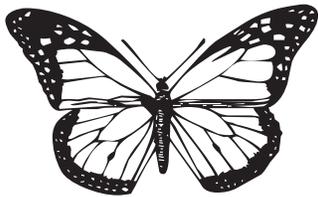# POPS Activity 2:
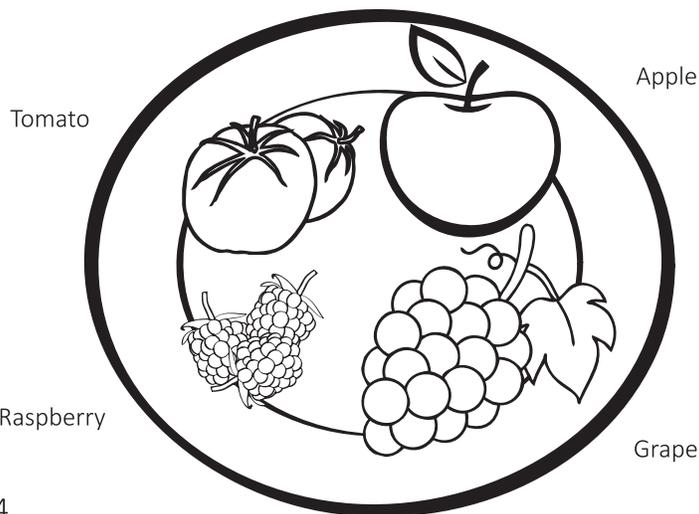## Specialized Plant and Pollinator Relationships

Specialized pollinator and plant relationships are critical to support the immense biodiversity of plants and animals. Table 3 (see PUPs curriculum) lists examples of specialized or interesting pollinator and plant relationships (for example monarch butterflies and milkweed plants). Walk around a garden in bloom and observe differences in types of pollinators that visit blooms of varying shapes, aromas, and colors. Have students take notes of their observations and discuss the notes as a group. Encourage students to research one or more of the relationships listed in Table 3 (see PUPs curriculum).

Lesson 4:
Bumblebee Eyes

Bumblebees have two different types of eyes: large compound eyes (2) located to the left and right of the face and small ocelli or primitive eyes (3) located above the compound eyes on the top of the head. Compound eyes lack the ability to focus so bumblebees see a blurry world. This is why it is best to plant pollinator plants in color masses instead of separating plants. Bumblebees are looking for 'billboards of color' as they fly over a landscape. The compound eyes are sensitive to ultraviolet, blue, and green, but not red. Primitive eyes are sensitive to light intensity.

primitive eyes

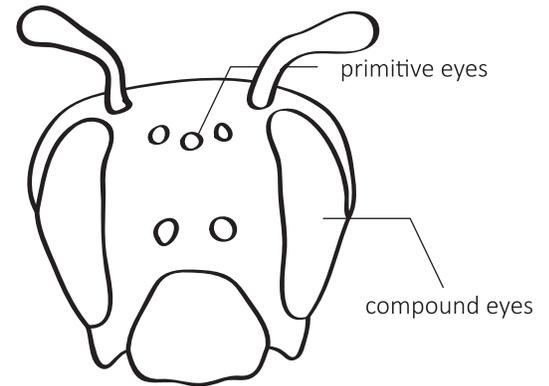compound eyes

POPS Activity 1:
Importance of Pollinators

Take time during a meal to discuss food items used to prepare the meal, or look at a menu and discuss food items listed on the menu. Ask students to identify which foods were pollinated by pollinators (see Table 1 in the PUPs curriculum). Discuss how important pollinators are for your diet and how eating habits would change if pollinators did not exist.

Apple

Tomato

Raspberry

Grape

Lesson 5:
What is Pollination?

Pollination is the transfer of pollen from the male anther to the female stigma. Pollination results in fruit and seed production in many plants. However, sometimes humans grow plants to eat the flower parts. Many flowers are edible, such as nasturtiums, borage, and chive blossoms but do we ever specifically eat male or female flower reproductive parts? The answer is yes! One example is the most expensive culinary spice in the world, saffron. Saffron threads are harvested stigmas (female reproductive parts) from the fall blooming crocus, *Crocus sativus*. It takes approximately 1 acre or 4,500 crocus blooms to produce 1 ounce of saffron!

