many nesting tubes you'll need.

**Tip**: If you're short on time, nesting tubes can be purchased readymade at your local hardware or gardening supply store.

Assemble the Bee House. Place each nesting tube inside a toilet paper roll with all open ends facing the same way until it's full. Trim tubes, on the open end, so they are flush with the end of the toilet paper roll, then place the rolls inside your container with open ends of tubes facing out. Keep adding bath tissue rolls filled with nesting tubes until the container is full.

**Tip**: Fill in gaps between the bath tissue rolls with small handfuls of peat moss (use your pencil to pack it in small spots). Moss helps insulate the bee house, providing a comfortable environment for the bees.

### MASON BEE HOUSE INSTRUCTIONS CONTINUED...

**Find the Right Site.** Choose a south-facing spot in your school yard that will be protected from rain, and hang it about eye level. Trees and fence posts are natural choices if available.

**Safety Tip:** Although these little mason bees very rarely sting (the males don't even have a stinger), talk with your kids about how to be safe around bees, and set a good example by exercising caution yourself.

**Encourage mason bees to visit.** Once you have built and installed the house, it's natural to want bees to move in right away! Encourage them to visit your yard with these tips:

\* Set up more than one mason bee house in different locations. \*Have plenty of flowering plants growing nearby to provide the bees with nectar and pollen.

\*Mason bees need bits of mud or clay to secure their eggs in their nesting tubes, so keep a small dish of mud or clay nearby. \*If you notice birds pecking at the bee house, cover the entrance with chicken wire.

\*Create a bee bath by setting stones in a shallow dish of water near the bee house.



"Bee Bath" or watering station

# **POLLINATOR HOTELS**

#### What is a Pollinator/Insect Hotel?

A pollinator hotel is a human-made structure created from natural materials to provide a home or shelter for pollinators and other beneficial insects. They can come in a variety of shapes and sizes and are found all over the world. Pollinator hotels have been used for centuries to attract pollinators to farmland to ensure healthy crop pollination.

#### Why Build a Pollinator Hotel?

Loss of habitat has put our pollinators in danger. Insects are essential to our existence and they need hiding places. Building Pollinator Hotels helps create needed bug homes and awareness. Insect hotels are fun to build, are beautiful pieces of garden art and provide amazing opportunities for learning.

#### How to Build a Pollinator Hotel?

There are almost as many types of <u>pollinator hotels</u> as there are pollinators. Please see the link above for some ideas, or this one on <u>Pinterest</u> for more inspiration. The style chosen for this kit is the "pallet" pollinator hotel. It is kid friendly and all the materials can be found in and around every community.



Valleycliffe Elementary School



Brackendale Fair Grounds

## **The Pallet Pollinator Hotel**

By the Ulster Wildlife Trust



The Insect Hotel above is built entirely from recycled materials. The main structure is discarded pallets and everything else has been found, recycled or donated.

#### Where To Site Your Habitat

Many invertebrates like cool damp conditions, so you can site your habitat in semi shade, by a hedge or under a tree. Putting the habitat close to other wildlife features, such as an overgrown hedge, native shrubs or a pond will make it easier for small creatures to find it.

Not all creatures like to be in the shade: solitary bees like a warm sunny spot, so put tubes for bees on the sunniest side of the habitat, or put them elsewhere in the garden.

Choose a level, even surface: the hotel may end up fairly heavy, so will need a firm base.

**The Basic Structure** We used old pallets for the basic structure. The more you can use recycled or reclaimed materials the better. The habitat does not need to be more than 5 pallets high. Our pallets were all the same size. If you place the bottom pallet upside down, this should create larger openings at the ends, which can be used for a hedgehog house. Although the structure should be stable, you might want to secure each pallet to the one below.

#### **Filling The Gaps**

There are many different ways to fill the gaps in the structure, here are some suggestions –

• **Dead wood.** Dead wood is an increasingly rare habitat as we tidy our gardens, parks and amenity woodlands. It is essential for the larvae of wood-boring beetles, such as the stag beetle. It also supports many fungi, which help break down the woody material. Crevices under the bark hold centipedes and woodlice.

