Nevada Bugs & Butterflies Activity Packet

2020

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NV Bugs

Created by Cynthia Scholl, Nadya Muchoney and Julie Watson

We hope you enjoy exploring the amazing diversity of life in Nevada with the activities on the following pages.

We are especially excited to see what you find during our first **iNaturalist challenge, Nevada Bugs & Butterflies Summer Nature Challenge**. Please feel free to share your findings with us on social media as well using the **#myNVbugs** hashtag.

- Cynthia, Kevin, Nadya, Julie and the rest of the NV Bugs Board

An Acmon blue butterfly and two pygmy blue butterflies on thin leaf milkweed. Photo by Cynthia Scholl.

Nature Walk Basics

Going on a nature walk by yourself or with your family is a great way to explore nature, exercise, relax, and recharge. Walks can be short or long, or maybe you don't even leave your backyard! Here are some tips and tricks for a successful Nature Walk.

What to Bring:
A backpack
Water
Snacks
Binoculars
Bug boxes, cup, small container, etc.
Sun protection
Field guides
Device with nature apps like iNaturalist or Seek on it
A can-do attitude!

Exploring outside is a very safe activity but taking some precautions can make your nature walk even more enjoyable! Make sure you pack right if you're leaving your house. Water, snacks, and protection from adverse weather are all important. If you are old enough to go by yourself make sure a grownup knows where you're going and how long you will be gone.

While on your walk keep your eyes, ears, and even your nose open! Touching and feeling things when safe to do so is a great way to explore your environment. There's so much to observe and explore with your senses. On the next couple pages are some themed hike ideas, scavenger hunts, and bingo sheets to help lead you or your explorers on a successful Nature Walk!

Observing and Asking Questions on your Nature Walk

One of the most important skills to being a scientist is making detailed observations of your surroundings. Here is a list of open-ended statements to get you started. Sometimes when you make lots of observations you come up with more questions and not very many answers – don't worry, that's what being a scientist is all about!

On my nature walk, the weather was:

On my nature walk I saw something for the first time:

On my nature walk I imagined being a bug and this is what I saw:

These are some of the things I wondered about on my nature walk:

Buggy Nature Walks

Spider-web Hike

Explore the world of our web spinners! Grab a squirt bottle and fill it with water. You'll want the squirt nozzle to have a mist option. Walk your favorite trail and mist areas with vegetation like grasses or in large bushes to find some awesome spider webs! You may even find some spiders in them!

Optic Hike

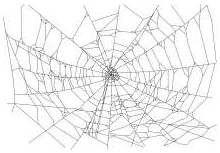
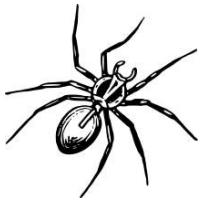
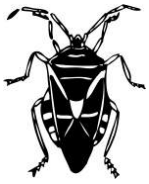
Binoculars aren't just for the birds! Grab your favorite pair of binoculars and get looking for your buggy favorites. Dragonflies, butterflies, and bees are all great ones to observe through your binoculars!

Focus Feature Hike

While out hitting your favorite trail take a moment to really focus on one area. Maybe it's a tree, a bush, a particular rock, whatever you'd like, but really try to find as many crawly critters as you can in that area. Bushes and small trees when they're in bloom are great to find lots of bugs! Bug jars, magnifying glasses, small cups; these are all great ways to explore these areas!

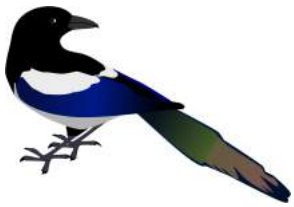
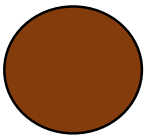
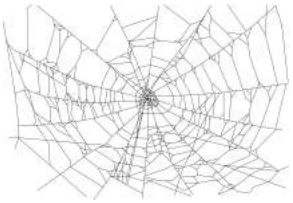
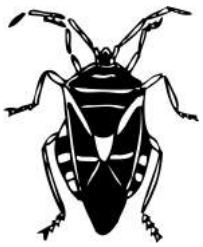
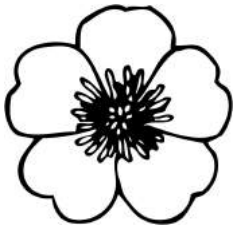
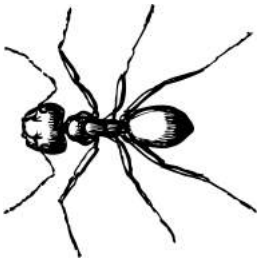
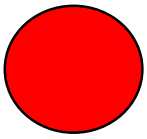
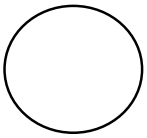
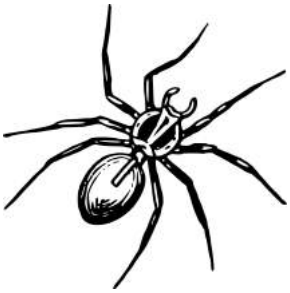
Backyard Bug Bingo

