

Name _____ Test Date _____ Hour ____

PLANT STRUCTURE & FUNCTION #1 - NOTEBOOK

Origin and Evolution

LEARNING TARGETS



- I can explain the characteristics of all living things.
- I can explain the special characteristics of plants.
- I can identify the ancient ancestors of plants.
- I can describe the basic evolution of plants.
- I can identify the two main groups of plants.
- I can describe the differences between nonvascular and vascular plants, and give examples of each.
- I can describe the structure and function of the two vascular tissues.
- I can identify and describe the two subgroups of vascular plants.
- I can identify and describe the two subgroups of seed producing vascular plants.
- I can describe the different characteristics of monocots and dicots.
- I can create a graphic organizer to illustrate the classification of plants.

SCIENTIFIC LANGUAGE

1. **Cyanobacteria** - Plants' ancient ancestor, also known as a blue-green algae, has the same type of chlorophyll that plants use for photosynthesis.
2. **Nonvascular** - Plants that absorb water directly through their cell membranes, do not produce seeds, and have rhizoids.
3. **Rhizoids** - Threadlike structures to anchor nonvascular plants in the ground.
4. **Spores** - The reproductive cells of seedless plants.
5. **Xylem** - Tissue made up of hollow tubular cells that are stacked one on top of another to form a vessel transporting water and dissolved substances from the roots throughout the plant.
6. **Phloem** - Tissue made up of tubular cells that are stacked to form structures called tubes that move food from where it is made to other parts of the plant.
7. **Fronnd** - The leaf or leaflike part of a palm, fern, or similar plant.
8. **Monocots** - Seeds that have one cotyledon.
9. **Dicots** - Seeds that have two cotyledons.
10. **Cotyledon** - Part of the seed often used for food storage.

What is a Plant?

Take a close look at a plant outside, what characteristics would you expect to see?
Do all plants have the same parts? What do they have in common with each other?
What differences may plants have between each other?

Scientists have identified close to _____ plant species with more still to be _____.

Without plants most _____ on Earth would not be possible.

How many plants can you name?

Why are plants so important?

Characteristics of Plants

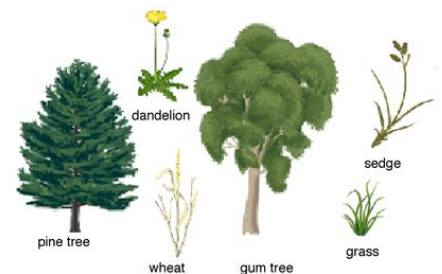
Plants range in size from _____ to _____ m. They all need _____ which they either pull from the soil or absorb because they are submerged in it. Plants are made of _____. Many plant cells contain _____ which contain the green pigment chlorophyll used in _____. In addition, most plant cells have a large central _____ used for _____.

Plants are _____. All living things have a few things in _____.

- They are made of _____, which are specialized to do _____ jobs.
- They have _____, they instructions for _____ the organism.
- They need _____.
- They need raw _____ from the environment.
- They _____ and _____ to their environment.
- They _____.
- They _____.
- They have _____ (changed) over time.

Plants have some things that make them _____.

- They can _____, use light to make their own _____.
- They can keep _____ their _____ life time.
- They are _____ in one place.
- They take in _____ and release _____.

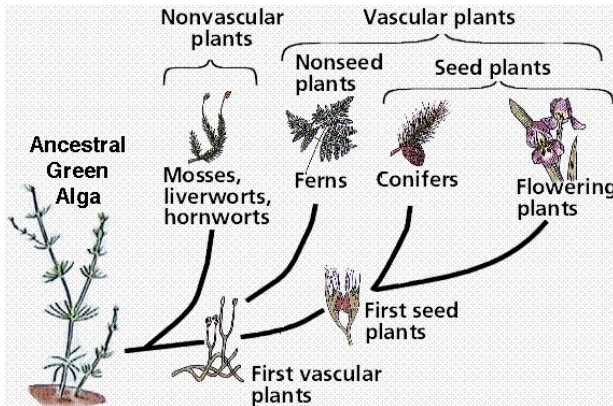
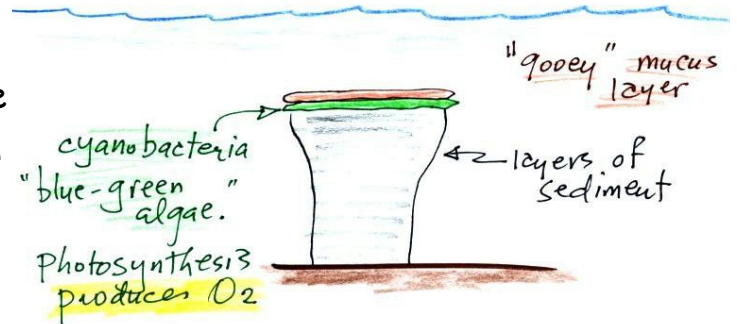


