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Plant Essay: The Weeping Willow's Family Tree

This paper is about the evolution of plants. The Phylogenetic tree is where it begins. It is a diagram that shows evolutionary relationships between plants over many generations. It also shows how they are related to one another and what they have in common. It shows that by the labels of characteristics that all species above it have.

The characteristics of plants means that to be called a plant you need to have all 3 characteristics to be considered alive. The first characteristic is chloroplasts, which makes plant cells green (usually), however they can sometimes be brown or red. It is also where photosynthesis takes place. The second characteristic is the cell wall, which is something plant cells have, and animals don't. It supports and protects the cell, it also surrounds it. The third is called photosynthesis. It is the process plants use to help make energy. The equation is carbon dioxide + water + sugar + oxygen.

Plants are also very valuable to the food web, which is a more accurate and complex food chain. Plants are at the very bottom of the food chain because they provide food to everyone else and are called producers. Without them, the whole food chain would collapse because plants provide food and air for everything. Without them all living things would suffocate and starve.

One type of plant is something called a charophyte. Or, in layman terms, green algae. They aren't true plants because they are the ancestors and because of this, they don't have all the characteristics that their descendants have. Therefore, a true plant is every plant on the phylogenetic tree except charophytes. It typically lives in water. In fact, it is the only plant that does, the rest live on land, with the exception of lichen. Lichen is a combination of algae and fungus. Lichen is a symbiosis, which is when something is good for both parties. An example of it in lichen is that algae brings the food and fungus provides a home. It looks like a sponge. They are non vascular, which means they can't move water throughout their "body". The way they get away without having vascular tissue is that they are literally surrounded by water 24/7, which ensures that they won't dry out. They are one cell thick and nicknamed sea lettuce. Spirogyra is another type of green algae. It appears as a spiral straw, hence its name. It is green because it contains a spiral of chloroplasts.

Another type of plant is a Bryophyta, or more commonly known as: moss, liverwort, and hornwort. This particular branch of the species lives on land. They get away with being non-vascular by the help of their fat shape and that they live close to the ground, which is helped by the fact that they are bucket shaped and can hold water easily. They reproduce by spores.

Plants have gotten better at living on land than back when they were mosses. They have a waxy coating covering their leaves, called a cuticle, which seals in water to prevent it from escaping. How it holds in water is by acting as a waterproof barrier that is selectively permeable. Something called a stomata is also another reason why plants are better on land. It

is made of tiny pores at the surface of leaves and are formed by two cells named guard cell. It holds water in when there is strong sunlight there is accumulation of glucose due to high photosynthetic activity and due to osmotic pressure, the cell starts absorbing more water from the companion cell. Plants also move water by vascular tissue. There are two types: Xylem, which conducts water and dissolved minerals upward from the roots. The second one is Phloem, which conducts food downward from the leaves. Plants also have another way of moving water, and that is transpiration, which is the loss of water due to evaporation at the top of the plant. Plants are selfish and want to hold onto water.

Pteridophytes are commonly known as ferns and by their other name, equestrium. They are not the same as mosses, obviously, but they do have similar characteristics. They both have spores and need moist environments to reproduce, which is why they live on land and close to water. They reproduce by having their spores transported, or more than just one spore, which is Sori. Sori is a clump of spores. Spores are different from seeds because they are smaller than seeds. The seeds also get more resources from Mama seed than the spores get from Mama spore. Spores don't need to be fertilized, seeds do. Sperm need to swim to the egg and they can't do that on land. The ferns have vascular tissue and that means they can get taller and don't need to rely on osmosis.

On the topic of Gymnosperms, or as their more commonly known, pine trees or conifers. Pine trees and ferns are similar because they both live on land and both have vascular tissue. Strong and epic vascular tissue has let the pines spring to new levels of awesomeness and become taller plants. They live on land because they no longer need water to reproduce, as they have seeds. They protect their seeds using cones. They use their vascular tissue like any other

plant, to move water and food. It affects their shape by making them very tall and they are lined with wood/cellulose tubes to stop them from collapsing.

Angiosperms are commonly known as flowers. Like conifers, they are land plants, vascular, and have seeds. They are the 4th species of plant to make it to land. They can handle dry areas and no longer need water for reproduction because they have seeds. They are the second species to evolve seeds. The seeds have a coat to protect the baby plant. The flowers are to attract pollinators and their fruit is to move the baby far away from the mom so they aren't in competition. They must attract pollinators for two reasons. One to get better genetics and the other is because this provides more diverse genetics. How the flowers attract pollinators is by certain colors that work for different species. Flowers also have special scents that work better on pollinators that do not use sight as their primary mating sense. Bees see UV, so showing colors in the UV spectrum is better for attracting bees. Some flowers make themselves look like wasps in order to trick them into mating.

Plant evolution is something to marvel at because they have come so far over a long period of time. It started with one type and then branched off, or derived, into a new plant and/or type. They are derived from their ancestors, the ones that make it have adapted to different lifestyles and are chosen by something called Natural Selection, which is coinciding with the topic of Evolution. This may seem like it happened overnight but actually, it took many years and generations to happen. It is a slow process and takes many tiny steps.

The Lady of the Forest:

Cold, frigid air, like the first breath of winter, causes the water to create tiny ridges and ripples. The talkative water that seems to be chattering its own teeth at the cold, slowly moves to what sounds like a small waterfall. Many branches, block the flexible and ever churning liquid, from jumping onto the rocks that guard the ivy and redwood covered forest floor. Tangled branches snare and snag at the water and roots curl and uncurl underneath the mulch and wood shaven soil, writhing about with life. The forest, she awakens from her deep slumber. The air is thick with dense fog that shrouds her from the other side. Peace, thou of factories and mechanical beasts of power, she wishes for peace. Fallen and dead trees, a warning sign perhaps? Or maybe a newborn vegetation. Many think fire puts the lady of the forest in chaos, but this is not so. The forest is like a Phoenix, she is reborn from the ashes. Once she is old and tired, she lets herself become engulfed by the heat and warmth of the flames. She who is gone will always leave something behind. It will always be given to those who ask. The forest has one fear, however. To be replaced by something that is more important than she. The Lady of the Forest will fight and will always have help when fighting. She lives on, as long as she is wanted.