

High School Scavenger Hunt

During this activity, students will use their critical thinking skills and prior knowledge to answer questions and explore the Atlanta Botanical Garden.

Materials

- Copies of High School Scavenger Hunt handout (reference terms can be excluded for a higher level of difficulty)
- Writing utensil
- Clipboard



Background

The Garden is an excellent place to explore the relationships between organisms and to learn more about how plants adapt to different environmental conditions. This scavenger hunt focuses on those topics. Some of the answers can be found on signs, but many of the questions require students to make their own observations. Below is more information about each question.

1. Find and explain an example of mutualism. Give an example of how one part of the relationship might suffer if their counterpart is removed.

Mutualism is a relationship between two species of organisms in which both benefit from the association. One popular example in the Garden is pollination – the flower is assisted in reproduction and the pollinator receives nectar. This is easily observed on a sunny, warm day in the Garden.

Both plant and animal also benefit from certain kinds of seed dispersal. Some plants produce a delicious fruit with a seed inside. Once eaten, the seed can pass through the digestive system of an animal and then emerge through the feces in another location. This assists the plant with spreading seeds to distant locations and assists the animals with a tasty treat. In the Edible Garden and on some of the trees, the students may observe edible fruits with seeds.

2. Find an epiphyte or air plant in the Tropical Rotunda. Explain how it is an example of a commensalistic relationship. Who benefits?

Epiphytes are plants that grow on another plant or sometimes on rocks and buildings. In the tropical rainforest, they often grow in the tree canopy where sunlight is plentiful. The host trees are not affected by the presence of the epiphytes and the plants get much needed sunlight. Common examples of epiphytes are bromeliads and orchids, which are plentiful in the Fuqua Conservatory and Fuqua Orchid Center.



High School Scavenger Hunt

3. Describe an example of a plant tropism in the Garden. What is the stimulus?

Growth patterns of plants are sometimes influenced by the presence or lack of sunlight. Depending on the season, students may encounter a sunflower facing the sun or a plant growing long towards a sunny location.

Some vines are also stimulated by touch. When seeking an object to wrap around, a vine tendril can be straight. When it comes in contact with an object to wrap around, it will curl and grow around that object.

4. In the Rose Garden find 2 plants in the *Asteraceae* family. List their genera's below. (Hint: Look at the "Anatomy of a Plant Label" sign). List one characteristic the two plants have in common that you observe.

Various plants from this family are in the Rose Garden. Students must look at the black plant labels in the top left hand corner for the word *Asteraceae* and then write the first word in the italicized name in the center.

5. List and describe two different survival adaptations observed in the amphibians on display in the Fuqua Conservatory.

Camouflage is apparent in the Splendid Leaf Frogs (*Cruziohyla calcarifer*), Horned Marsupial Frog (*Gastrotheca cornuta*), Crowned Tree Frog (*Anothea spinosa*), Pratt's Rockett Frog (*Colostethus pratti*) and Gaiges Rain Frog (*Pristimantis gaigeae*). They camouflage with coloration as well as shape. For example, the Horned Marsupial Frogs have small protrusions near their eyes that look like leaf tips.

Students may also discuss the bright colors of the Poison Dart Frogs (*Dendrobates azureus*, *Phyllobates aurotaenia*, *Phyllobates bicolor*, *Phyllobates terribilis*). Those bright colors are often referred to as warning coloration because the bright colors warn predators that the frogs are poisonous.

Information on a sign near the frog terrariums: Female Horned Marsupial Frogs (*Gastrotheca cornuta*) have a pouch on their back. During breeding the male helps the female place eggs into her pouch where they stay for nearly 3 months. Horned Marsupial Frogs have no free swimming tadpole stage. When the tiny frogs are developed, they leave the female's pouch and begin their lives in the canopy.



High School Scavenger Hunt

7. List one stressful growing condition for plants living in the Tropical Rotunda in the Fuqua Conservatory.

Tropical rainforests are wet, warm environments that are able to support lots of life, but there are still some challenges that plants must overcome, such as too much rain/water, constant moisture and lack of sunlight. Only 2% of sunlight reaches the forest floor. As a result many plants have adaptive traits to help them gain more sunlight (dark or reddish coloration, large leaves, growing on other plants). Additionally, the soil does not accumulate many nutrients from fallen debris. Instead nutrients are utilized by rainforest plants and decomposers quickly. As a result, most soil is nutrient poor in the rainforest.

8. What are three adaptive traits you observe in the plants growing in the Tropical Rotunda that allow them survive in a tropical environment and overcome the stressful growing condition faced in the question above?

Large leaves and reddish or dark green leaves can be found in the tropical rotunda. Darker colors tend to absorb more sunlight, which assists the plant with obtaining more sunlight on the forest floor. Many vines and epiphytes (plants that grow on another plant or rock) are also prevalent throughout the Tropical Rotunda. Those plants utilize other plants in order to reach sunlight in the canopy.

Students may also notice exposed roots on certain plants. The roots are able to collect water and nutrients from the air versus the nutrient poor soil.

8. List one stressful growing condition for plants growing in the Desert House in the Fuqua Conservatory.

Deserts are dry, sunny habitats. The lack of regular rainwater and the constant sunlight can be stressful for plants. Additionally, the soil in a desert is sandy or rocky and usually does not contain many nutrients or have the ability to store water. As a result many plants have adapted to store their own water and to repel the sunlight.

9. What are three adaptive traits you observe in the plants growing in the Desert House that help plants survive in a desert environment and overcome the stressful growing condition faced in the question above?

