Calendar Connections

May ~ Botany

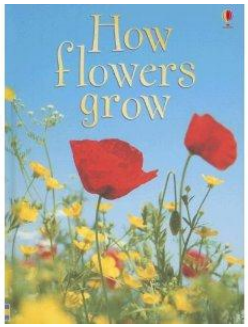
Target Level: grades 3-6

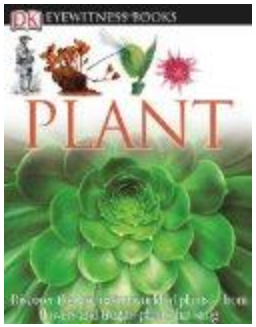
The facts are created at a more advanced level but can easily be used for the entire homeschool family! Young children will soak up the information their older siblings are taught while all together.

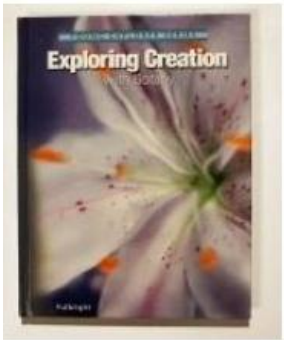
Although the cards were created for May,
they can be used for any month of the year!

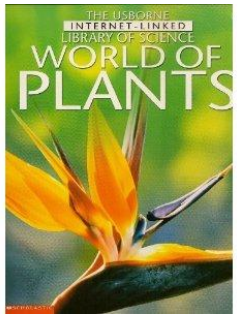
Botany Books

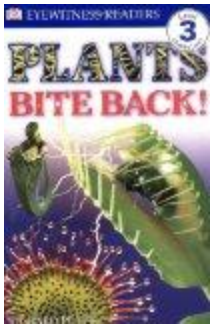
Click on the images to see more about these recommend books.

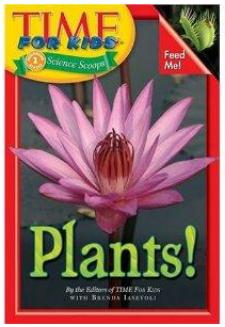












Calendar Connections

Helpful Items

~these are the *exact* products we use~

cardstock

laminator

laminating film

We use this particular calendar, you can get it on Amazon here!

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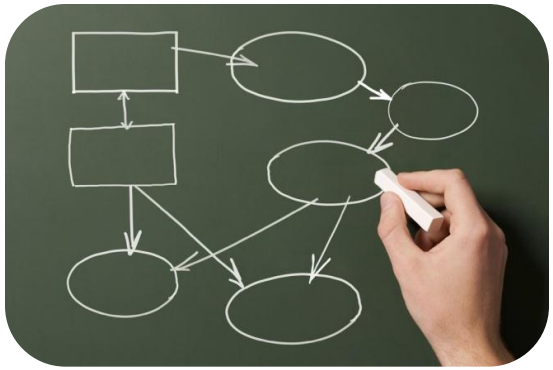

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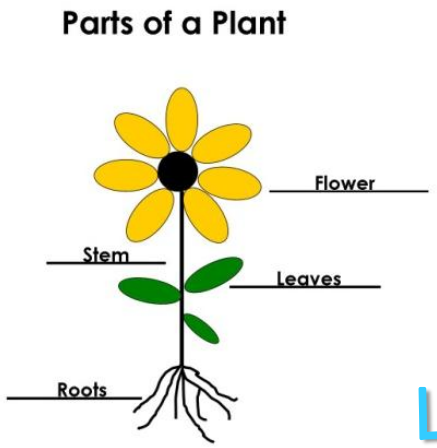

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Botany

This month is going to be a lot of fun!!! Before starting this study, take a walk outside – somewhere where you will see trees, plants, and flowers. Take a magnifying glass, a notebook, and a pencil with you. If you can take a digital camera. Look at the different flowers and note their shape and color. Look at the leaves on the trees and note their shape and size. Can you find any moss? Can you count the number of different plants and trees you see? You were just doing botany! Botany (bot' uh nee) is the study of plants. This month you will be studying the wonderful world of plants!

2

Taxonomy

Do you, or someone you know, like to be organized? Are all your socks neatly placed in one drawer and your t-shirts in another? How do your Lego's look? Are they all organized by size and color? There are so many living things in this world that biologists need to organize them in order to study them. Taxonomy is the classifying, or organizing, of living things into different groups. There are seven different categories that living things are broken down into: Kingdom, Phylum, Class, Order, Family, Genus, and Species. Plants are in Kingdom Plantae (plan' tay). Once botanists have placed plants into groups by their special features, they give the plant two names: one based on genus and one based on species. These names are in Latin. Why Latin? Because Latin is a dead language (meaning no one speaks it) so it doesn't change and is the same for everyone!