• Holes for solitary bees. There are many different species of solitary bee, all are excellent pollinators. The female bee lays an egg on top of a mass of pollen at the end of a hollow tube, she then seals the entrance with a plug of mud. A long tube can hold several such cells. Hollow stems, such as old bamboo canes, or holes drilled into blocks of wood, make good nest sites for solitary bees. Holes of different diameters mean many different species can be catered for. You can make a home for solitary bees by collecting old canes or pieces of hollow plant stems, then placing in a length of plastic drain-pipe or a section from a plastic drinks bottle. You can also build a wooden shelter, similar to a bird box. Solitary bees like warmth, so place your habitat in a sunny spot, perhaps on a south-fencing wall. Bees use differing ways to seal their egg chambers: look out for canes blocked with dried mud or bits of leaf.

• Frog hole. Frogs eat many slugs and other garden pests. Although they need a pond to breed in, they can spend most of the year out of water. We use stone and tiles as these provide the cool damp conditions amphibians need. Newts may also take advantage of these conditions. Amphibians need a frost free place to spend the winter; this could be in the centre of our habitat, inside the base of a dry-stone wall, under a pile of rubble or deep underground.

• Straw & Hay. These provide many opportunities for invertebrates to burrow in and find safe hibernation sites.

• **Dry Leaves.** More homes for a variety of invertebrates; this mimics the litter on the forest floor.

• Loose bark. Beetles, centipedes, spiders and woodlice all lurk beneath the decaying wood and bark. Woodlice and millipedes help to break down woody plant material. They are essential parts of the garden recycling system.

• **Crevices.** Many garden invertebrates need a safe place to hibernate in through the winter. Our insect hotel has many different types of crannies and crevices that different species of invertebrate can hide in over winter.

• Lacewing homes. Lacewings and their larvae consume large numbers of aphids, as well as other garden pests. You can make a home for lacewings by rolling up a piece of corrugated cardboard and putting it in a waterproof cylinder, such as an old lemonade bottle.

• Ladybirds. Ladybirds and their larvae are champion aphid munchers! The adults hibernate over winter, they need dry sticks or leaves to hide in.

• **Bumblebees.** Every spring queen bumblebees search for a site to build a nest and found a new colony. An upturned flowerpot in a warm sheltered place might be used.

• Nectar producing plants. Why not plant some nectar-rich flowers around your habitat. These provide essential food for butterflies, bees and many other flying insects.







## **EXPLORING THE PARTS OF A FLOWER** A POLLINATION ACTIVITY FOR KIDS

by Jacquie Fisher in Nature & Outdoor Activities

#### Pollination & the Parts of a Flower

This project is a peek inside the flower which may be something your class has never had the opportunity to do. This activity will show kids that flowers have both male and female parts and explain how reproduction happens in nature.



#### Here's What You'll Need: Per Child

• A fresh cut flower or two - try to find one that has a large open bloom where you can see the "insides" and not just all petals. Tulips and daffodils are great choices.

- A small somewhat sharp paring knife
- You may also want a magnifying glass
- A cutting board
- Paper towels

• And depending on how messy the kids like to get, be sure to cover their shirt and keep a wet rag close by as the pollen on the flower can leave marks on clothes.

Speaking of pollen -- if your child has seasonal allergies, they may want to wear a dust mask so they don't inhale any pollen. 1. Have the kids identify the outside parts of the flower (petals, stem, etc). Review the parts of a flower. You can use the flower template found in the binder to help them become more familiar with the terms.

Once you've gone over the outside parts of a flower, we want to cut open the flower.

Carefully take your paring knife and begin at the bloom on the flower -with medium pressure, make a cut into the petals and base and then pull your knife down the flower and continue cutting through the top layer of the stem.

This is a great opportunity to teach older kids about knife skills. If you have younger kids, this is a job for adult helpers.

Now begin at the top of the flower and gently pull apart of petals on either side of your cut.



When you first open the flower, you'll see **the male parts which are called the stamen**. They are those long tubes and on the ends (the anthers) are where you'll find the pollen. It looks like yellow powder in our flower.



If you carefully pull back the petals and separate the stamen, you'll find **one** long tube in the center -- this is the female part of the flower -- also called the pistil.

The top of the pistil is called the stigma and is usually sticky. The pistil is usually taller than the stamens.