Leaves in the Desert House tend to be smaller and also a lighter in color than those in the Tropical Rotunda. Some of the succulents in the Desert House don't even have leaves. Instead, they photosynthesize through their green stems. Students may also observe plants that are white or grayish colored. That coloration acts as a sun repellent. These adaptive traits protect the plant from releasing too much water through their leaves.

Students may also notice that many of the leaves have a waxy covering to prevent water loss.

Succulents are prevalent throughout the Desert House (note: there are no cacti in the Desert House). These succulents store water in their stems, leaves or roots to survive during dry periods.

Some of the plants also have spines or hairs to protect the plant from sunlight and animals.

High School Scavenger Hunt

10. List 4 different plants used for medicine and the ailments they each treat.

Many medicinal plants can be found in the Orangerie in the Fuqua Conservatory and also in the Desert House. Here is a list of a few the students may encounter:

Rosy Periwinkle (*Catharanthus roseus*) - childhood leukemia and cases of Hodgkin's disease

Aloe vera - the treatment of wounds, burns and minor skin infections. Aloe vera juice is also touted to relive digestive issues such as heartburn and irritable bowel syndrome

African Cherry Tree (*Prunus Africana*) - internationally traded for use in drugs designed to heal enlarged prostate glands

Bay Laurel (*Laurus nobilis*) - antioxidative, anti-inflammatory and anti-convulsant

Black Pepper (*Piper nigrum*) - used historically as a medicinal treatment for a number of maladies from heart disease to insomnia

Cardamom (*Elettaria cardamomum*) - fights inflammation, throat congestion, and digestive disorders; as well as gum and teeth infections

Ceylon Cinnamon (*Cinnamomon zeylanicum*) - known for its treatments of toothaches, colds, and as a digestive aid; as well as for its anti-fungal and anti-bacterial properties

Climbing Oleander (*Strophanthus gratus*) - produces a vitally important medicinal drug called Ouabain, which was used historically as a treatment for heart failure

Curaré (*Chondrodendron tomentosum*) - anesthetic & muscle relaxant for surgeries

Quinine/Jesuit Bark (*Cinchona pubescens*) - treatment for Malaria

11. Oftentimes wetland or bog habitats lack soil nutrients. As a result, some plants obtain extra nutrients by capturing and digesting insects. Those plants are called carnivorous plants. Visit the Native Bog Garden and list the names of two carnivorous plants (they can be from the same genus).

Most likely, they will find Pitcher Plants (*Sarracenia*) or Venus fly traps (*Dionaea muscipula*), but they may also find Sundews (*Drosera*). In the Native Bog Garden there are 7 different species of pitcher plants.

12. What are 5 edible plants currently in season in Georgia?

This information is found in the Edible Garden on a sign called, "Georgia in Season".



High School Scavenger Hunt

Name: _____ Date: _____

Directions

During your visit to the Atlanta Botanical Garden find and then answer the questions below. Some answers can be found on signs posted through out the Garden and others are from your own observations.

1. Find and explain an example of mutualism. Give an example of how one part of the relationship might suffer if their counterpart is removed.

2. Find an epiphyte or air plant in the Tropical Rotunda. Explain how it is an example of a commensalistic relationship. Who benefits?

3. Describe an example of a plant tropism in the Garden. What is the stimulus?

4. In the Rose Garden find 2 plants in the *Asteraceae* family. List their genera's below. (Hint: Look at the "Anatomy of a Plant Label" sign).

- a.
- b.

List one characteristic the two plants have in common that you observe:

5. List and describe two different survival adaptations observed in the amphibians on display in the Fuqua Conservatory.

- a.
- b.

6. List one stressful growing condition for plants living in the Tropical Rotunda in the Fuqua Conservatory.



High School Scavenger Hunt

7. What are three adaptive traits you observe in the plants growing in the Tropical Rotunda that allow them survive in a tropical environment and overcome the stressful growing condition faced in the question above?

- a.
- b.
- c.

8. List one stressful growing condition for plants growing in the Desert House in the Fuqua Conservatory.

9. What are three adaptive traits you observe in the plants growing in the Desert House that help plants survive in a desert environment and overcome the stressful growing condition faced in the question above?

- a.
- b.
- c.

10. List 4 different plants used for medicine and the ailments they each treat.

- a.
- b.
- c.
- d.

11. Oftentimes wetland or bog habitats lack soil nutrients. As a result, some plants obtain extra nutrients by capturing and digesting insects. Those plants are called carnivorous plants. Visit the Native Bog Garden and list the names of two carnivorous plants (hint: they can be from the same genus).

- a.
- b.

12. What are 5 edible plants currently in season in Georgia?

- a.
- b.
- c.
- d.
- e.



High School Scavenger Hunt

Reference Terms

Adaptation – Adaptation is the evolutionary process whereby a population becomes better suited to its habitat. This process takes place over many generations. All adaptations help organisms survive in their ecological niches. These adaptive traits may be structural (shape, body covering, coloration, leaf shape or size), behavioral (searching for food, mating, vocalizations) or physiological (making venom, secreting slime, phototropism).

Carnivorous plants – plants that eat and digest meat, usually insects.

Commensalistic – relationship between two organisms where one organism benefits but the other is unaffected.

Epiphyte – air plant: plant that derives moisture and nutrients from the air and rain. Epiphytes usually grow on another plant. A vine is not an example of an epiphyte because it usually roots into the ground.

Mutualism – a relationship between two species of organisms in which both benefit from the association.

Tropism – directional growth of a plant or movement of a plant in response to a stimulus.