Can you imagine being able to make your own food inside of your body?

Can you imagine if you kept growing your whole life??
Can you imagine being anchored in one place forever???

Where did plants come from?

The first plants lived in _____. The first _____ plants evolved around _____ mya and probably needed to live in _____ areas. Ancestors were probably ancient _____ algae (aka _____). Cyanobacteria and plants both have the same type of _____ which are used for _____. Cyanobacteria have the distinction of being the oldest known _____, more than _____ billion years old.

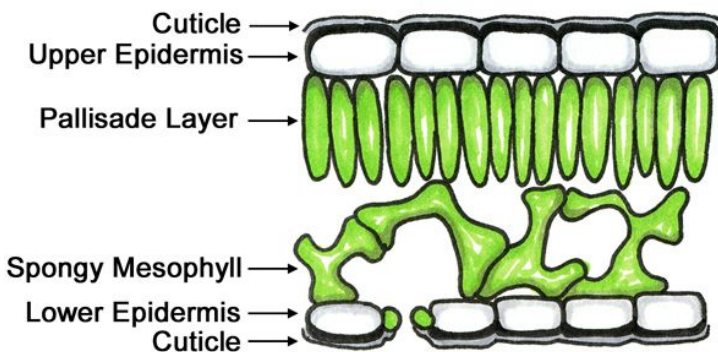


As the Earth's surface _____ over time, so did the types of _____. Some plants needed to _____ to life on _____ rather than water. Advantages for plants on land was that there was access to more _____ and _____ for _____ than

there was in the water. As more plants moved on land, more _____ was released into the _____. Scientists believe _____ bearing plants evolved around _____ mya and _____ plants around _____ mya.

As land plant species _____ to life on land, different plant _____ began to appear. Plants developed _____, the waxy _____ layer to help conserve or keep _____. Cell walls were made of _____ which provided _____ and _____.

Cross section of a typical dicot leaf:



also developed to get _____, _____ and _____ to other parts of the plants. Even the methods of _____ had to change. Spores and _____ became water _____, which you now

see in fruits, like _____, that have _____ waterproof coatings.

Types of Plants

Plants can be grouped into _____ main categories, _____ plants and _____ plants. Vascular plants have _____ structures that _____ water, nutrients and other substances throughout the plant.

Nonvascular plants do _____ have these tubelike structures and use other ways to move _____ and other _____.

NonVascular Plants

Plants that are _____ do _____ grow from _____, and they do not have all the _____ parts you think of when talking about a plant. They are usually just a few _____ thick and grow only _____ cm in height.

Instead of _____ they have _____, _____ structures to _____ them in the ground. Nonvascular plants grow in _____ places. In nonvascular plants, _____ is _____ and distributed directly through their _____ and _____ instead of the tubelike structures that vascular plants have.

Nonvascular plants do not have _____ or _____ to produce seeds instead they reproduce by _____, which are single _____ cells.

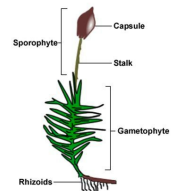
Most nonvascular plants are classified as _____, which have a _____, leaf like growth around a _____ stalk. _____, a less common nonvascular plant, have one-celled _____. Both mosses and liverworts can tolerate _____, _____ periods, can grow in _____ soil and in places where other plants _____ grow. These characteristics make them great _____ species.