POPS Activity 3:
Bumblebee Vision

Practice your bee vision by visiting a garden in bloom and look at the differences between color masses and single plants. Look at the two areas with normal vision and then through insect vision glasses. If you do not have insect vision glasses, try briefly crossing your eyes causing your vision to be temporarily blurred. Be careful not to cross your eyes too long! Which flowers do you notice better with unfocused vision, single flowers or flower masses? Ask students whether it is better to plant masses of pollinator plants or single plants when trying to attract bumblebees to a pollinator garden. Ask students to observe a group of pollinator plants of their choice for 5-10 minutes (the plants should be in bloom). Instruct students to take notes on the number and types of animals (insects, birds) that visit the flower group during the observation period? What kind of behaviors does each type of animal exhibit while visiting the flowers? Discuss observations as a group.

Lesson 3:
Bees and Flowers

What if someone told you bees can sense the electrical charge of flowers? Bees generate a positive charge as they fly through the air. It turns out pollen has a negative charge and is attracted to the positive charge on the bee. Recent research published in Science magazine indicated that bees are able to sense the weak negative charge of a flower. By sensing charge, bees are able to more efficiently forage for pollen and flowers have an increased chance of being pollinated. UnBEElievable!

POPS Activity 4:
Pollinator Mad Libs

If you didn't play mad libs growing-up, you missed out! Ask your students to break-up into two groups to apply their pollinator knowledge to create a mad libs story (see example below). They should create a story and then take-out out select nouns, verbs, adjectives and adverbs. After both groups complete their story, have them ask the other group to provide words to fill in the blanks. Ask the two groups to read their funny mad libs stories to each other and then have them read their original story.

Now that I am a USU Extension PUP, I know why it is important to _____ pollinator _____, _____ pollinator
VERB   PL. NOUN   VERB
_____, and _____ the importance of pollinators to
NOUN   VERB
_____. Pollinators move _____ from _____ to
PL. NOUN   NOUN   NOUN
_____, which produces many _____ we _____.
NOUN   PL. NOUN   VERB
Types of pollinators include _____, _____,_____,
NOUN   NOUN   NOUN
_____, _____, _____ and _____. I am
NOUN   NOUN   NOUN   NOUN
going to tell my _____ about the PUPs program so they can
PL. NOUN
_____ _____ too!
VERB   PL. NOUN

Lesson 2:
Can Pollinators Enhance Fruit and Vegetable Production in Wind Pollinated Plants?

The Xerces Society, an invertebrate conservation organization, estimates that 1 in 3 mouthfuls of food we eat are pollinated by pollinators. Although some foods are technically wind pollinated, pollination can sometimes still be enhanced by pollinators. Corn, for example, is wind pollinated but have you ever watched a corn plant in bloom? It's loaded with bees! Pollen rests on the plant's tallest point, the male flower structure or tassel, and is blown down to the female flower parts located on the developing ear. Pollen must come in contact with each corn silk to fertilize the kernels (ovules) on the corn ear. Bees can certainly help dislodge pollen from the tassel even though they are not technically carrying the pollen from the male to female flower parts. Pollination of tomatoes, also wind pollinated, can be enhanced by bumblebees.

USU Extension PUPS Program

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Who may use this curriculum?
Educators, community leaders, and parents

Curriculum materials available at:
http://extension.usu.edu/saltlake/htm/yardgarden/pups-program

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UtahStateUniversity
SALT LAKE COUNTY EXTENSION

USU Extension

POPS

Program

Promoters of Pollinators

UtahStateUniversity
SALT LAKE COUNTY EXTENSION

Lesson 1:
What is a USU Extension POPS?

POPS educate others about pollinators by promoting the 3 P's:

1) **Plant** pollinator plants: Native plants and many flowering herbs provide an excellent source of quality pollen and nectar. Some plants, like petunias, are heavily bred for attributes like flower size and color but are not a good source of pollen and nectar for pollinators.

2) **Protect** pollinator habitat by avoiding use of insecticides toxic to bees: Broad spectrum insecticides are also toxic to beneficial insects. Oftentimes gardeners will see a surge in garden pest populations, like aphids, sometime after broad spectrum insecticide use because the spray killed off beneficial insects that were helping to control the pest population.

3) **Promote** the importance of pollinators to others: Many pollinator populations are in decline. By promoting pollinators, you are becoming part of the solution!

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POPS Activity 5:
Plant a Pollinator Garden

When planting a pollinator garden, consider the following tips:

• Plant pollinator plants in masses (at least 3 feet long and wide).

• In an effort to supply pollinators with a consistent source of pollen and nectar, plan for continuous blooms throughout the growing season.   Your garden should include spring blooming, summer blooming, and fall blooming pollinator plants.

• Plant 15-25 types of pollinator plants of varying colors and flower shapes in your garden.

• Plant pollinator plants in a warm, sunny, and open area in your yard.

• Consider providing pollinators with a clean water source contained in a vessel with shallow sloped sides.

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