3

Plant Needs

Plants are living things that need four things to survive: sunlight, water, minerals, and air. Where do the minerals come from? Minerals come from the soil. It is possible for plants to die if the soil does not have enough of the proper minerals – that is why many gardeners add plant food to the soil, to help the plants can grow healthy and strong. Farmers will often rotate crops (move different crops to different fields) each year as different plants add or take away different minerals. The air provided necessary gases for the plant to breath and make food.

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Parts of a Plant

Every part of a plant has a job to perform. Roots hold the plant in the ground and draw water and minerals from the soil to nurture the plant. The stem carries the water up through the plant. Leaves make food that the plant needs to survive. And the flowers make the seeds. All flowers have the same basic makeup, even though they may look quite different. Find a flower in your garden or in the woods and see if you can identify each part.

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Seeds

Did you know that inside every seed is a little baby plant? Each seed stays dormant (Greek word meaning "to sleep") until it gets what it needs to wake up – warmth, water, and air. The seed doesn't need sunlight until later, after it emerges from the ground. The baby plant can sleep for weeks or even years! In fact, bean seeds were found in King Tut's tomb. They had been there for more than 3000 years! Scientists took them home and planted them. Guess what? They grew into healthy beautiful bean plants.

If you look at a seed you will notice it has a shell called the testa. The testa protects the baby plant from the cold and different elements that could harm it. Testas come in all different shapes, sizes, and colors.

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Germination

When the seed receives warmth and water, the testa loosens it's hold on the baby seed. The water then seeps inside and the baby plant, called the embryo, wakes up! This starts the process of germination. The embryo's root, called the radicle, grows down into the soil. The radicle grows tiny little fibers, called hairs, that search for water and nutrients. The next part, the hypocotyl, grows up through the soil and will become the stem of the plant. The epicotyl is at the top of the embryo and holds the plumule which will become the first true leaves of the plant. Between the epicotyl and the plumule are the cotyledons. These have all the nutrition needed for the first several days of life.

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7 **Vascular Plants**

Vascular (vask' you luhr) plants have tubes that carry water and chemicals inside the plant. Water and chemicals run up the plant in tubes called xylem (zy' lum). Sugar and other chemicals flow down the plant through other tubes called phloem (floh' em). We often call these tubes "veins". There are two different types of vein patterns. Monocot plants (such as corn) have veins that run straight up and down, while dicot plants (such as a primrose) has a vein running down the center with little veins branching out. The majority of plants are vascular. Can you find examples of each vein type?

8 **Nonvascular Plants**

If a plant has roots, stems, and leaves it is vascular. If vascular means plants that have veins, then what does nonvascular mean? That's right – no veins! So what type of plant has no veins? It's really hard to think of plants without roots, stems, and leaves, but there are some! Take a walk in the forest and look at the rocks and trees. Do see anything on them? You might see something green that feels soft to the touch. This is moss. Nonvascular plants absorb water and spread it around much like a paper towel. Spill some water on a flat surface and place the edge of a paper towel in the water. Do you see how the water spreads through the towel? That is how nonvascular plants move water.

9 **Angiosperms**

There's something about spring that makes people feel more alive – the warmer temperatures, the blooming trees, the beautiful colors of the flowers – it's all refreshing. Flower-making plants are in a phylum called Anthophyta (an' thouh fie' tuh). Antho means flower and phyta means plant. This tells us that the plants in this phylum make flowers. They are also called Angiosperms. Angio means "container" and sperm means "seed". Angiosperm means "seed container". There are many different kinds of containers including fruits and nuts! If you are trying to decide if a plant is an angiosperm all you need to ask is, "Does it make flowers?" If the answer is "yes" then it is an angiosperm.

10 **Flowers**

All plants that flower are angiosperms. Can you imagine life without flowers? It would be a very boring and dreary place to live! We would also starve to death as all fruits and many vegetables would not exist if there were no flowers. We would also have no wheat, rice, or oats – so that would mean no bread, cereal or oatmeal! We'd still have meat, right? No! Most of the meat we eat (except fish) comes from animals that eat wheat, corn and other flowering plants. Not only are plants beautiful to look at – they are necessary to our survival!

