Mounts Botanical Garden of Palm Beach County

Teacher Guide
Wicked Plants

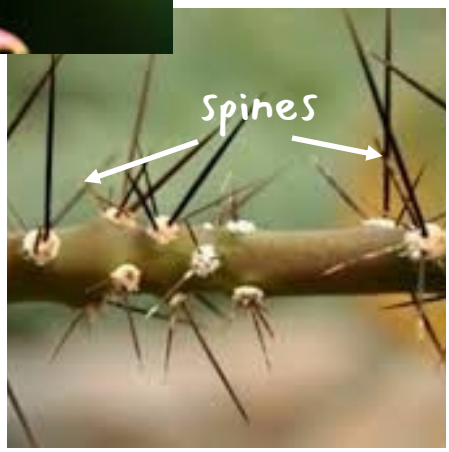
Plants, come in all shapes and sizes. Some have beautiful flowers and sweet smells while others are covered in thorns and have terrible odors.

Why do you think plants have evolved through the years to have different appearances?

One of the biggest problems that plants have to overcome is that they are stationary. Plants that have been successful have managed to figure out how to protect themselves from things that want to harm them or eat them in order to reproduce and continue their lineage.

Hard **external barriers** such as thick bark and waxy leaves are a good line of defense for plants against herbivores interested in making them a tasty snack. These adaptations make the plants harder to eat and less palatable for those looking for a tender treat.

Another protection found in many plants are **thorns**, (which are modified branches), and **spines**, (which are modified leaves). These can cause painful injuries to those who try and eat them.



Just think about how unpleasant it would be to bite into a cactus!

Some species, such as the Acacia Tree, have developed a **symbitic relationship** with animals. These trees have hollow thorns that provide a great shelter for stinging ant colonies. In return, the stinging ants discourage predators from eating them.

Another clever yet dangerous adaptation some plants have developed are **chemical defenses**. These chemicals produced by the plant may cause foul odors, bitter taste, and can even poison the predator unfortunate enough to have made a meal of it.

Some plant adaptations may be off-putting to humans but are very inviting to other animals. Amophophallus titanium, better known as the **Corpse Flower,** is native to Sumatra. This extremely rare plant blooms just once every 7-10 years and the flower only lasts 1 or 2 days.

What is s amazing about this flower? It is HUGE, reaching heights of 8-10 feet, and...It smells like rotting flesh! The bloom has a pungent aroma and dark burgundy color that resembles rotting meat. The temperature of the flower even rises to 98 degrees, mimicking a rotting animal.

This unpleasant combination attracts beetles and flies that feed on dead animals. As the insects move in thinking they're getting a meal, they crawl around and pick up pollen.

When they fly off and land on another corpse flower, they deposit the pollen on the other bloom. The **transfer of pollen** between flowers of the same species leads to fertilization, and successful seed and fruit production for plants. Blooming corpse flowers have become huge events in Botanical Gardens. In 2016, a single bloom at the US Botanic Garden in Washington D.C. attracted 130,000 visitors and 650,000 addi- tional viewers online. After just 36 hours, the flower wilted and died. It will not bloom again for at least another decade.

Most plants can't survive on sunlight alone (photosynthesis), they also need nutrients absorbed through their roots. The ability to trap and kill insects is mostly an adaptation to plants living in places with poor soil quality.

Carnivorous Plants

These are called Carnivorous Plants and there are over 500 different species found world-wide and although they sound exotic, more species grow in the U.S. than anywhere else. The deceptive methods that Carnivorous plants have developed to attract prey are actually quite ingenious.

Sundew Plants

Sundew Plants attract insects with what look like raindrops on the tiny, hair-like leaves. It's really a trick, the "water" is actually a super sticky liquid which traps the insects so the plant can digest them with enzymes.

Perhaps the most well known carnivorous plant is the **Venus Flytrap.** These ominous looking plants are native only to North and South Carolina.

Their “traps,” which are actually modified leaves, have tiny hairs inside which are only triggered if they have been brushed at least twice. If you think about it, that means that in some ways, the plant can count! Each individual trap can only close 5-6 times before it has used up all of its energy and wilts, which is a good reason for you NOT to force your Venus Flytrap to close on your finger.

It is wasting precious energy without getting any nutrition from it. Tap water will also kill your Venus Flytrap. They naturally grow in low nutrient soil and the high levels of minerals in tap water will overwhelm the plant and kill it.

Pitcher Plants are also a well known carnivorous plant. They have a deep pitcher like cavity filled with liquid.

Prey falls in the pitcher and the slippery sides keep it from getting back out. Once the insect drowns in the liquid, digestive enzymes break it down so the plant can use it for nutrition.