Can you get a bingo in your backyard? Explore your backyard and see if you can get a bingo. When you find something mark off the corresponding square.

 A flying bug	 A bug that lives underground	 A black bug	 A bug that is camouflaged	 A traveling bug
 A spiderweb	 A bug eating	 A bug that hops	 A bug that stings	 Hear a bug noise
 A smooth bug	 A green bug	FREE	 A group of bugs together	 A bug on a flower
 A spider	 A bug that's climbing	 A bug that's building something	 A bug with wings	 A bug that doesn't fly
 A bug trying to hide	 A bug with spots	 A bug with antennae	 A bug's home	 A bug on a leaf

Beginner Backyard Bingo

Can you get a bingo in your backyard? Explore your backyard and see if you can get a bingo. When you find something mark off the corresponding square.

 A bird	 Something brown	 A spiderweb	 A bug
 A leaf	 A flower	 An ant	 Something red
 A tree	 A stick	 Something white	 A butterfly
 Something green	 A spider	 A rock	 Dirt

Sensory Scavenger Hunt Challenge

Complete this list to become the ultimate outdoor explorer! Use your senses to complete these challenges then check the box! For an added challenge write in your own on the line!

Touch

- ☐ A Pinecone
- ☐ A Smooth Rock
- ☐ Something Rough
- ☐ A Leaf
- ☐ _____

See

- ☐ A Butterfly Flying
- ☐ A Bird on the Ground
- ☐ An Ant Walking
- ☐ Leaves Moving
- ☐ _____

Hear

- ☐ A Bird Call
- ☐ A Bug Sound
- ☐ The Wind Blowing
- ☐ Water Moving
- ☐ _____

Smell

- ☐ Dirt
- ☐ A Rock
- ☐ Leaves
- ☐ Something Wet
- ☐ _____

Making Observations with iNaturalist

iNaturalist is a free platform that can be used by anyone 13 or older to record naturalist observations. Logging observations of plants and animals is a fun way to learn more about local organisms (and contribute to a global database of biodiversity observations). Join the **Nevada Bugs & Butterflies Summer Nature Challenge** to see how many Nevada bugs you can find!



iNaturalist observations recorded around Reno, NV by board member Nadya

Getting Started

1. Set up an **iNaturalist** account using the **iNaturalist** mobile app or website
2. Join the "Nevada Bugs & Butterflies Summer Nature Challenge" project: https://www.inaturalist.org/projects/nevada-bugs-butterflies-summer-nature-challenge-2020
3. Look for bugs! When you spot one, take some photos of your discovery
4. Upload your observation using the mobile app or website
5. If you know what kind of bug you observed (like a butterfly), add this info. If you don't, the iNaturalist community will help you identify it!
6. Add your observation to the NV Bugs "Summer Nature Challenge" project
7. Check back to see whether your bug has been identified and learn more!

Resources

Check out board member Julie's tutorial on using iNaturalist, Seek by iNaturalist, and other nature observation apps!
Link: https://youtu.be/zl20v6Ta1uU
iNaturalist Getting Started Guide
Link: https://www.inaturalist.org/pages/getting+started
iNaturalist Video Tutorials
Link: https://www.inaturalist.org/pages/video+tutorials

Don't want to share your sightings?

Seek by iNaturalist is kid-friendly tool that can be used to identify observations without sharing them publicly – great for nature journaling! You can also try sketching your nature observations on paper.

