

# Plant and Animal Interactions

## 21 LESSON

### Materials Needed

**For each student:** Student Data Sheet: "Plant and Animal Interactions"  
pencil  
clipboard

**For each adult:** Leader Sheet: "Plant and Animal Interactions"  
Maps: "Plant and Animal Interactions"

### Topic

Plant and Animal Interactions

### Grade Level

6-8

### Student Outcomes

- ✿ describe four different relationships that occur between plants and animals (mutualism, commensalism, predation and parasitism).
- ✿ generate hypotheses about plant and animal relationships.

### Time Frame

May-October  
60 minutes

### Location

Perennial Garden  
Gladney Rose Garden  
Climatron

### Pre-Visit Activity

Have students observe and record the behavior of animals (insects, spiders, birds, amphibians, mammals, etc.) in their yards and see how they interact with the plants there. Is there any evidence of animals eating plants or of animals helping plants? Students can create a chart of their own observations and propose relationships between the plants and animals studied.

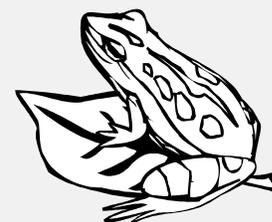
### Background Information

All organisms interact with individuals of other species. They may feed on them, or try to avoid being eaten by them. They may compete with other species for a common resource, or cooperate with them for a common good. In this class we will examine the types of inter-species interactions that can occur between plants and animals. These interactions generally fall under a few categories.

**Predation** occurs when one organism eats another. Herbivores eat plants. Carnivores eat animals. There are even carnivorous plants. Carnivorous plants consume insects because the soil in which they grow is very poor in nutrients and the plants need more nitrogen. These plants still obtain their energy from the sun through photosynthesis.

**Parasitism** is similar to predation in that one species benefits at the expense of the other. The differences are that the host is not usually killed in the process and the parasite is usually smaller than the host. The parasite can be internal to the body of the host, such as roundworms or external, such as ticks and leeches. We often call plant sucking insects, like aphids, plant parasites.

**Commensalism** describes a situation in which one individual benefits and the other is neither hurt nor helped by the interaction. For example, epiphytes on the trunks of rain forest trees are helped by the trees which give them a surface on which to grow. The trees do not seem to be affected by the epiphytes, unless the weight of the epiphytes gets so heavy that the tree branches break!



## Key Terms

Predation  
Mutualism  
Commensalism  
Pollination  
Parasitism

## Missouri State Standards

### 5-8

SC VII.C.2  
VII.E.1  
VIII.A.4  
VIII.B.1

## Background Information *continued*

**Mutualism** occurs when organisms of both species benefit from their association. The relationship between pollinators and plants is a great example of mutualism. In this case, plants get their pollen carried from flower to flower and the animal pollinator (bee, butterfly, beetle, hummingbird, etc.) gets food (usually nectar or pollen). Seed dispersal is also often accomplished through a mutualistic relationship between the plant and its animal disperser. Many animals eat the sweet fruit that surrounds the seeds. The seeds are then deposited in a new location some distance away from the parent plant, often in fecal material which adds a little fertilizer as well!

These types of interactions occur between species in every ecosystem. In this exercise, you will search for and see many specific examples of the interspecific interactions outlined above while walking through the Perennial Garden, Gladney Rose Garden, and the Climatron.

## Post-Visit Activity

Have students look for these relationships in their own backyard or nearby park. Challenge them to find one example each for herbivory (predation), pollination (mutualism) and seed dispersal (mutualism). The inferences that students make observing organisms in their back yard are hypotheses. For example, a beetle on a flower might be hypothesized to benefit the plant as a pollinator . Alternatively, it may harm the plant as a herbivore. How can you test each hypothesis?

Divide students into small groups to pick a particular biome to study (desert, savannah, tundra, etc.). Challenge them to find examples in these other environments, of the complex relationships studied in this lesson. Emphasize that organisms engage in complex relationships everywhere and part of the challenge we face is to help preserve the delicate balance of our natural world.

# Plant and Animal Interactions

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## 1 Ridgway Center

Divide students into groups and give each student the data sheet: *Plants and Partners*. Adult leaders should each receive *Climatron and Garden Maps and Leader Sheets*.

Today we're going to look at some complex interactions between plants and animals. We'll divide into small groups and explore three Garden areas. At each stop look at the plants highlighted by your adult leader. Look for any signs of animals, especially insects. Watch closely and listen to your leader's explanation of the interaction. Then, as a group, hypothesize what the interaction is. Write your notes and hypothesis on your worksheet.