11 **Flower Families**

There are many families of angiosperms, far to many to list. But there are a couple of very interesting flower families we should study. The first group is composite flowers. Sunflowers, chrysanthemums, daisies, and asters are apart of this family. They are different from other flowers in that they do not have the typical stamens and carpels of other flowers. Instead the center of the flower is a mass of tiny structures – really hundreds of little flowers on one stalk. Each tiny flower in the center has its own tiny stamens and carpel. These flowers are also called "ray flowers" because the petals surround the central disk like rays of the sun.

12 **Carnivorous Plants**

Do you remember what carnivorous means? "Carn" is a Greek word meaning "meat." Carnivorous means "meat eating." There are plants that actually eat meat! But don't worry – they won't eat you! The Venus flytrap is probably the most famous of carnivorous plants. Other carnivorous plants include the bladderwort, the pitcher plant, and the sundew. It is important to know that these plants do not eat insects for food. Like other plants, they make their own food. They digest the animals as a source of nitrogen – a vitamin that the plant needs to stay strong and healthy.

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13 **Pollination**

In order for a flower to make a seed pollination must occur. Pollination is when pollen, a fine powdery substance that fertilizes the plant, gets from the stamen to the carpel. Pollen must be taken from one plant and carried to another plant of the same kind. Wind is one way in which this occurs, but it is not the most efficient way as the wind blows in many different directions. Trees are more often pollinated by the wind as many trees develop little catkin flowers. After the catkins form and pollen covers their tiny stamens, the pollen then blows off in hopes of landing on another near by tree, therefore ensuring another generation of trees born from seeds.

14 **Bees, Birds, and Butterflies**

Animal pollination is the most common and reliable way to pollinate. The chief pollinators are bees. Bees need flowers just as much as flowers need bees. Bees need the nectar from flowers to help produce honey, the food that they eat during the winter. They also need pollen. They eat the pollen as a source of protein and use it to mix with honey to make a substance called "bee bread." How do bees find the nectar? Flowers have special patterns on their petals which tell bees and butterflies exactly where their nectar is stored. These special designs "point" the insect towards the center of the flower. These are called nectar guides. Some nectar guides are only visible to insects that can see ultraviolet light.

Though bees are the chief pollinators, butterflies and hummingbirds also aide in the distribution of pollen.

15 **Self-Pollination**

Very few plants can self-pollinate. Self-pollination is when a single plant can pollinate itself – without the aide of an insect or bird. God did design a few plants that can self-pollinate and most of them are plants of foods we eat! God designed them to help mankind. Wheat, barley, rice, and oats can all self-pollinate. Beans, peas, soybeans, peanuts, eggplant, lettuce, peppers and tomatoes can as well. These are foods that people around the world depend on to live.

16 **Fruits and Vegetables**

What is the difference between fruits and vegetables? Do you remember the term "angiosperm"? It means "seed container." All seed containers are called "fruits." Usually we think of apples and oranges as fruits. But everything that grows from a pollinated flower and contains seeds is considered a fruit. That would mean things we usually think of as vegetables, such as tomatoes and cucumbers, are actually fruits! So what is a vegetable? A vegetable is any edible part of a plant that does not have seeds. Can you think of any vegetables? Lettuce leaves are vegetables since they have no seeds. Broccoli, carrots, and potatoes are also considered vegetables since they, too, contain no seeds.

17 **Seed Dispersal**

The process of getting seeds from the parent plant to a new location is called seed dispersal. It is important for seeds to disperse and not concentrate themselves in one area so as to not deplete the land of the necessary nutrients to grow healthy strong plants. There are five different ways seeds are dispersed: humans, water, wind, animals, and mechanical.

Human dispersal is often ignored as a method of dispersal because it is the most common method – farming. This is the method in which we get most of our food. Water is another way of dispersal and is used by plants that live in or near the water. The seeds usually float along until they either drop down to the bottom and take root or settle along the shore line.

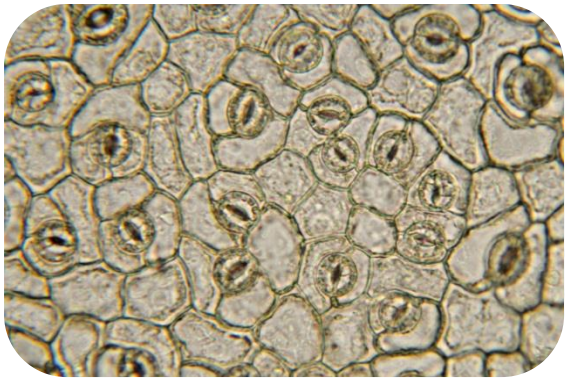
Have you ever taken a dandelion fluff ball and blown the seeds into the air? You have just aided in wind dispersal!