For Parents

- Kids should only use iNaturalist with the help of an adult
- Locations of observations can be made private or obscured in order to protect privacy
- Licensing and copyrights for observations and photos can be adjusted in "Account Settings"

Buggy Citizen Science Projects

Citizen science projects are a great way to learn about species in your area, while also contributing to real scientific research! Using just your observational skills, a camera, and a smart device, you can help scientists study and protect the insects found in Nevada. Check out these projects to get involved:

Western Monarch Milkweed Mapper

The **monarch butterfly** is one of the most recognizable bugs in the world, and they rely on **milkweed** plants for food! By sharing your observations of monarchs and milkweeds, you can help scientists better understand western monarchs and their habitat needs.
Website: www.monarchmilkweedmapper.org, or use **iNaturalist:** www.inaturalist.org/projects/western-monarch-milkweed-mapper

Bumble Bee Watch

Have you spotted **bumble bees** buzzing around flowers in your yard or neighborhood? Consider snapping a photo and reporting your sighting to Bumble Bee Watch! Your observations will help researchers monitor and conserve these fuzzy pollinators.
Website: www.bumblebeewatch.org

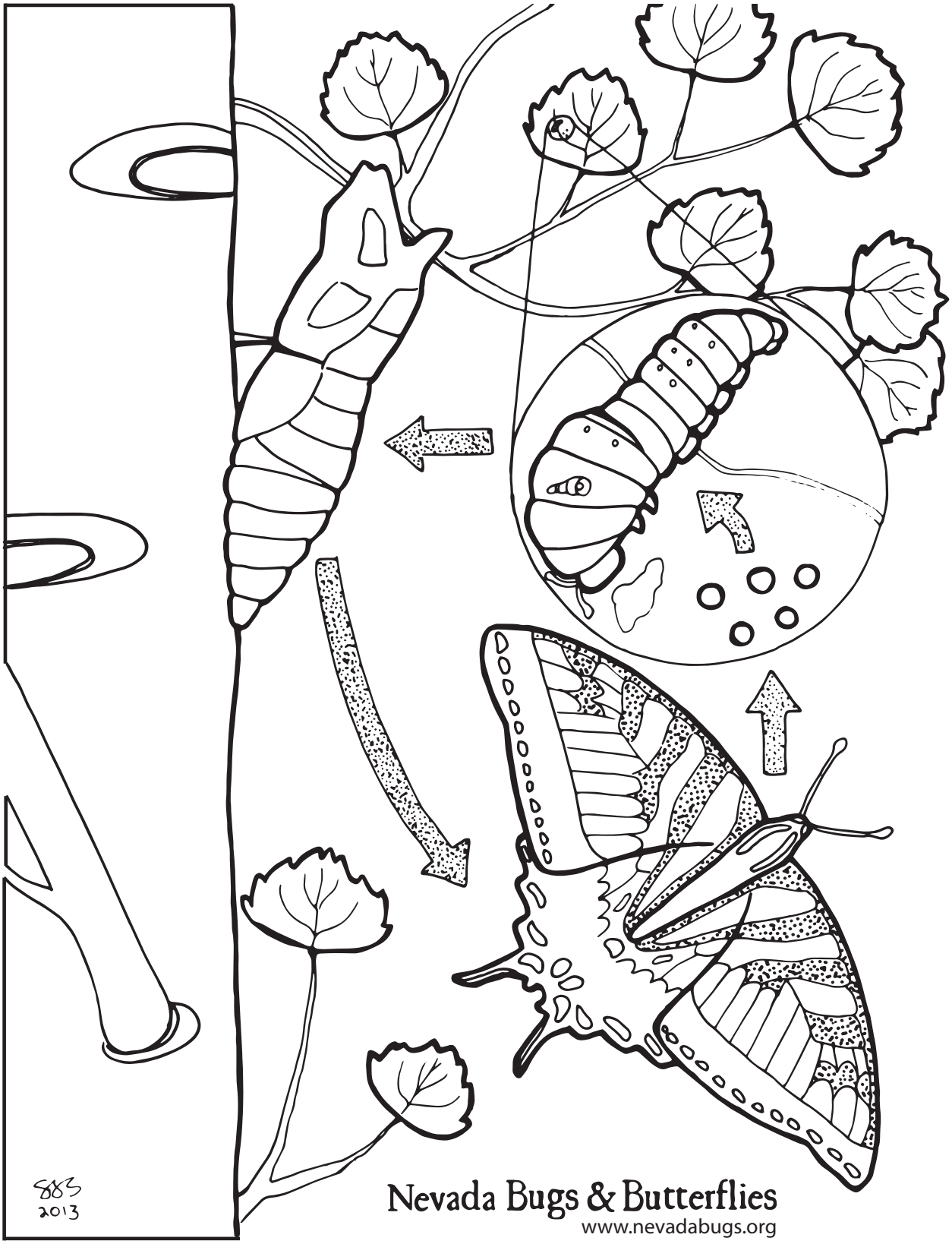
Journey North

Help track the migration of **monarch butterflies** by reporting sightings of monarch butterflies, eggs, and caterpillars, along with their **milkweed** host plants. Check out Journey North's migration maps to follow the incredible journey of the monarchs in real-time!
Website: www.journeynorth.org/monarchs