Some pitcher plants have a **symbiotic relationship** with larger animals such as frogs and bats. The animals hide in the pitchers unharmed and eat the insects attracted to the plant. In turn, they poop in the pitcher and the plant uses the nutrients in that for its food. (YUCK!)

Extended Activities

- Watch this short video of the full bloom cycle of Perry the Corpse Flower: https://www.youtube.com/watch?v=_Epdns3bTtY
- Watch this Gross Science From Nova video about carnivorous plants: https://www.youtube.com/watch?v=aladpRIVdRI
- Watch this SciShow Kids video about carnivorous plants: https://www.youtube.com/watch?v=6L_p3ZkSlLo
- Watch this SciShow video about poisonous plants: **Better for older students. Watch first to decide if it is appropriate for your class https://www.youtube.com/watch?v=E9peKIdne44
- Watch this Epic Wildlife video about poisonous plants: https://www.youtube.com/watch?v=AbPm6cBHUCI
- Watch this SciShow Kids video about Plants with Weapons: https://www.youtube.com/watch?v=wu_9tIK4DWo

Grades K-2

Video lesson on Carnivorous plants of Texas. Contains discussion questions you can adapt to early grades and Next Generation Standards for grades K-3. https://florida.pbslearningmedia.org/resource/lsps07.sci.life.eco.carnivplants/carnivorous-plants-of- texas/

Grades 3-5

Check out this lesson plan from PBS Learning Media of Florida on Plant Adaptations. https://florida.pbslearningmedia.org/resource/reach-with-stem-olant-adaptations/plant-adaptations/

Grade 6+

PBS Learning Media lesson about plant defenses. Contains video, reading passages, discussion questions and support materials: https://florida.pbslearningmedia.org/resource/a31fbd4a-4c61-4118-b770-1d29f1437883/plant-defense/

Common Core State Standards
Grades K – 12

K-12

English Language Arts:

Strand LAFS.K12R: Reading

Cluster 3: Integration of Knowledge and Ideas: 3.7

Strand LAFS.K12.SL: Standards for Speaking and Listening

Cluster 1: Comprehension and Collaboration: 1.2, 1.3

Strand LAFS.K12.L: Language Standards

Cluster 3: Vocabulary Acquisition and Use: 3.6

Grade K

English Language Arts:

Strand LAFS.1.SL: Standards for Speaking and Listening

Cluster 1: Comprehension and Collaboration: 1.2, 1.3

Science:

Body of Knowledge SC.K.L: Life Science

Big Idea 14: Organization and Development of Living Organisms : 14.3

Body of knowledge SC.K.N: Nature of Science

Big Idea 1: The Practice of Science: 1.2, 1.5

Grade 1

English Language Arts:

Strand LAFS.1.SL: Standards for Speaking and Listening

Cluster 1: Comprehension and Collaboration: 1.3

Science:

Body of Knowledge SC.1.L: Life Science

Big Idea 14: Organization and Development of Living Organisms: 14.1, 14.2, 14.3

Big Idea 17: Interdependence: 17.1

Body of Knowledge SC.1.N: Nature of Science

Big Idea 1 Practice of Science: 1.1, 1.2, 1.4

Common Core State Standards

Grade 2

English Language Arts

Strand LAFS.2.SL: Standards for Speaking and Listening

Cluster 1 Comprehension and Collaboration: 1.2, 1.3

Science

Body of Knowledge SC.2.L: Life Science

Big Idea 16: Heredity and Reproduction: 17.2

Grade 3

English Language Arts

Strand LAFS.3.SL.1: Standards for Speaking and Listening

Cluster 1: Comprehension and Collaboration: 1.1, 1.3

Science

Body of Knowledge SC.3.L: Life Science

Big Idea 14: Organization and Development of Living Organisms: 14.1, 14.2

Big Idea 17 Interdependence: 17.2

Grade 4

English Language Arts

Strand LAFS.4.SL: Standards for Speaking and Listening

Cluster 1: Comprehension and Collaboration: 1.2, 1.3

Strand LAFS.4.L: Language Standards

Cluster 2: Knowledge of Language: 2.3

Science

Body of Knowledge SC.4.L: Life Science

Big Idea 16: Heredity and Reproduction: 16.1, 16.2

Grade 5

English Language Arts

Strand LAFS.5.SL: Standards for Speaking and Listening

Cluster 1: Comprehension and Collaboration: 1.3

Science

Body of Knowledge SC.5.L: Life Science

Big Idea 14: Organization and Development of Living Organisms: 14.2

Big Idea 17: Interdependence: 17.1