I'm sure the kids will immediately begin to play with the pollen -- it draws them in like glitter. Just be sure to wash their fingers off so they don't get any in their eyes or near their face when they are done.

Here's a better look at the anthers and stigma of another flower. You can see that the anthers look all fuzzy again -- that's the pollen that's collecting on the tips.

For pollination to take place, the pollen needs to be transferred from the anthers to the stigma.

Here's a better look at the anthers and stigma of another flower. You can see that the anthers look all fuzzy again -- that's the pollen that's collecting on the tips.

For pollination to take place, the pollen needs to be transferred from the anthers to the stigma.



Now I know what you're thinking -- can you take the pollen from one flower and move it to the stigma of the same flower (basically, can a flower self-pollinate)?

It depends on the plant -- for example, these flowers have the male and female parts in the same bloom. But if you've ever seen a pumpkin vine grow, you'll see that the vine produces both male and female BLOOMS. So the pollen from the male bloom has to get to the female blooms in order for a pumpkin to begin to grow.

Now this next part is AWESOME!

If you look at the base where all the stamen and stigma come together, there is a small buldge in the flower. This is the ovary (yep, another female part).

Carefully peel back the greenery surrounding it and you will reveal the egg cells!! I know -- totally cool!!



Even though I magnified the photo above, the kids can easily see them and carefully remove them. This is another great reason to have a magnifying glass for the project.

#### Some Questions To Ask The Kids:

**Do pollinators know its their job to pollinate flowers?** No, it's only by accident that pollination happens. The flowers are the real sneaky ones here. They attract the pollinators with scent, colour and nectar, in hopes that the bee or other pollinator will pass on their pollen to another plant.

#### Can humans pollinate a flower?

Yes, we can! It would be impossible for us to pollinate everything pollinators do, but we can do it. All we have to do is transfer the pollen from the anther of one flower to the stigma of another flower.

## **Flower Dissection Activity for Younger Kids**

This should take about 40 minutes, depending on how much information you give them at the same time.

#### What you will need per child:

plain postcard or card stock paper pencil and colouring crayons double-sided sticky tape a flower tweezers



**1** Ask your children to write their name on one side of the card, and draw a careful picture of the flower they have chosen.

**2** Then they need to stick a length of double-sided sticky tape across the other side of the card and remove the protective covering.



**3** They must take the flower apart **very carefully.** Tell them to start with the petals, **pulling very gently** and trying not to tear them. As they pull them off, they can put them gently on to the tape.

**4** Next, they can stick on the green bits that were outside the petals. These are the sepals.



**5** They can use the tweezers to pull off the smaller pieces in the middle. Tell your children to look carefully, and they might find two different sorts! There should be stamens with pollen, and a pistil with a sticky end.

**6** Ask them to look at what they've stuck on their card. Can they count how many petals there are? Did they find lots of stamens - or were there too many to count?

# **Cheese Puff Pollination**



Although I prefer to go outside to a field of wildflowers or a garden to let children observe pollination first hand, this activity is super cool for the classroom or as a warm up for the real thing.

1. Have each student draw a flower on construction paper and lay it on his or her desk.

2. Have students eat cheese puffs without licking their fingers. They want to collect as much cheese puff dust on their fingers as possible! Tell the students that this represents collecting pollen from their flowers.

3. Next, have them" fly" to another flower in the room and rub their fingers on their peer's flower. Then, have them fly back to their seats. Did all of the flowers get pollinated? What will happen to the flowers that did not?

4. After this activity, show the video **<u>Pollinators - Putting Food on the Table</u>** from the

#### Nature Works Everywhere website:

http://www.natureworkseverywhere.org/#resources/535ac920c4b7761540c469f2 to demonstrate the importance of pollinators within an ecosystem.

## ANOTHER WAY TO DO THIS ACTIVITY:

To start, pour Starbursts (still in their wrappers) in the bottom of a big bowl (I'd decorate the bowl to look like a large flower) and covered them with cheese puffs.

The Starbursts represented the nectar found in the "flower" and the cheese puffs are the stamen covered in cheesy "pollen".

Next, after washing and thoroughly drying their hands, invite your little pollinators up to the table one at a time to root through the stamens to get their

nectar.





As they do, their hands will quickly become covered in "pollen".