Lost Ladybug Project

Become a Lost Ladybug "spotter" by searching for **ladybugs** in your yard or other habitats. If you find one, take a photo, but if you don't find any, that's useful information, too! Your observations will help scientists keep track of ladybug diversity across North America.
Website: www.lostladybug.org

Western Tiger Swallowtail Butterfly Life Cycle



Did you know: Western tiger swallowtails are some of the most noticeable butterflies in our state! The caterpillars eat cottonwood and poplar trees, and sometimes you will see female butterflies way up in the tops of the trees looking for good places to lay their eggs.

Becoming a Caterpillar Detective

Many people enjoy watching butterflies and moths in the wild, but spotting their immature forms, caterpillars, can be more difficult! Caterpillars are flightless and often great at hiding, so finding the larval form of your favorite butterfly species may require some detective work. Here are a few tips from a caterpillar enthusiast, our own board member Nadya Muchoney, for observing these bugs in the wild:

Understand life cycles

Different butterfly species lay eggs at different times of year. Sites like www.butterfliesandmoths.org and www.inaturalist.org can help you learn about the seasonal timing (**phenology**) of butterfly life cycles and discover when it's possible to spot local caterpillars in the wild! Caterpillars are most common between the spring and fall.

Becker's white caterpillar on prince's plume

Monarch caterpillar on a milkweed host plant

Focus on host plants

Caterpillars are picky eaters! Many caterpillars have specialized diets, which means that they only like to eat certain types of plants. Learning about these **host plants** can help you locate caterpillars, since they can often be found on, or near, their food sources. You can find host plants in fields, forests, parks, or even in backyards.

Sleuth for signs of feeding

Caterpillars leave telltale clues about where they have been living. You can find evidence of caterpillar feeding, or **herbivory**, by looking for leaves that have been chewed or damaged. You may even spot pellets of caterpillar excrement, called **frass**, on host plants! Some caterpillars also create noticeable tents, webs, or shelters.

Melissa blue caterpillar tended by an ant on Canadian milkvetch

Crescent caterpillars on thistle

Search and discover!

Check the **tops** and **undersides** of leaves for caterpillars. If you don't find anything with your eyes, try placing a light-colored piece of fabric or paper beneath a tree or shrub, and tapping its branches with a stick. The sheet will help you notice any bugs that fall out. Scientists use this technique to discover insects hiding on plants!

Bugs visiting flowers

Can you find a bee, fly, wasp or other bug visiting a flower and draw them? On the next few pages you will find a guide to different kinds of bees found in Nevada. Remember that flies often have huge eyes and very short antennae. Bees and wasps are sometimes hard to tell apart, but bees are usually much fuzzier.

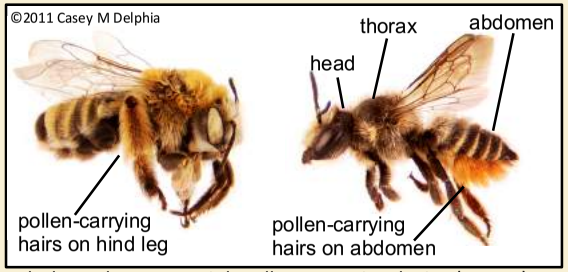
Although bees and wasps can sting when they feel threatened, they won't hurt you if you give them space and watch from a distance. What are these insects doing when they visit flowers?