NONVASCULAR PLANTS:

- _____
- Liverwort

Seedless Nonvascular Plant

- Rhizoid:
- Threadlike structure that anchors a seedless, nonvascular plant

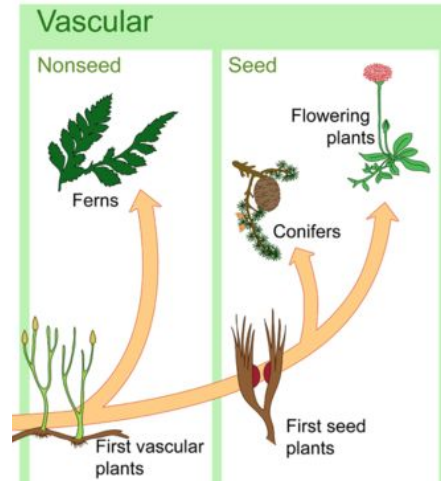


Vascular Plants

_____ plants can grow _____ and _____ than nonvascular, because they have the _____ structures which can _____ water and nutrients _____ the plant.

VASCULAR PLANTS:

- _____ plants
- _____ trees
- _____ trees
- Cactus
- _____ plants



Two important tissues that make up the _____ tissue system in a vascular plant are _____ and _____.

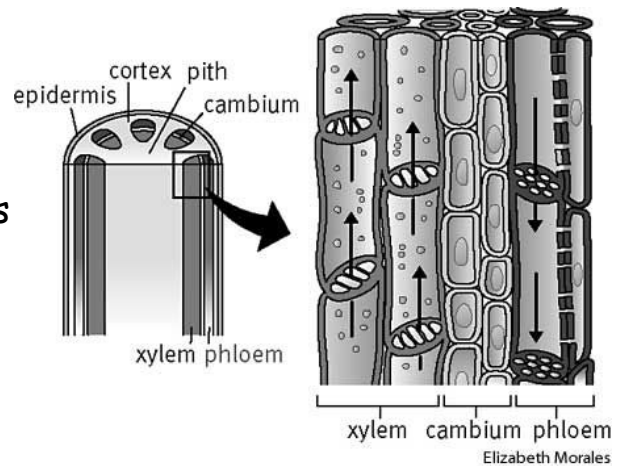
XYLEM

_____ tissue is made up of _____ cells that are _____ one on top of another to form a _____, think blood vessels. Xylem _____ water and dissolved substances from the _____ throughout the _____. The _____ cell walls of xylem are also important in adding _____ to the plant.

PHLOEM

_____ is a plant tissue also made up of _____ cells that are _____ to form structures called _____. Tubes are _____ than vessels.

Phloem tubes _____ from where it is _____ to other parts of the plant where it is _____ or _____.

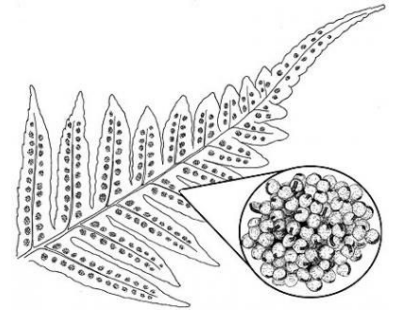


Elizabeth Morales

_____ plants can be grouped into _____ subgroups, _____ plants and _____ plants .

SEEDLESS Vascular Plants

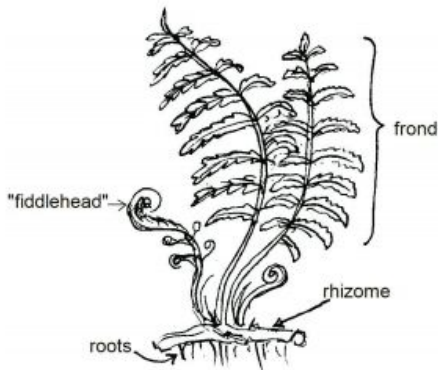
Just like the nonvascular mosses, _____ reproduce with _____ instead of _____. They are _____ from mosses in that they have _____ tissue that _____ water, minerals, and food to _____ throughout the plant.



seedless vascular plants:

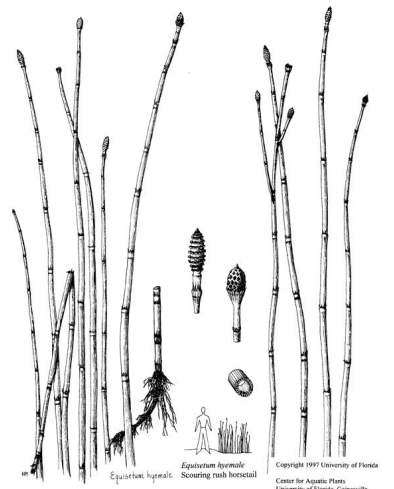
- _____
- _____ moss
- _____ pines

Many seedless vascular plants are known only through _____. They flourished during the _____, _____ period around _____ mya. At that time, horsetails grew _____ m tall unlike today at _____ m. The seedless vascular plants that died long ago formed the _____ that we use today.



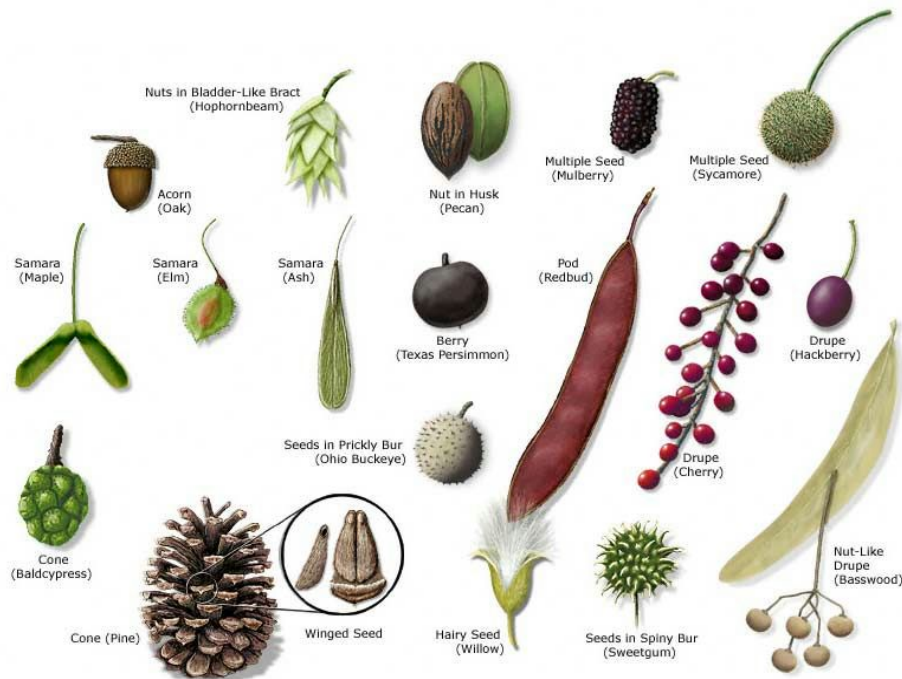
The _____ group of _____ vascular plants are _____. They have _____, _____ and leaves (called _____). Clues left in _____ layers indicate that _____ mya most of the world was _____ and ferns grew to _____ m in height compared to today's _____ m.

Another seedless vascular plant are _____. They have stems that are _____ with a hollow center surrounded by a ring of vascular tissue. Horsetails contain _____, a very common _____ mineral. Historically these plants were used to _____ objects, _____ tools and _____ cooking utensils.



SEED Producing Vascular Plants

What did you eat today? Most _____ foods we eat today come from _____ plants. Most of the plants you are _____ with are _____ producing _____ plants. Seed producing vascular plants have _____, _____, _____, and _____ tissue. They produce _____ which usually contain an _____ (tissue needed to grow a plant) and stored _____ to be used by the embryo as it _____ into a plant. Seed producing vascular plants are divided into _____ major groups, _____ plants and _____ plants.



CONE BEARING Seed Producing Vascular Plants

CONE BEARING
SEED PRODUCING
VASCULAR PLANTS

- _____
- _____
- cycads
- gnetales

Vascular plants that are _____ (_____) produce seeds that are _____ protected by _____. Many gymnosperms are _____, because some _____ leaves _____ remain on their branches.