To demonstrate the movement of pollen, They must pick up more nectar (another Starburst) from the next flower (cut out of a paper towel) and experience how the "pollen" rubbed off as they did.

When the whole class has finished pollinating, ask them if they actually thought about pollinating or if they thought mainly about getting that nectar? What do you think the bee or butterfly is concentrating on?



In one teacher's class a boy shouted "I did it! I pollinated that flower! I'm a rockin' bee!" When done you can let the students eat their Starburst (pollen and anthers) and even the stamens! Fun!!!

# **POLLINATION GAMES**

#### Pollination Activity #1 – Act it out!

Materials:

Art supplies: Coloured paper, pencils, crayons, pipe cleaners, sparkles, glue etc.

2 or 3 pre-made flower headbands Cotton balls Double-sided tape

Start by introducing the different pollinators and allowing students to decorate wings to wear. Give them the choice of making bee, butterfly or hummingbird wings, since those are the most common pollinators in our area.

Once they are all wearing their wings, give each student a straw and tell them it is their proboscis and also put a strip of double-sided tape on each student's arm (since the pollen will need to stick to them).

With a helper parent or teacher put on headbands with petals attached, to show that you are flowers. You should each have a cup filled with apple juice, to represent the nectar in the flower.

Half of the students line up in front of you and half in front of your helper. They use their 'proboscis' to take a sip of the 'nectar' and I stick a cotton ball on the tape on their arm, telling them that pollen just got stuck to them.

Send them to the line in front of the other flower (helper). There, they will take another sip of nectar and the other flower will take the 'pollen' that was stuck to the students' arm. Presto! They successfully pollinated the flower.

https://gardenatschool.wordpress.com/2012/06/16/pollination-games/

#### Pollination Activity #2–Pollination Tag

This next activity is a good reinforcement of the importance of pollination to plants.

Start by telling students to draw their favourite fruit on a piece of paper. On the other side of the paper, tell students to draw a large flower. In the center of their flower, place a piece of double-sided tape, and attach a cotton ball to the flower. This is the pollen!

Students may choose to color the cotton ball with marker to distinguish their pollen from the other flower's in the class. Next, choose three students to be pollinators. They can put on their wings from the previous day's activity. The pollinators will now chase the flowers in a game of tag (you may want to implement some rules for safety).

When a flower is tagged, it must give its pollen to the pollinator. If the pollinator is already carrying a cotton ball, he/she hands the pollen to the flower to pollinate it. When this happens, the flower turns over his/her piece of paper to show that he/she turned into a fruit. This player then comes out of the game to sit down.

The game ends when most of the flowers have been pollinated and turned into fruits!



Bumble bee pollinating a blueberry flower

## **Pollination SURVEY ACTIVITY For Early Grades**

Familiarize students with different types of pollinators and watch pollinators in action. Best done at a time of year when you have as many different coloured flowers as possible. Learn about some of the insects and animals that are necessary for gardens to thrive.

You will need an area filled with plants flowering in all different colors in order to do this activity. Hopefully your school has a colourful schoolyard garden in place, or perhaps you are looking for an activity to do on a field trip to the local botanic garden or arboretum.

This activity is best done after students have already been introduced to <u>pollination</u>. Hand out a chart, clipboard, and pencil to each student. The chart should have different types of pollinators on one side (bees, butterflies, moths, birds, etc) and all the colors of flowers on the other side (white, pink, red, orange, yellow, purple).

Students are to go into the garden and search for pollinators. When they find one pollinating a flower, they should mark on their chart what type of pollinator it is as well as the color flower it is pollinating. They can also try smelling the flower, after the pollinator has left, and decide whether it smelled sweet, like perfume or was stinky.

After exploration time, come together as a class to make a class graph/chart of which color flowers each pollinator preferred, using students observations. Discuss what colors you might plant if you were trying to attract a certain pollinator. Discuss ways that flowers make themselves attractive to pollinators, such as fragrance, color, and shape.