Nevada Bee Identification Guide

Devon Picklum[1], Cynthia Scholl[2], and Kevin Burls[2]
1 Ecology, Evolution, and Conservation Biology, University of Nevada, Reno, NV
2 Nevada Bugs and Butterflies
In cooperation with Pollinator Partnership
Photographs of Nevada bees by Joseph S. Wilson

Why bees are important: Bees provide essential ecosystem services in natural and agricultural landscapes as pollinators of three-quarters of flowering plants. For people, this means every third bite of food is the result of pollination. Plants rely on pollinators to reproduce and set seed. Honey bees pollinate crops, but native bees also have a role in agriculture and they are essential for pollination in natural landscapes. There are 1,000 native species of ground-nesting, twig-nesting and parasitic bees found within Nevada. This guide gives information for identifying 10 major groups of bees commonly observed in Nevada including key characteristics, sizes (in mm), nesting habits, floral preferences, and distinctive behaviors.

Bee Identification: Bees have three body segments: a **head**, **thorax**, and **abdomen**. The **head** has compound eyes, a pair of segmented antennae, and mouthparts including mandibles for biting, and the tongue for drinking nectar. The **thorax** bears the legs and four wings. The **abdomen** contains digestive organs and the sting in females.



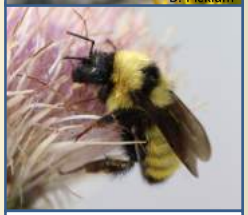
Female bees have special pollen-carrying hairs (scopa), usually on the legs, or in the case of leafcutters, under the abdomen. Honey bees and bumble bees carry pollen packed tightly into a ball on pollen baskets (corbiculae), concave areas on their hind legs.

Bumble bees (*Bombus* spp.)

Family: Apidae - 10-23 mm

Robust, black body, extensively covered with bands of black, yellow, orange, or whitish hairs, long face, pollen basket on hind legs.

- Social colonies nest underground, usually in abandoned rodent nests.
- Bumble bees pollinate in cool, cloudy weather when most bees are at home.
- Bumble bees can buzz-pollinate flowers, like tomatoes, that require vibration to release pollen.

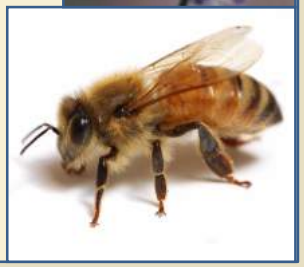


Honey bees (*Apis mellifera*)

Family: Apidae - 10-15 mm

Light to dark brown body with pale and dark hairs in bands on abdomen. Abdomen barrel-shaped. Heart-shaped head; pollen baskets on hind legs.

- Large social colonies of 30,000 or more. Nest in man-made hives, tree hollows, or rock outcrops. Colonies swarm to locate new nests.
- Honey bees are not native to the U.S., but were brought over by Europeans in the 17th century.



Carpenter Bees (*Xylocopa* & *Ceratina* spp.)

Family: Apidae

Xylocopa - 13-30 mm

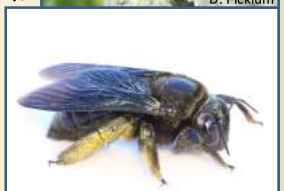
Shiny dark black to metallic blue-green body, sparse hairs on abdomen, robust with massive jaws. Pollen-carrying hairs on rear legs.

- Solitary to communal, nests are burrowed into wood, often in roof eaves.

Ceratina - 3-15 mm

Shiny dark metallic blue-green body, sparsely haired, cylindrical abdomen. Pale yellow marks on face. Pollen-carrying hairs on hind legs.

- Solitary or subsocial, nest in twigs and stems.



Sweat bees (*Agapostemon*, *Augochlorella*, *Halictus* spp. & others)

Family Halictidae - 3-12 mm

Two forms: 1) dull metallic blue or bright metallic green to copper or 2) black/brown with light bands of hair on the abdomen. Parasitic forms often have red abdomens. Slender body, pollen- carrying hairs on hind legs.

- Solitary to social, nest in the ground.
- Some are attracted to salt in your sweat.

Mining bees (*Andrena* & *Perdita* spp.)

Family: Andrenidae - *Andrena* 7-18mm, *Perdita* 2-7 mm

Black or dull, slender metallic body often with brown or reddish hairs. Pollen-carrying hairs on hind legs and side of thorax.

- Solitary or communal, nest in sand.
- Andrena are abundant in the spring as they are one of the first bees to emerge each season.
- Perdita is a diverse genus, bright yellow, black and whitish bees.

Squash bees (*Peponapis* & *Xenoglossa* spp.)

Family: Apidae - 10-18mm

Brown body covered in dense light hair on the thorax and in bands on abdomen. Coarse dense pollen-collecting hair on hind legs. May have light spot on face, males have long antennae. Appear to have protruding "nose".