Leaves of most _____ plants are _____ like or _____ like.



needle-like
e.g. *Pinus*



awl-like (subulate)
e.g. *Juniperus communis*



scale-like
e.g. *Cupressus*

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FLOWERING Seed Producing Vascular Plants

FLOWERING
SEED PRODUCING
VASCULAR PLANTS

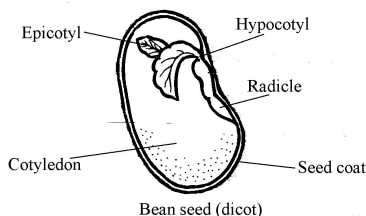
- _____
- _____
- daisy
- _____

Vascular plants that are _____ (_____) have a _____ that contains one or more _____. The plants you are most _____ with belong to this group. The flowers vary in _____, _____ and _____. Almost _____ color can be represented in some _____. Not all fruit produced is _____ like an _____. Some fruits are _____ and _____.

SEE

THINK

WONDER



Vascular, seed producing flowering plants can be divided into two groups, _____ and _____. Monocot is short for _____, and dicot is short for _____. A _____, is the part of seed often used for _____. The prefix mono means _____, and di means _____.

Therefore, _____ have _____ inside their _____, and dicots have _____. Other differences between the two include the _____, _____ and _____.

Monocots - Many of the important _____ come from monocots. _____, _____, _____ and _____ are all vascular, seed producing flowering monocots. Bananas, _____ and dates are _____ of _____. Lilies and _____ are also monocots.

MONOCOTS

- _____
- _____
- iris
- _____

Leaves - The leaves of a monocot are more _____ and _____. The vascular structures produce _____ veins in the leaves of these plants.

FLOWERS - The flowers of a monocot produce flower parts in multiples of _____.

SEEDS - The seed of a monocot produce seeds with only _____.

STEMS - The vascular tissues are arranged as bundles _____ throughout the stem.

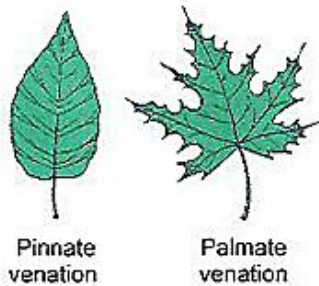
Dicots- Dicots also produce familiar foods, such as _____, green beans, _____, _____ and oranges. Most _____ trees such as _____, _____, and elms are dicots.

DICOTS

- _____
- _____
- petunias
- _____
- _____ trees

Dicots

Leaf venation

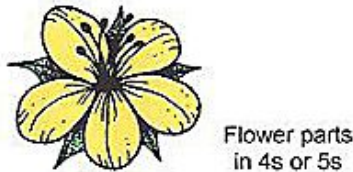


Pinnate venation

Palmate venation

Leaves - The leaves of a dicot are _____ and _____. The vascular structures produce a _____ like pattern _____ from a _____ line in the leaves of these plants.

Flower parts

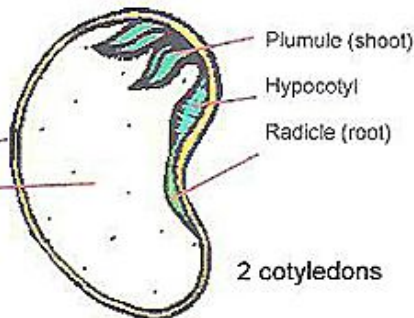


Flower parts in 4s or 5s

FLOWERS - The flowers of a dicot produce flower parts in multiples of _____ or _____.

Plumule (shoot)
Radicle (root)

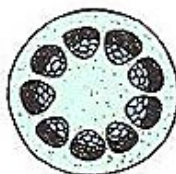
Seed coat
Cotyledon



2 cotyledons

SEEDS - The seed of a dicot produce seeds with _____.

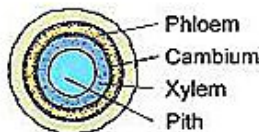
Seed cotyledons



Cross-section of herbaceous dicot plant stem

STEMS - Vascular bundles occur in _____. These produce the _____ rings and _____ stems.

Vascular bundle arrangement



Cross-section of young woody dicot plant stem



Cross-section of older woody dicot plant stem

Plants