Usually, you'll find that bees are most attracted to purple flowers and butterflies are most attracted to bright colors such as yellow, pink, and orange. Butterflies particularly like flowers with strong fragrances and petals that are long, like a landing strip, for them to rest on while feeding. Hummingbirds are usually attracted to red or dark pink flowers with deep throats they can easily stick their beaks into. Moths do a lot of pollination at night so they rely on fragrance more than colors. And green flowers are usually wind-pollinated. Some flowers that are pollinated by flies will even smell like trash, to better attract their pollinators!

# **Educational Resources:**

#### GENERAL POLLINATOR/POLLINATION VIDEOS, GUIDES AND LESSON PLANS:

Educator's Guide to: WINGS OF LIFE Disney/Imax DVD found in this kit. <u>http://nature.disney.com/wings-of-life/educators-guide</u> The Disneynature WINGS OF LIFE webpage has a great Educator's Guide which includes over 25 pages of lessons and activities targeting grades 2-4.

Whole Foods has an amazing Pollinator program online. Follow this link to a cute 1 min video about the importance of bees and the trouble they are facing: <u>Share the Buzz</u> or this one for activities: <u>school-garden-resources</u>

**The Nature Conservancy -** *Nature Works Everywhere.* Here is a link to a Gardens Activity Guide: Habitat video and guide: (The activity guide is written for older grades, but some of it could be adapted for younger grades). <u>Nature Works Everywhere</u>

Pollination Canada – Seeds of Diversity: <u>http://www.seeds.ca/pollination</u>

**Pollinator Partnership**: Mainly an American organization, but a great guide to everything you need to know or teach about pollinators. <u>http://pollinator.org/index.html</u>

**Science World of BC:** Pollinator Activities: http://www.scienceworld.ca/resources/units/pollinators

**Nature's Partners: Pollinators, Plants, and You.** Inquiry learning-based curriculum for grades 4 to 6. By North American Pollinator Protection Campaign: <u>http://www.kidsbutterfly.org/curriculum</u>

### **Educational Resources Continued:**

**Canadian Wildlife Federation:** Pollinators From Flowers To Food To Our Future: Lesson plans, links, photos and more: http://cwffcf.org/en/discover-wildlife/resources/educational-units/pollinators-fromflowers-to-food-to-our-future/?referrer=https://www.google.ca/Links to

#### POLLINATOR/POLLINATION ACTIVITY BOOKS:

**The University of Illinois:** created an <u>activity book</u> that has a pollination song, as well as some printout pollination worksheets including word searches and coloring pages.

Here's another activity book from the USDA called "Bee Pollen Popular" <u>http://www.life.illinois.edu/entomology/pollinators/docs/Pollination%20Activity%20Book.pdf</u>

**The Smithsonian:** Excellent classroom-ready materials for grades four through nine. The Smithsonian invites teachers to duplicate materials from this publication for educational use.

http://www.smithsonianeducation.org/images/educators/lesson\_plan/partne rs\_in\_pollination/pollen.pdf

#### FIELD TRIPS AND GUEST SPEAKER IDEAS:

Gardens: Van Dusen Botanical Gardens: 5251 Oak Street Vancouver, BC http://vandusengarden.org/

**UBC Botanical Gardens:** 6804 SW Marine Drive Vancouver, BC Tel 604 8224208 <u>http://www.botanicalgarden.ubc.ca/</u>

Honeybee Centre: Surrey BC: <u>http://www.honeybeecentre.com/</u>

**Sea to Sky Beekeepers**: Contact through Sea to Sky Beekeepers facebook page

\*Try visiting other schools or community pollinator gardens in your own community.

## **A YEAR IN MASON BEE KEEPING**



In late winter, hang your mason bee nest or house against a wall in a sunny location that has morning light. Placing it about eye level is best. That way you can watch them coming and going!

Consider putting the cocoons out near or on the nest in early March. Choose a warm sunny day with little wind. If using the bees for pollinating your fruit trees, wait until the trees are about 25% in bloom. Otherwise look around your garden and neighbourhood to see what is flowering. Imagine your bees visiting 17 blooms a minute in a 100-meter radius from the nest. Is there enough forage? If so,

bring out the bees.

Hang around for a half hour or so and watch for the males to emerge. They are a little smaller than the females and have a white tuft of hair on their foreheads. They are cute!

