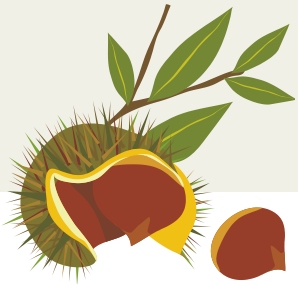
Plant Defense: Thorns, Smells and Flowers



A Teacher's Resource Guide

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What are plants?

Plants are living organisms that turn sunlight into energy through the process of photosynthesis. Life on earth depends on plants because of this.

Plants may be Gymnosperms (evergreens), Angiosperms (flowering plants such as roses or sunflowers), Bryophytes (mosses) and Epiphytes (plants that grow on other plants such as orchids or mistletoe). They can also have different lifestyles: aquatic (growing in water such as duckweed) or parasitic (such as ghost plant or Indian pipe plant). In other words, plants have a variety of traits and grow in many different areas.

Orchid

Ghost plant or Indian pipe plant

What is defense?

Defense is another way of saying protecting oneself. For animals, this might be the tough shell of a tortoise, the sharp claws of a mountain lion, the horns of a sheep or the quills of a porcupine. Animals use these traits to protect themselves.

Plants, like animals, need to protect themselves from becoming dinner. Plants can have thick, tough cell walls (cacti) that are hard for animals to penetrate. Plants may have thorns to keep plants from crushing, walking or eating them (roses). Plants might use different scents to keep animals away (such as marigolds keeping rabbits away) or they might have oils that harm animals (Poison Ivy).

Why do plants need to protect themselves?

Damage on a tree from a woodpecker

Unlike animals, plants cannot move. If a deer is grazing grass, the grass cannot run away or hide. So, plants need these defenses, these ways to protect themselves, in order to stay alive. This might be to avoid being eaten, crushed, or harmed. Just like humans, bacteria and viruses can enter in a plant from a cut or wound.

Thorns

A “thorn” is a loose term for any sharp, pointed appendage coming off a plant for defensive purposes. Botanically, “thorns” can also be called spines, prickles or trichomes based on their location on the plant. These sharp appendages come in a variety of shapes (pointy, hooked), lengths and colors (brown, white, silver).

Thorns are modified branches with sharp, pointed appearance. In other words, at every place where a plant would have a branch, a thorn would be there instead.

Spines are modified leaves that are also sharp and pointed. In other words, spines are in place of leaves on a plant.

Prickles are any sort of pointed, sharp plant part that isn't where a branch of leaf would be. For example, roses have prickles, which are located on the stem.

Trichomes are hairs on the plant that might be located on the stems, leaves or branches. Many times, these hairs irritate our skin and cause reactions (such as stinging nettle). The hairs are usually thin and light colored, which makes it hard to pull them out of our skin. Not all trichomes are bad! Some feel soft (Camphor basil or Lambs ear). Plants have trichomes to keep herbivores or people away or to make their leaves or stems unappetizing to eat. Imagine trying to eat lettuce covered in cotton balls!

Smells

Plants emit different smells to either attract or repel animals. If a plant needs pollinated or wants a meal, it may attract insects (Skunk cabbage, roses). If a plant wants an animal to eat it, maybe to disperse its seeds, it may smell delicious (like apples). For a plant, this means it can 1) pollinate its flowers and reproduce or 2) acquire nutrients that may not be available.

Skunk cabbage in bloom

Oils

Some plants excrete oils. Humans do the same things when they sweat. For plants, oils may be used to kill other plants (such as black walnuts) or harm animals (such as poison ivy, poison sumac). The plant is trying to keep everything away in order to survive.

Thick & Waxy Skin

The skin of the plant, the outside layer, is a barrier between the plant's organs and the outside world. Sometimes, plants may need to thicken their skin to help cope with their environment. For example, Aloe Vera, a common houseplant, has thick skin to keep from dehydrating. Trees have different types of bark to help deal with cold or hot environments.

Do plants just use one defensive strategy?

Not always! Remember, plants have all sorts of stresses because they live in unique environments. Plants may need to protect themselves from animals and protect themselves from harsh environments. Aloe vera has thick skin and thorns. Roses have thorns and smells. If

you find a plant, you can look for its defense mechanisms (thorns, oils, smells, thick skin, waxy skin) and determine what it's trying to protect itself from.

Additional Resources:

Game where students are detectives learning about life cycles, growing plants indoors, plant parts and plant structure: http://urbanext.illinois.edu/gpe/index.cfm

Phenomenal photos of thorns, prickles and spines: http://waynesword.palomar.edu/ecoph30a.htm

Explanation of flower shapes and colors in relation to animal attraction: http://www.buzzaboutbees.net/flower-pollination.html

Video of plants moving leaves in order to avoid being crushed: http://www.youtube.com/watch?v=Zq3UuHlPLQU

Photos:

Orchid: http://orchidcare101.com/orchids-and-their-natural-habitat/

Ghost plant: http://www.discoverlife.org/mp/20q?search=Monotropa+uniflora&guide=Wildflowers&cl=US/GA/Douglas/Sweetwater_Creek_State_Park

Star thistle, floss tree: http://waynesword.palomar.edu/ecoph30a.htm

Stinging nettle: http://www.wildmanstevebrill.com/Plants.Folder/Nettle.html

Lamb's ear: http://www.250news.com/blog/view/21899/1/lamb's+ear+-+not+a+baaaaaad+plant+to+add+to+your+garden?id=67&st=60

All other photos taken by Laura Hlusko