18 **More Seed Dispersal**

Mechanical dispersal is the ability of a plant to fling their seeds away when they are ripe. Pea pods use this method. When the seeds are ready, the pod dries up. When the pod dries, the inside of the pod dries faster than the outside. This causes the pod to twist, suddenly splitting open, causing the pod to spin. While the pod is spiraling, it causes the seeds to fly out of the pod in all directions.

Have you ever had a burr stuck to your socks? This is the final method of dispersal – animal dispersal. Inside each little burr is a seed that developed from the flower of the plant. Burrs are carried around by animals until they are pulled off where they will settle and grow into a new plant.

Did you know that burrs were the inspiration for George de Mestral to develop Velcro? While grooming his dog, he was amazed at how difficult it was to remove burrs. He studied a burr under a microscope and copied the hook pattern he saw and developed Velcro!



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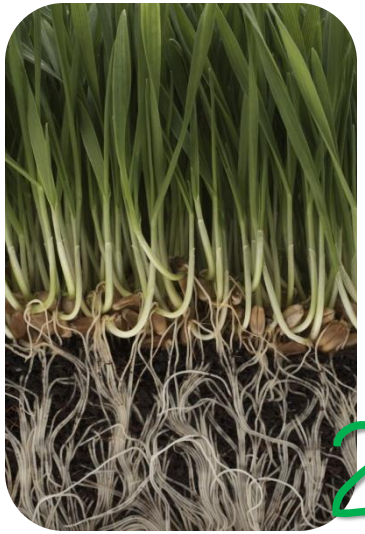

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19 Leaves

What plant can you find between your chin and your nose? Two lips! (tulips) Did you laugh? Did you know that leaves have a mouth? Actually they have several tiny mouths – so tiny you need a microscope to see them. They are found on the bottom side of every leaf and they are called stomata (stoh mah' tah). These tiny mouths are just as important to the leaf as yours is to you! Stomata open and close just like your mouth, but they don't eat food. They help the leaf make food by allowing important chemicals from the air to come into the leaf. Without these stomata the plant would not survive. As a result, leaves are very important to a plant. Without leaves, a plant will die.

20 Photosynthesis

Do you know what a plants favorite food is? It might be your favorite too! It's sugar! Each leaf on a plant is a little sugar-making machine. It is a process called photosynthesis. Photo means "light" and synthesis means "to put together." So "photosynthesis means "putting together with light." That's exactly what leaves do. Leaves take water from the roots and combine it with light from the sun and carbon dioxide from the air to make sugar for the plant and oxygen to be released into the air for us to breath.

21 Chlorophyll

Have you ever wondered why leaves are always green? It is because they are filled with a substance called chlorophyll. Chlorophyll is important because it absorbs the light that the leaves need to make sugar. It takes the light's energy and gives it to the leaves in just the right way so that the leaf can use it. It is chlorophyll that makes the leaves green. When leaves are green you know it can perform photosynthesis (make food). If chlorophyll is absent then the leaves are not green and photosynthesis cannot occur. We can remember that chlorophyll is responsible for making leaves green by thinking "chlor" sounds like "color" and "phyll" sounds like "fill." Chlorophyll fills the leaves with green color.

22 Transpiration

Remember the stomata in leaves? They take the carbon dioxide from the air and release the oxygen from the leaves. They also have another important job. The stomata perform a process called transpiration – the release of excess water from the plant that comes up from the roots. The plant must get rid of excess water or it will die. Transpiration is the reason for plants loosing their leaves in the fall. If trees and plants kept their leaves all winter, when it is difficult for the roots to get enough water, water would continue to escape from the leaves through the stomata and the plant would die of thirst. Therefore, the leaves falling off protects the tree from losing water.

23 Roots

We already mentioned earlier the two main jobs of roots. Do you remember what they are? They are to absorb nutrients and water from the soil and to hold the plant in place like an anchor. Without roots there is no plant. Roots also play an important part in preventing the erosion of soil as they wrap themselves around the soil and hold it in place. Roots grow throughout the entire life of the plant. The older the plant the longer and thicker the roots. Roots grow longer by adding cells to their tips and grow fatter by adding cells around their tube-like bodies. A wild fig tree in South Africa grew roots that were more than 393 feet long! Not all roots are underground. In a rainforest there is a lot of water present in the air. As a result you will see plants growing right on trees with their roots hanging down into the air or running into the moss. They don't need soil as they have all they need floating around in the air or hidden in the moss.