Being male, they have no stinger and so are perfectly safe to gently handle as they emerge. They will sit on your hand for a minute before flying off for a long awaited breakfast. If they leave a bit of orange sticky stuff behind don't be shocked; just a little bee poop as a memento... If you are very lucky and very patient you might find the males huddled together beneath a flower blossom having a snooze.







#### A YEAR IN MASON BEE KEEPING Continued:

The females will stay in their cocoons for another few days or weeks, depending on the weather. Hopefully sooner than later. After emerging they will mate almost right away, but it takes a few days for their ovaries to mature. Until then they seem to disappear. Eventually, if you have the right conditions, you'll see them busying themselves around the nest.

They're hard to follow, being such fast fliers. You can spot them around fruit tree flowers if you wait long enough. In the afternoon they can be seen with their back ends sticking out of the nest tubes, having a siesta.

For greater success helping your bees, make sure there is exposed clay nearby. Unfortunately, one year my bees used construction-grade sand to make their walls. The next spring the newly emerged bees couldn't chew their way out. Since then, I haven't left this to chance.

A small tray of water with rocks in it for landing on also increases the bees' ability to lay eggs. Planting a diversity of flowering material, in terms of colour, height, type of flower, and time of blossoming will give the bees more opportunities for forage.



#### **A YEAR IN MASON BEE KEEPING Continued:**



Adult female bees lay a single egg and deposit a ball of gathered pollen and nectar. Then they wall that chamber closed before laying the next egg and depositing the next food ball. Being parthenocarpic, mason bees lay fertilized eggs—females at the back of the nest tubes, and unfertilized male eggs at the front.

Usually by the end of June, this year's adult females are dead. You will notice a drop-off in activity around the nest. At this time, it's worth bringing the nest indoors, and placing it with the entry holes pointing up somewhere out of the way like on top of the refrigerator. This will ensure that the larvae in each chamber will be in contact with their stored food supply.

By bringing it indoors, you can prevent the developing larvae from being eaten by birds or parasitized by wasps. Don't worry about it being too warm, as the larvae need time to spin their cocoons and turn into pupae.

By the end of August the larva have pupated inside their cocoons and are already fully mature. They will stay in this dormant condition until the following spring when the cycle begins anew. By late September, it will be safe to open the nesting tubes to wash the cocoons.

#### A YEAR IN MASON BEE KEEPING Continued:

Gently take the tubes apart and float the waterproof cocoons in a bowl of cold water. Delicately rub them back and forth with your fingers until no more mud and mites can be seen clinging to the cocoons. The mites are very small and look like rust, turning the water very red.

Cocoons containing live healthy bees tend to float on the surface of the water. Keep the sinkers separate from the good cocoons to see what emerges. This is a good way to get up close and personal with one of the small wasps that parasitize mason bees.

Gently dry the cocoons (mould can be a killer for the bees too), by placing them on dry towels and rolling the cocoons around to remove moisture.

Place the cocoons into a paper bag or cardboard box, such as a Jell-O container. Place it in the refrigerator or an unheated room until conditions are right in the spring for release.

Article compliments of Brian Campbell, Certified Bee Master.



### A YEAR IN MASON BEE KEEPING Continued:

#### Too late or too early?

Mason bees emerge from their cocoons at exactly the time when early spring flowers are opening. Their brief lives as adults last from March until around the end of June. In late winter/early spring, on sunny days you may see insects flying around. That's the signal that it's warm enough to place your mason bee cocoons outdoors. Don't worry if it rains or gets cold again – these insects are pretty tough. In south coastal BC and the US Pacific Northwest, March is the time when many trees go into bloom and dandelions and Forsythia flowers appear.

You have to play it by ear in regions where winter can drag on. Simply keep an eye out for flowers and early insects.

By July 15th, it's probably too late to hope for success with mason bees, no matter where you live.

#### Planting for mason bees?

The ideal flower for mason bees is actually that of a fruit tree like cherry, plum, or apple. These flowers are shallow and numerous, and they appear in spring and early summer. If you have flowering fruit trees in your yard, or even in your neighbourhood, it's not strictly necessary to plant more flowers to feed your mason bees.

However, all pollinators (including your mason bees) benefit from a wide variety of flowers blooming over a long period. If you have room to plant a bed of wildflowers, you will be rewarded by the presence of all kinds of pollinators throughout the growing months, from bumblebees to hummingbirds and butterflies. Planting flowers with wild pollinators in mind is a simple step we can all take to enhance pollinator vitality in our neighbourhoods. Choose a wildflower blend to suit your particular planting needs.

