21.1 Plants have specialized \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ systems

Plant tissues are made of \_\_\_\_\_ basic cell types.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells are the most common plant cell type.
	+ store \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ help \_\_\_\_\_\_\_\_\_\_\_ wounds to the plant
	+ have thin flexible \_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells provide support to a growing plant
	+ they are \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ strings are strands of collenchyma.
	+ they have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell \_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plant cell type
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell wall hardened by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_ when they reach maturity
	+ used by humans to make linen and \_\_\_\_\_\_\_\_\_\_\_\_\_

Plant organs are made of \_\_\_\_\_\_\_\_ tissue systems.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissue covers the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a plant.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the plant
	+ secretes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of leaves
	+ forms outer \_\_\_\_\_\_\_\_\_\_\_\_\_ of trees
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissue is found \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a plant
	+ provides \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ stores materials in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_
	+ most commonly made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissue transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ compounds.
	+ \_\_\_\_\_\_\_\_\_\_\_\_ networks of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tubes
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21.2 The Vascular System

The vascular system allows for the transport of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Water and dissolved minerals move through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Xylem contains specialized cells.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are short and wide
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells are long and narrow
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells die at maturity
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ explains \_\_\_\_\_\_\_\_\_\_\_\_\_ movement.
	+ Plants passively transport \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the tendency of water molecules to bond with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ other.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the tendency of water molecules to bond with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ substances.

 Water travels from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the \_\_\_\_\_\_\_\_\_\_\_\_\_ of trees.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the loss of water vapor through leaves.

* + water vapor exits leaf \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ helps \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ water to the top branches

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carries sugars from photosynthesis throughout the plant.

* Phloem contains specialized cells.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ elements have holes at ends
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells help sieve tube elements
	+ unlike xylem, phloem tissue is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ explains sugar movement.

* + plants \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ transport sugar from the source
	+ sugar flows to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ due to pressure differences

21.3 Roots and Stems

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form the support system of vascular plants.

* Roots \_\_\_\_\_\_\_\_\_\_\_\_ plants and \_\_\_\_\_\_\_\_\_\_\_\_\_ mineral nutrients from soil.
* Roots provide many functions.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the plant
	+ absorb, transport, and store \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ root \_\_\_\_\_\_\_\_\_\_\_\_\_\_ help \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* There are several parts of a root.
	+ root \_\_\_\_\_\_\_\_\_ covers the \_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an area of growth
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ contains xylem and phloem
* There are two main types of roots.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ root systems have fine branches.
	+ Taproot systems have one main root.

Stems support plants, transport materials, and provide storage.

* Stems have many functions.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ leaves and flowers
	+ house most of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system
	+ store \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ grow underground for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Form new plants
* Some stems are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and conduct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Some stems can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bark.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth increases a plant’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth increases a plant’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ help determine the \_\_\_\_\_\_\_\_\_\_\_ of a tree.

Draw & Label

21.4 Leaves

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ absorb \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and carry out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Most leaves share some similar structures.

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ collects \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for photosynthesis
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is between the leaf’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissue layers.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells surround each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ open and close when guard cells change \_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ When stomata are open, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ Stomata \_\_\_\_\_\_\_\_\_\_\_\_\_\_ at \_\_\_\_\_\_\_\_\_\_ & when plant loses too much \_\_\_\_\_\_\_\_.
* Leaves may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Leaf veins may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Leaf margins may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Most leaves are specialized systems for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* There are \_\_\_\_\_\_\_\_\_ types of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ types contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mesophyll absorbs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mesophyll connects to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \* Leaves have many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* + for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperatures, ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ for water \_\_\_\_\_\_\_\_\_\_\_\_\_, ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_ environments, ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ for getting \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_