24 Geotropism

When planting a seed did you ever look at it and wonder which way was right side up? No, you don't. No matter which way you place the seed in the soil, the roots know to grow down. How does it know? God has given them a sense called geotropism. "Geo" means "earth" and "trop" means "turning." Geotropism refers to the fact that the roots are always turning toward the earth. What causes this sense? Plants have a chemical called auxins that affect how a plant grows. Gravity causes different amounts of this chemical at different places in the root. Because of the uneven distribution, roots grow in the direction of gravity which is towards the center of the earth.

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Rooting

Plants generally grow from seeds, but there is another way to grow a plant. It is called rooting. To root a plant is take a healthy stem or branch from the plant and put it in soil or water. Within a few weeks roots begin to grow from the stem and you have a new plant! Plants grown by this method, however, are not really "new." They are clones. What is a clone? A clone has all the same DNA as the plant from which the stem or root came. It is a copy of the original plant. Some plants that root easily are: willow trees, African violets, ivy, geraniums, begonias, coleus, and roses. If you have any of them around, take a snip, remove the bottom leaves and submerge it in water and see what happens!

26

Stems

The stem of a plant is much like our spine. It gives the plant its form and structure. Without a stem plants wouldn't be able to lift their lovely flowers or leaves off the ground. There are many different kinds of stems. Tree stems are hard and woody. Zinnia plants, however, are soft and green. Strawberries have stems that grow sideways along the ground called runners. Although there is a lot of variety in plant stems all vascular plants have a stem of one kind or another. The stem holds the tubes (xylem and phloem) that carry water up the stem to the leaves and the sugary food down to the feed the rest of the plant. Remember auxins? The chemical that tells the roots to grow down into the earth? It turns out that this same chemical makes the stem of the plant bend and twist in order to grow towards the light. When something prevents the light from reaching the plant, auxins cause the plant to twist and turn its way around the object to reach the light.

27

Trees

Take a look at a tree in your area. What is its purpose? Think about it. Trees provide us with so much more than we realize. Not only do they provide beauty but also shelter for animals, shade, food, and healthy air. Their roots also help to keep the entire structure of earth's landscape stable. The bark of the tree is considered a shield of protection. Right under the bark of the tree you will find the xylem and phloem that carry water and sap up and down the tree. If you peel the bark off a tree you would be damaging important cells and cause the tree to lose water and nutrients.
Did you know that even though a tree is alive, the very core of the tree trunk is actually dead? As the tree grows and layers of xylem and phloem are added, the old ones are plugged up and die. This is now called heartwood and it has the job of helping the tree survive rough storms and winds by giving it strength.

28

Gymnosperms

For most of the month we have been focused on angiosperms, plants that make their seeds from pollinated flowers. Today we will discuss gymnosperms. "Gymno" means "uncovered" and "sperm" means "seed." So a gymnosperm means "uncovered seed." Angiosperms produce their seeds in some type of a covered container. Gymnosperm seeds are not. Gymnosperms are separated into four different phyla. One phyla that you are familiar with is called Coniferophyta (con ih' fur oh fye' tuh). Conifer is Latin for cone bearer and phyta means plant. Can you name a tree that is a cone bearer? Pine trees! Have you ever looked at a pine cone? Have you ever shaken one? If you have you probably heard a rattling sound – that's the seeds. Gymnosperm trees usually have needles or scaled leaves. They are also called softwood trees. Most conifers keep their leaves throughout the winter, consequently they are called evergreens.

29

Plant Providers

We already mentioned how trees are huge providers – from the houses in which we live to the books that we read. We've also discussed how much of our food is grown from plants. There are other plants that provide us with useful things. Bamboo is possibly one of the most useful plants and is especially popular in Asia. Its strong, tube shaped stems have dozens of uses from furniture, water pipes, and flooring to hats. Did you know that a lot of your clothing is from a plant? Cotton is a fiber that grows from a plant in little balls. It is picked and then spun into a yarn or thread and woven into a fabric.

30

Strange Plants

There are many strange but wonderful plants found throughout the world. The smelliest flower is one by the name of the corpse flower. It grows in the rainforest of Indonesia and its smell of rotting meat can be smelled half a mile away! Giant sequoias are the worlds biggest trees. Some are so large that they have roads cut through them. Giant bamboo can grow 3 ft. a day. It grows so fast you can hear it creaking.

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31 "And why do you worry about clothes? See how the lilies of the field grow. They do not labor or spin. Yet I tell you that not even Solomon in all his splendor was dressed like one of these. If that is how God clothes the grass of the field, which is here today and tomorrow is thrown into the fire, will He not much more clothe you, O you of little faith?"

Matthew 6: 28-30

May