## Pollinators, Meet Your Plants Project Wild

Materials:

- copies of each page, folded in half and laminated.
- flowers of different colors, sizes, and shapes

Directions:

• Show students the different flowers you have gathered. Ask them which one is their favourite. Go around the room and have several students share which flower is their favourite and why.

• Explain to students that just like they prefer some flowers over others, so do pollinators. For example, because a butterfly has a long, slender mouth part (proboscis), they prefer flowers that are long and tube-like. Some flies, on the other hand, have short, round mouth parts much like a sponge. For these pollinators, a wide-open flower is preferred. Or, for other pollinators, like moths, a flower that is open at night is preferred because that is when moths are active. The concept of pollinators preferring some plants over others is known as Pollinator Syndromes.

Just like we have symptoms or characteristics which are specific to a syndrome or illness, pollinators have characteristics that are specific to their preferred plants.

• Brainstorm with students all the different kinds of pollinators we have - bees, butterflies, moths, beetles, ants, birds, bats (although bats are not pollinators in BC, they are in other parts of the world).

### **Pollinators, Meet Your Plants continued:**

• Give each student one card (either a pollinator card or a plant card). Explain to them that they are to use the characteristics of their pollinator or plant to find their match - each plant will have more than one pollinator, except the cactus.

• Once all students have found their match, or matches, have the pairs of students explain to the class why they are a match.

#### ANSWERS:

Rufous Hummingbird ......Columbine or Red-flowering Currant

**Bumble Bee** ......Lupine, Aster, Pacific Crab Apple Flower, Ocean Spray, Rose, Blueberry

Lady Bird beetle ....... Rose, Goldenrod, Asters, Pacific Crab Apple Flower

**Flower Fly** .......Pacific Crab Apple Flower, Aster, Ocean Spray, Red-Flowering Currant

**Bee Fly** ......Pacific Crab Apple Flower, Ocean Spray, Asters, Rose, Red-Flowering Currant

Leaf-Cutter Bee ...... Asters, Blueberry, Red-Flowering Currant

**Mason Bee** .......Pacific Crab Apple Flower, Red-Flowering Currant, Ocean Spray, Blueberry

Swallowtail Butterfly......Red-Flowering Currant, Columbine

Bat.....Saguaro Cactus Flower

## **Pollinator/Pollination Vocabulary List**

Anther	Top of the stamen, where the pollen is produced.
Calyx	The term for the group of sepals located just under the petal
Corolla	The term for a flower's petals, collectively.
Filament	The tube that holds up the anther, giving support to the plant.
Native plants	Plants that have developed, occur naturally, or existed for many years in an area (typically for thousands of years or longer).
Native pollinat	ors Pollinator species that have developed, occur naturally, or existed for many years in an area (typically for thousands of years or longer).
Nectar	The sweet smelling and tasting liquid inside a flower.
Ovary	The bottom part of a flower's pistil; holds the ovule, where a seed is formed.
Ovule	The small plant structure that creates seeds containing female genetic information.
Petal	The colourful part of a flower that protects the plant's reproductive parts and attracts pollinators.
Pistil	Name for the three female parts, collectively, of the flower (the stigma, style, and ovary).
Pollen	tiny grains on top of the anther that need to go to the stigma for pollination.
Pollination	Transfer of pollen from a stamen to a pistil
Pollinator	Anything that moves pollen from the anthers of a flower to the stigma of a flower to accomplish fertilization.
Sepal	The individual, often green, leaf-like structures located just below the petals, used to protect the flower bud.
Stamen	Name for the two male parts, collectively, of the flower.
Stigma	The top of the flower's pistil, the area where the pollen is deposited at pollination; traps pollen.
Style	The slender part of a pistil, situated between the ovary and the stigma; pollen travels through this to get to the ovary.

# **BEE THANKFUL**



A sweet hive of honey and thanks to *The Community Foundation of Whistler*. Without your gift this project would not exist. And to *The Squamish River Watershed Society* for your guidance and vision.

You are the Bee's Knees.