We'll meet at the Brookings Interpretive Center adjacent to the Climatron in 40 minutes.

Groups should spend about 10 minutes in each of the outdoor gardens and 20 minutes in the Climatron.

## 2 Perennial Garden

### Coneflower/Bee

- Do you see any insects on these flowers?



Pick an insect and look at it closely.

- What is it doing?

Watch it closely for a minute or two.

- What do you think the insects are getting from the plant?
- Do you think the plant will be hurt or helped by this interaction?

The coneflower produces nectar attractive to the bee. The bee drinks the nectar and its rear legs are covered with pollen. As it leaves, it takes the pollen and pollinates another coneflower which provides for the plant reproduction. (Mutualism/pollination)

## 3 Gladney Rose Garden

### 1. Roses/Aphids

Begin each stop with questions similar to those used at the first. Encourage students to look closely and watch animal behavior.

Aphids are small insects about the size of a large pin head. They are often found along the stem or under the leaves of plants. Their long piercing mouthparts are stuck in the plant (they can't hurt you) and they suck juice from the plant as if their mouth were a straw. They often cause the leaves to turn yellow or grow in a distorted way. On a rose they can prevent the flower from opening. (Plant parasitism)

### 2. Rosehips/Birds

Rose hips are the fruit of the rose plant. After the flower is pollinated and the petals fall off, the fruit enlarges as the seeds develop within them. Birds eat rose hips and scatter the seeds in their droppings. (Mutualism/seed dispersal)

# Plant and Animal Interactions

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## 4 Climatron

### 1. Hibiscus / Hummingbird

A hummingbird inserts its beak into the hibiscus. As it feeds on nectar, pollen sticks to its head. This pollen is carried to the next hibiscus flower and contacts the stigma, the top of the pistil which is the female organ. In this way, flowers are pollinated and the plant can produce seeds. (Mutualism/pollination)

### 2. Pitcher Plant/Fly

Insects are attracted to the sweet nectar on the pitcher lid. They slip into the pitcher, drown in the fluid on the bottom, and are digested by the plant. (Predation/carnivorous plant)

### 3. Bromeliad/Tadpole

The bromeliad collects water in a central reservoir with its spiky leaves. It often serves as a home for treefrog tadpoles. (Commensalism)

### 4. Orchid/Moth

Some species of orchids have floral rewards and colorings attractive to moths. The moths eat nectar and transfer pollen from one orchid to another. (Mutualism/pollination)

### 5. Orchid/Fungus

Orchids produce the smallest of all seeds with little food for growth. Some only germinate when a fungus grows near them. The orchid uses some of the fungus as food and later the fungus draws nourishment from the plant roots. (Mutualism)

*Note that this interaction is between a plant and fungus, not a plant and an animal!*

## 5 Brookings Interpretive Center

### 1. Acacia/Ants

Ants protect the acacia plant from foraging animals and climbing vines. The ants live on the acacia in large nests. (Mutualism)

*See the ant/acacia display.*

### Closure

Today you've looked at some interesting plants with some complex relationships.

- What relationship seems the most interesting to you?
- Have you ever seen these examples before?
- What organism usually seems to benefit the most?

*Have students share some of their observations and see if they agree on the nature of the relationships seen today.*

### Teacher's Notes



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Student Data Sheet

# Plant and Animal Interactions

Complete the chart using the definitions given below:

- |                     |   |
|---------------------|---|
| <b>Relationship</b> | <b>Definition</b>   |
| <b>Predation</b>    | One organism eats another.  |
| <b>Parasitism</b>   | Similar to above, except the parasite is usually smaller than its host and doesn't usually kill it. |
| <b>Commensalism</b> | One species benefits and the other species is neither helped nor harmed.                            |
| <b>Mutualism</b>    | Two species benefit each other.   |

Location	Plant/Partner	Effect on Plants	Effect on Partner	Relationship
Perennial Garden	Coneflower/Bee			
Gladney Rose Garden	Rose/Aphid			
	Rosehips/Bird			
Climatron	Hibiscus/Hummingbird			
	Pitcher Plant/Fly			
	Bromeliad/Tadpole			
	Orchid/Moth			
	Orchid/Fungus			
	Acacia/Ant			



## Map: Plant and Animal Interactions



### Garden Map Key

1. Ridgway
2. Perennial Garden
3. Gladney Rose Garden
4. Climatron
5. Brookings Interpretive Center



## Map: Plant and Animal Interactions



### Climatron Map Key

1. Hibiscus
2. Pitcher Plant
3. Bromeliad
4. Orchid
5. Orchid
6. Acacia (in Brookings Interpretive Center)