- Solitary bees nest in the ground, often in or near pumpkin and squash fields.
- Only collect pollen from squash and pumpkins

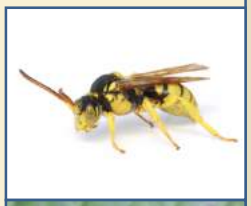
Mason bees (*Osmia* spp.)

Family: Megachilidae - 5-20 mm

Two forms: 1) black body covered in pale hairs or 2) dull metallic green-blue and less hairy. Carry pollen on hairs under abdomen. Head as broad as thorax, robust body, large mandibles.

- Collect mud to line their nests.
- Solitary, but nest in aggregations in natural or man-made holes such as beetle holes, nesting blocks, stems, or soil.

Cuckoo bees (*Nomada, Triepeolus* & *Sphecodes* spp.)



Family: Apidae - 5-18 mm

Slender and wasp-like; relatively thick antennae, often with few hairs. Red, black, or yellow body, banded abdomens. Triepeolus is black and white with red legs.

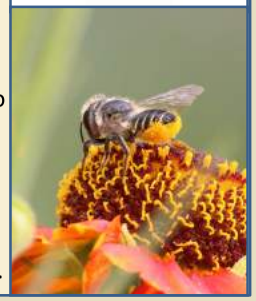
- Females feed on nectar but do not collect pollen.
- Females are kleptoparasites; they lay their eggs in another bee's nest to steal the nests and food.

Leafcutter bees (*Megachile* spp.)

Family: Megachilidae - 10-20 mm

Black body with light or dark hairs. Pollen-carrying hairs beneath abdomen. Some have rather pointy abdomens. Head is as broad as the thorax with large mouthparts used to cut leaves.

- Females cut circular pieces from leaves to line their nests
- Solitary, nest in beetle holes or wood nesting blocks, some in soil.



Long-horned bees (*Melissodes*, *Svastra* & *Eucera* spp.)

Family: Apidae - 7-20 mm

Robust and very hairy, dark body often with pale hair bands on abdomen. Dense pollen-carrying hairs on hind legs. Males have very long antennae.

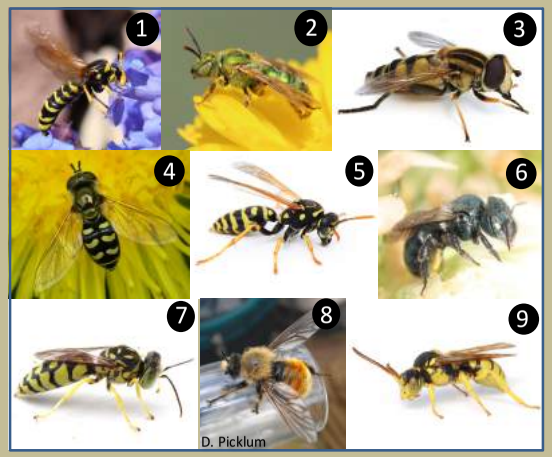
- Solitary to communal, nest in sandy soils.
- Some species are especially attracted to asters, sunflowers, and mallows.

A Bee or Not a Bee? There are two kinds of insects that are often confused with bees: flies and wasps. Many flower-visiting flies (e.g. the Syrphidae) are bee and wasp mimics in color, form, and behavior. By mimicking bees and wasps in appearance, they gain protection from predators. So, how do you tell these pollinators apart?

Fly Identification: Flies have only one pair of wings, while bees have two pairs. Flies usually have short, stubby antennae with single hairs, or feathery antennae. They have piercing/sucking or sponging mouthparts. Many flies have huge eyes that meet at the top of their heads.

Wasp Identification: Wasps have two pairs of wings, chewing mouthparts, a sting in females, and long antennae. While bee hairs are branched (plumose), wasp hairs are simple and straight. Bees are also usually hairier and more robust than wasps. Many wasps have a distinctive constricted "wasp waist," between their abdomen and thorax. While most wasps are carnivorous predators or parasites, some feed on pollen and nectar.

Now that you know how to tell the difference between bees, wasps and flies, try identifying the insects in the photos below. Answers are at the bottom.



1. Wasp 2. Sweat bee 3. Fly 4.Fly 5. Wasp 6. Mason bee
7. Wasp 8. Fly 9. Cuckoo bee